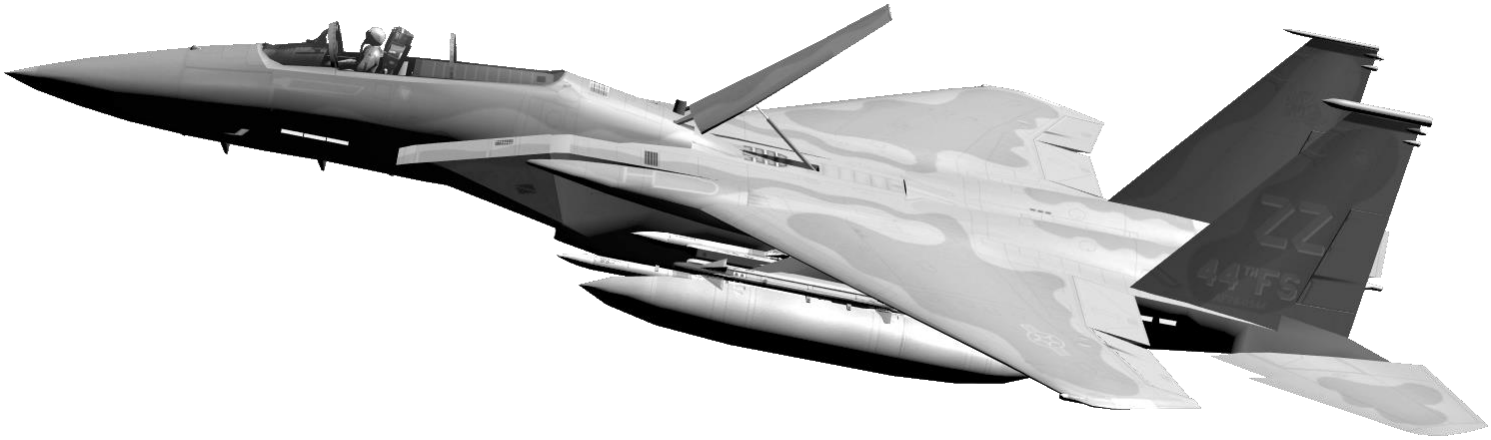
TO 1F-15C-1 BMS

FLIGHT MANUAL

F-15C AND F-15D



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FOREWORD

PURPOSE AND SCOPE

The Dash-1 covers aircraft systems, Normal Procedures, Emergency Procedures, Flight Characteristics, and Operating Limitations of the F-15.

The Dash-1 is to read in complement with the F-15 Dash-34 as well as the F-15 checklists.

Please note that the F-15C in BMS is under development process and not finished yet to its desired state.
This document will reflect the progression and will be constantly updated.

The following manuals supplement this manual to establish the complete Falcon BMS F-15C series:

- TO-1F-15C-34-1-1 BMS (Avionics, Weapons systems, Support equipment and munitions)
- TO-1F-15C-1CL BMS (Checklists for normal procedures and abnormal procedures)

These documents are located in the */Docs/02 Aircraft Manuals & Checklists/02 F-15C folder* of your Falcon BMS install.

The default F-15C keyfile "BMS - Full-F15ABCD.key" can be found in the same folder like the manuals.

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TABLE OF CONTENT

1. The Aircraft

The F-15 stands as a high-performance, supersonic air-superiority fighter crafted by McDonnell Aircraft Company, excelling in all-weather conditions. While its primary role encompasses aerial combat, its capabilities extend to ground attack missions as well. Its arsenal features radar and heat-seeking air-to-air missiles, complemented by a 20mm gun as the primary weaponry.

Dual Pratt and Whitney F-100 turbofan engines fuel its power. Noteworthy in appearance, the aircraft boasts a high-mounted swept-back wing, paired with twin vertical stabilizers. A lightweight yet robust structure houses its resilient subsystems. Elevated for enhanced visibility, the cockpit offers a strategic vantage point. Rigorous consideration for maintenance and dependability guided the design and placement of major aircraft systems. Accessories find their place within the airframe-mounted accessory drive (AMAD), while engine ignition self-sufficiency is ensured by the jet fuel starter (JFS). Remarkably, the system configuration eliminates the need for batteries. A comprehensive illustration of the general arrangement can be found in this document.

1.1 Aircraft General Data

- Crew: 1 pilot
- Length: 63.8 feet (19.44 meters)
- Wingspan: 42.8 feet (13.05 meters)
- Height: 18.5 feet (5.6 meters)
- Empty Weight: Approximately 28,000 pounds (12,700 kilograms)
- Maximum Takeoff Weight: Around 68,000 pounds (30,845 kilograms)
- Maximum Speed: Mach 2.5+ (1,650+ mph or 2,655+ km/h)
- Range: Over 3,000 miles (4,800+ kilometers)
- Service Ceiling: 65,000 feet (19,812 meters)
- Engines: Two Pratt & Whitney F100-PW-100 or -220 turbofan engines with afterburners

1.2 Armament and Systems

- Armament varies but generally includes an internally mounted 20mm M61 Vulcan rotary cannon

- Multiple hardpoints for mounting a wide range of air-to-air and air-to-ground missiles, bombs, and other ordnance, including AIM-120 AMRAAM, AIM-9 Sidewinder, AIM-7 Sparrow missiles as well as general purpose bombs (Mk-82/84).

- Advanced radar systems for target detection and tracking, including the AN/APG-63.

- Countermeasures and electronic warfare systems to enhance survivability and jam enemy systems.

2. Engine

Pratt & Whitney F100-PW-220:

- Thrust: Approximately 25,000 pounds (111 kN) in afterburner, and around 14,670 pounds (65.2 kN) in non-afterburning mode.
- Bypass Ratio: Around 0.36:1
- Length: Approximately 191 inches (4.85 meters)
- Diameter: Approximately 46 inches (1.17 meters)
- Weight: Approximately 3,750 pounds (1,700 kilograms)
- Features: The F100-PW-220 is a more advanced version of the F100 engine, designed to provide increased thrust and improved fuel efficiency. It is an upgraded version of the -100 and offered enhanced performance for newer F-15 variants.

Key Features:

- The F100 engine family is known for its reliability, high thrust-to-weight ratio, and adaptability to various aircraft platforms.
- These engines incorporate advanced technologies to improve fuel efficiency, reduce emissions, and enhance overall performance.
- The engines are equipped with afterburners, which allow for increased thrust when needed for high-speed operations and combat maneuvers.

2.1 Engine Control

Engine Control System

The F100-PW-220 engine control consists primarily of a hydromechanical main fuel control (MFC), afterburner fuel control (AFC) and a full authority digital electronic engine control (DEEC).

Digital Electronic Engine Control (DEEC)

The Digital Electronic Engine Control (DEEC) houses the operational parameters for automated engine control, spanning from IDLE to MAX A/B. It draws power from the engine alternator. The DEEC orchestrates the engine and afterburner fuel flows, regulates the position of the compressor inlet variable vanes (CIVV) and rear compressor variable vanes (RCVV), manages start bleed position, anti-ice, and nozzle position. The DEEC governs engine performance by modulating fuel flow to regulate airflow and nozzle positioning, ultimately ensuring the control of the Engine Pressure Ratio (EPR), which represents the ratio between engine exhaust and inlet pressures. By fine-tuning airflow and EPR, the DEEC maintains consistent engine performance, even for new or deteriorated engines, until it approaches the FTIT limit. In the event of a failure that hinders safe engine control, the DEEC will automatically switch to its secondary mode, equivalent to turning the ENG CONTR switch OFF. In this mode, afterburner operation is disabled, RPM is capped at around 80%, CIVV remains fully closed, the nozzle is almost completely shut (less than 5% open), and the ENG CONTR light is illuminated. The RCVV, start bleed position, and engine fuel flow are then managed by the Main Fuel Control (MFC). The engine persists in this mode until the issue resolves, and the ENG CONTR switch is cycled. You can initiate the engine start with the ENG CONTR switch either ON or OFF, although the starting time will be longer in the OFF position.

Main Fuel Control

The primary fuel control (MFC) contains the hydromechanical elements that the DEEC regulates when the ENG CONTR is in the ON mode. In the event that the DEEC shifts to the secondary mode, or the ENG CONTR switch is turned OFF, the MFC takes charge of hydromechanically managing the engine's fuel flow, start bleed position, and RCVV position. It does so in response to throttle movement, inlet static pressure, and engine inlet total temperature.

Engine Monitoring System

The F100-PW-220 engine features an engine monitoring system that comprises the DEEC and the engine diagnostic unit (EDU). These two components, the DEEC and EDU, work in tandem to continuously oversee the electrical control elements and the engine's functioning in order to identify any engine-related issues. Any instances of abnormal engine operation or the occurrence of intermittent or hard failures in its components are detected and marked for maintenance. When abnormal engine operation or component failure is identified, the EDU records relevant engine and aircraft data, aiding in the troubleshooting process during maintenance. Furthermore, the EDU keeps track of the engine's life cycle information. In the event of a fault demanding immediate maintenance attention, an airframe-mounted GO, NO-GO flag, situated on the avionics status panel in the nose wheelwell, is activated.

2.2 Engine Limitations

GROUND

CONDITION	FTIT °C	RPM %	OIL PSI	REMARKS
START	680	--	--	--
IDLE	-	-	15-80	--
MIL/AB	960	94	30-80	Notes 2,5 and 6
TRANSIENT	970	94	30-80	Notes 2,5 and 7
FLUCTUA-TION	±10	±1	±10	Notes 2,3 and 4

FLIGHT

CONDITION	FTIT °C	RPM %	OIL PSI	REMARKS
AIRSTART	800	--	--	--
IDLE	-	-	15-80	--
MIL/AB	970	96	30-80	Notes 1 and 2
TRANSIENT	990	96	30-80	Notes 2 and 8
FLUCTUA-TION	±10	±1	±10	Notes 2,3 and 4

NOTES

1. USE OF THE Vmax SWITCH IS PROHIBITED.
2. LIMITATIONS INCLUDE FLUCTUATIONS.
3. IN PHASE FLUCTUATION OF MORE THEN ONE INSTRUMENT, OR SHORT TERM CYCLIC FLUCTUATIONS ACCOMPANIED BY THRUST SURGES, INDICATE ENGINE ENTROL PROBLEMS.
4. NOZZLE FLUCTUATIONS ARE LIMITED TO +- 2% AT MILITARY POWER AND ABOVE. FLUCTUATIONS ARE NOT PERMITTED BELOW MILITARY POWER.
5. FOR ENGINE OPERATION AT MILITARY OR ABOVE, OIL PRESSURE MUST INCREASE 15 PSI MINIMUM ABOVE IDLE OIL PRESSURE.
6. ENGINE NOZZLE POSITION IS LIMITED TO 30% OPEN OR LESS AT MILITARY POWER.
7. MAXIMUM TEMPERATURE LIMITED TO 30 SECONDS.
8. MAXIMUM TEMPERATURE LIMITED TO 10 SECOUDS.

3. Aircraft Systems

3.1 Fire Warning / Extinguishing system

See chapter Fire Warning / Extinguishing Panel.

3.2 Aircraft Fuel System

Fuel is stored in various compartments within the aircraft. There are four interconnected fuselage tanks, two internal (wet) wing tanks, and three 600-gallon external tanks. These external tanks are interchangeable and can be mounted on the centerline and inboard wing station pylons.

For F-15C/D aircraft, there's the option to attach conformal fuel tanks (CFT) to the outboard side of each engine nacelle. Each CFT is compartmentalized, and it automatically transfers fuel between compartments to maintain the center of gravity. All these tanks can be refueled on the ground through a single pressure refueling point, and during flight, they can be refueled through the aerial refueling receptacle. The external tanks can also be individually fueled through external filler points.

In the case of internal tanks, the wing tanks and tank 1 serve as transfer tanks. On F-15C/D aircraft, tank 1 comprises one main tank and left and right auxiliary tanks. The tank arrangement ensures that all internal fuel transfers even in the event of transfer pump failure. CFT fuel is transferred by transfer pumps to any internal tank that can accept it. Regulated engine bleed air pressure facilitates fuel transfer from the external tanks to any internal tank capable of receiving it, maintaining a positive pressure in all internal fuel tanks.

Each CFT in F-15C/D aircraft is pressurized by a self-contained ram air pressurization and vent system. Float-type fuel level control valves manage fuel levels during refueling or fuel transfer operations.

During refueling in F-15C/D aircraft, the transfer pump in tank 1 is shut off, causing the interconnect valve between tank 1 and the left auxiliary tank to open. The left and right auxiliary tanks then fill as tank 1 fills. Fuel can only gravity transfer to the auxiliary tanks through a standpipe located near the top of the main tank of tank 1.

All internal, CFT, and external fuel (except for engine feed tanks) can be dumped overboard from an outlet at the trailing edge of the right wingtip. Vent outlets at each wing's trailing edge vent all internal fuel tanks. The external tanks have vent outlets in their individual pylons, and each CFT is vented through an outlet located at the back of the CFT.

The fuel quantity indicating system provides the amount of fuel in pounds for all internal, CFT, and external fuel. Refer to the servicing diagram in this section for information on fuel grade and specifications.

3.2.1 Fuel Feed System

The aircraft employs two distinct fuel feed systems, one for each engine. In standard operating conditions, fuel temperature is meticulously regulated through a process of fuel recirculation into the internal wing tanks. These internal wing tanks serve as heat exchangers, efficiently lowering the fuel temperature before it proceeds to the feed tanks. Within the feed tanks, baffles are strategically positioned to provide a controlled fuel supply for the left and right main boost pumps, particularly during instances of negative G-forces or inverted flight.

Under normal operating conditions, the right main boost pump exclusively provides fuel to the right engine, while the left main boost pump exclusively supplies the left engine. When the total feed tank fuel drops below 1000 pounds, both feed tanks may not simultaneously feed. The main boost pumps are well-equipped to deliver pressurized fuel flow to the engines, consistently catering to their power requirements throughout the entire range of flight conditions.

However, should either or both main boost pumps fail, or if either or both main generators become inoperative, or if both transformer-rectifiers fail, the emergency boost pump comes into play. This, coupled with a system of tank interconnect and crossfeed valves, allows the remaining operational pump(s) to efficiently channel all available fuel from the feed tanks to both engines. When one main boost pump and the emergency boost pump are operational, pressurized fuel is ensured for both engines, even throughout the entire spectrum of non-afterburner power settings. In the case of double boost pump failure (any two), the remaining pump still retains the capacity to supply fuel to both engines, covering all non-afterburner power settings from sea level to an altitude of 30,000 feet.

However, should boost pump failure(s) occur, the reduced fuel flow capacity limits unrestricted afterburner operation. In the event that both main boost pumps and the emergency boost pump are inoperative, the engines rely on suction feed for their fuel supply. In most flight conditions, the engine necessitates pressurized (boosted) fuel to prevent fuel vaporization. Consequently, the loss of both main and emergency boost pumps could lead to a dual engine flameout.

During single-engine operation, the feed tank of the inoperative engine remains inactive until the fuel level in the functioning engine's feed tank falls significantly below the threshold that triggers the FUEL LOW warning light.

3.2.2 Air Refueling System

The air refueling system has a fixed receptacle, a slipway control switch (see Fuel Control Panel), a hydraulically operated slipway door, two slipway light, a receptacle flood-light, a signal amplifier, a READY light, an air refueling release button, an air refuel pressure switch, end an emergency slipway door actuating system. For CG control, a float switch in tank 1 prevents external tank refueling until tank 1 fuel quantity is above approximately 1,560 pounds.

3.3 Electrical Power System

The aircraft's electrical power supply system is composed of two primary AC generators, two transformer-rectifiers, an emergency AC/DC generator, and a power distribution (bus) network. When on the ground, external electrical power can be connected to the bus system, ensuring power supply. Additionally, during engine starts, the JFS generator contributes electrical power to a section of the bus system without the need for external power sources.

AC Electrical Power

The primary source of electrical power is provided by two AC Generators. The two Generators work under the split bus non synchronized operation principle.

Meaning that when both generators are operating, some buses are being independently supplied by the generators. In case of the failure of one of the two Generators, the faulty Generator takes itself off the line. The remaining Generator will power the buses originally being powered by the faulty or turned OFF Generator. It is the Generator control unit that removes the faulty Generator connection from the buses. Each Generator has a built-in protection system for undervoltage and overvoltage. There is also a system that limits the current to avoid one issue on one Generator to affect the second one and to shut down both Generators at the same time.

Except for the external ECM pod, one Generator is capable of supplying power to the entire electrical system. In single Generator operation mode, the ECM pod is automatically put in the standby mode.

When in the ON position, each Generator comes automatically online and is connected to its respective buses as soon as the engine reaches 44% RPM.

The ON/OFF switch needs to be cycled to bring the Generator back online once the fault or condition that brought it offline has been resolved/cleared. If the Offline condition was underfrequency and that the current frequency is restored in that case the Generator comes back online automatically.

To remove a Generator from the buses it supplies, simply put the generator switch to the OFF position. The L GEN OUT and R GEN OUT indicator lights will respectively light up on the caution light panel.

The Generator control switches are positioned on the engine control panel.

DC Electrical Power

DC Power is provided through two transformer-rectifiers (TR) units. One TR can power the entire DC system.

Note that when there is a single TR providing DC power to the DC electrical system, there is no cockpit warning or indication that one TR has failed.

Emergency Generator

The emergency generator is motor driven and supplies AC/DC current. In normal electrical configuration, when the two DC Generators and the two TR's units are online, the emergency generator is separated from the primary electrical system.

Conditions for the emergency generator to come online:

- Double TR failure or Double Generator failure.
- Combination of failures.
- Either one or both fuel boost pumps fail.

With either one Generator failure or two boost fuel pump failures, the emergency Generator activates and powers the emergency/essential buses only.

With both Generators inoperative or both TR units' failure, the emergency Generator supplies power to the AC/DC buses and to the emergency/essential buses.

During engine starts without external power, the emergency generator is doing a self-test of its emergency boost pump. It does that by staying online during engine start until 30 seconds after one of the Generators comes online, after which it automatically goes offline, provided the emergency Generator control switch is in the AUTO position. When doing an engine start with external power, the emergency Generator does not come online and self-test the emergency boost pump.

EMER BST ON and EMER BST SYS MAL lights come on when on the ground and one of the main Generators is offline. The lights go out as soon as the second main Generator comes online.

The Emergency Generator has a 3-position switch:

AUTO: comes on automatically when the conditions for it are fulfilled.

MAN: manually activates the emergency Generator.

ISOLATE: the emergency power Generator supplies power to the following systems only:

- Emergency fuel boost pump.
- Arresting Hook.
- Emergency air refueling switch (for the opening of the slipway door.)
- Engine RPM indicators (For F-15C and D).

While in ISOLATE, cycle the switch from the ISOLATE to the MAN position to restore the emergency Generator supply of power in the event of a complete electrical failure.

JFS Generator

The JFS switch provides control over the JFS and its ignition system. The JFS READY light is powered by the JFS itself.

3.4 Hydraulic Power Supply System

There are 3 separate hydraulic systems. To isolate a hydraulic leak, a Reservoir Level Sensing system is used (RLS) in all three systems. When a leak is sensed, the RLS shuts off the affected circuit; this method allows the maximum number of circuits to remain operational. The two systems are:

PC System:

There is a PC1 pump and a PC2 pump, each operating at 3000 psi, each PC system is divided into circuit A and B.

Utility System:

There is a left and right pump for the utility systems, the right pump is operating at 3000 psi and the left pump is operating at 2775 psi, the utility system is divided into circuit A and circuit B.

Reservoir Leveling System:

The reservoir leveling system is a system that automatically shuts down/isolates circuits with leaks and restores other circuits with the leak. At some point, eventually this can lead to a total loss of fluid. Total loss of fluid is recognized as a total loss of utility fluid which is indicated by a pressure at zero on the utility fluid gauge.

Hydraulic pressure indicator:

PC1 Hydraulic pressure indicator.

PC2 Hydraulic pressure indicator.

Utility hydraulic pressure indicator.

3.5 Landing Gear System

Electrically controlled and hydraulically operated. The is a weight on wheel sensor which does not allow for the gear to be retracted while on ground with the gear extended. With the main and nose gear extended, the forward doors will close.

3.6 Nose Gear Steering System

The F-15 Nose Wheel Steering (NWS) system operates distinctively compared to the F-16 counterpart. It is configured for automatic engagement upon detecting the presence of weight on the front landing gear (commonly referred to as Weight on Wheels, or WOW), and it disengages promptly once WOW is no longer detected.

This system offers two operational modes: the normal mode and the maneuver mode. In normal mode, the maximum allowable wheel steering angle is capped at 15 degrees. Transitioning into maneuver mode elevates this steering angle limit to 45 degrees, which can be accomplished through the activation of the NWS callback button.

Furthermore, the NWS can be entirely disabled when the aircraft is grounded by simply pressing the designated paddle control.

3.7 Brake System

The brakes are positioned on the main wheels and are activated via pressure on the rudder pedals. An anti-skid system is incorporated in the normal braking system. There is no anti-skid protection on the emergency brake system.

3.7.1 ANTI-SKID SYSTEM

The anti-skid system can be manually activated or deactivated by the pilot via an electrically controlled switch. In case of failure of the system, a cockpit warning will indicate to the pilot that the system has failed. It will only be triggered when the gear comes down. ANTI-SKID on the caution light panel and MASTER CAUTION will also come on. There is a touchdown protection system, which prevents brake application on touchdown before the wheels spin up.

Anti-skid and ARI (Aileron Rudder Interconnection) are connected. After touchdown, the ARI will be disengaged by the anti-skid wheel spin up signal.

Anti-skid switch positions:

- NORM: anti-skid is ON when the landing gear handle is down.
- OFF: Anti-skid and ARI are off when landing gear comes down.

Emergency Brake System:

JFS accumulator provides the pressure to the emergency brake system. It is activated by pulling the emergency brake/steering handle. Emergency braking is more sensitive due to the absence of the anti-skid system.

3.8 Arresting Hook System

Currently not implemented in BMS.

3.9 Flap System

F-15 flaps have two modes: AUTO and OFF. On auto, flaps will retract automatically above 250 kts and extends automatically when below 240 knots.

3.10 Speed Brake System

Hydraulically operated and electrically controlled.

Below 25 units of angle of attack (AOA) the speed brakes can be extended in any intermediate position from fully retracted to fully extended. Above 25 units of AOA, if the speed brake is extended it will automatically retract. If you are above 25 units of AOA and you extend the speed brakes, the speed brakes will not extend. When the AOA is reduced, provided the switch is still in the extend position, the speed brakes will extend.

Speed Brake Switch:

Center Detent: Stops the speed brake in any intermediate position.

Aft Detent: Extends the speed brake.

Forward Detent: Retracts the speed brake.

The SPD BK OUT light located on the caution light panel illuminates when the speed brake is extended or partially extended position.

3.11 Flight Control System

WIP

3.12 AOA Tone

WIP

3.13 Departure Warning

WIP

3.14 Automatic Flight Control System

3.14.1 Control Augmentation System (CAS)

WIP

3.14.2 Autopilot modes

All three CAS axes must be engaged and operating satisfactorily to engage the two autopilot modes, pitch/roll attitude hold and altitude hold.

Pitch/Roll Attitude hold

Attitude hold is engaged by placing the attitude hold switch on the CAS control panel to ON. Attitude hold will automatically be disengaged and the attitude hold switch will remain in the ON position when the pitch attitude is greater than ± 45°, or the roll attitude is greater than ± 60°, or control stick steering (CSS) is in effect. Control stick steering will be engaged, and roll attitude hold will be disengaged when a lateral force is applied, and pitch attitude hold will be disengaged when a longitudinal force is applied to the control stick. When stick forces are relaxed, CSS is disengaged, attitude hold is re-engaged, and the aircraft will hold the attitude that existed upon re-engagement. When one of the following conditions exist attitude hold will be disengaged and attitude hold switch will physically move to the OFF position: load factor is greater than +4g or less than Og, INS attitude signals are not valid, a CAS axis is disengaged (manually or by a fault monitor), the emergency quick release lever is depressed, or the attitude hold switch is manually moved to OFF. To re-engage pitch/roll attitude hold the switch must be placed back to the ON position.

Altitude hold

The attitude hold switch must be on before the altitude hold switch can be engaged. Altitude hold is engaged by placing the altitude hold switch. on the CAS control panel, to ON. The altitude at the time of engagement is the reference altitude. If the pitch (CSS) is in effect, roll attitude is greater than ± 60°, altitude hold disengages and the altitude hold switch will remain in the ON position. When stick forces are relaxed, CSS is disengaged, and the aircraft will hold the altitude at re-engagement. When one of the following conditions exist altitude hold will be disengaged and altitude hold switch will physically move to the OFF position: an ADC or INS failure, ATT HOLD disengages, vertical velocity exceeds 2000 ft/min. or the altitude hold switch is physically moved to OFF. To reengage altitude hold the switch must be placed back to the ON position.

3.15 Pitot-Static System

WIP

3.16 Canopy System

WIP

3.17 Ejection Seat System

WIP

3.18 Environmental Control System

WIP

3.19 Anti-Icing System

WIP

3.20 Interference Blanker System (IBS)

WIP

3.21 UHF Communications System

The F-15 has two UHF radios (Radio 1 and Radio 2), no backup radio. The main communications control panel controls Radio 1 while the integrated communications control panel on the left controls Radio 2, but can also display information about Radio 1.

Both radios have manual and preset modes. Radio 1 consists of a backup radio. Radio 2 has an extra switch (DIS FREQ) to display the real frequency selected for either radio1 or radio2 (which is not the same as the frequency digits if mode is not manual). Press and hold, up displays radio 1, down displays radio 2.

Please note that intraflight VHF frequencys are not possible to use yet via the DTC in BMS. The best workaround is to use radio 2 or radio 1 on UHF 15-20 (Flight 1 = UHF 15, etc.) or brief a certain frequency for intra-flight communication in UHF manual mode.

3.21.1 Intra-flight Communication - Wingman/Element/Flight Commands

To enable infra-flight communications with your non-human flight members, go to the “Miscellaneous page” (see Comms-Navbook, Page 44) and direct AI with the call “Switch Flight Uniform”. Now AI is available on UHF.
For example, if you are the first flight in the package via briefing tab, your flight members will be now available under UHF 15. Flight 2 is on UHF 16, etc.

3.22 Lighting Equipment

F-15 lighting is composed of several different switches. Each one controls a different set of panels with 5 levels of intensity. Please refer to the Exterior Lights Control Panel.

3.23 Oxygen System

WIP

3.24 Emergency Equipment

WIP

3.25 Built-In Test (BIT) System

WIP

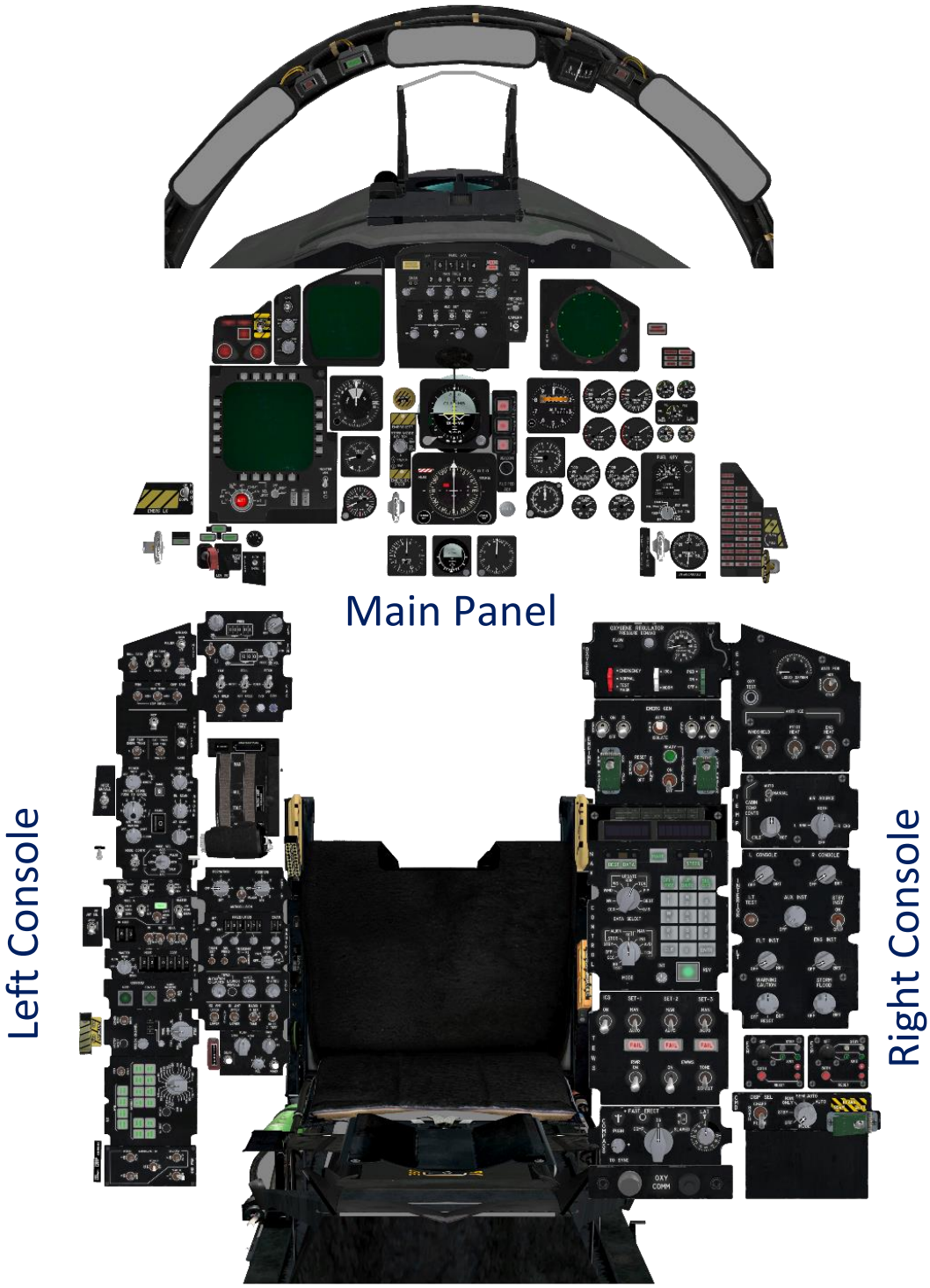
3.26 Central Computer (CC)

WIP

3.27 Air Data Computer (ADC)

WIP

4. Instruments & Cockpit Layout



4.1 Cockpit Controls and Displays

4.1.1 PHILOSOPHY OF COCKPIT CONTROLS AND DISPLAYS

The F-15C's cockpit controls and displays are underpinned by a well-defined philosophy that aligns with advanced aviation principles. Delving into the intricate design, this philosophy is grounded in maximizing pilot efficacy, situational awareness, and mission success.

The cockpit's ergonomics are meticulously structured to facilitate rapid and intuitive interactions. The placement of controls is a result of extensive human factors analysis, minimizing cognitive load during high-stress scenarios. The integration of HOTAS (Hands-On Throttle and Stick) controls enables pilots to seamlessly manage critical functions without diverting attention from the primary task of flying and combat engagement.

In terms of displays, the F-15C incorporates multi-purpose color display (MPCD), the Vertical Situation Display (VSD) and head-up display (HUD) that provide a comprehensive overview of flight parameters, sensor inputs, and tactical information. These displays are strategically positioned within the pilot's line of sight, ensuring quick access to essential data without requiring undue head movement.

4.1.2 F-15 COCKPIT CONTROLS

4.1.2.1 Left Console

1- Ground Power Panel

2- BIT Panel

3- JTIDS Mode Control Panel

4- KY-58 Control Panel

5- ICS Control Panel

6- Integrated Communications Control Panel

7- IFF Antenna Selector Switch

8- IFF Control Panel + Interrogator Panel

9- TEWS Panel

10- Exterior Lights Control Panel

11- Seat Adjust Switch

12- Radar Control Panel

13- Non-Cooperative Target Recognition Enable Switch (NTCR)

14- Fuel Control Panel

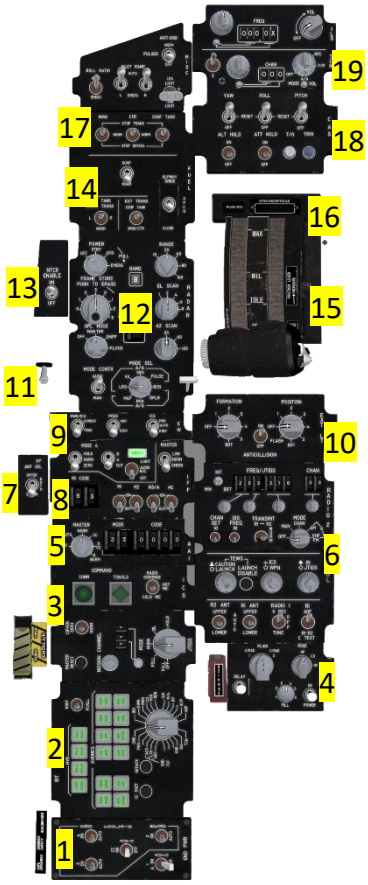
15- Throttle

16- Data Cartridge (DTC)

17- Miscellaneous Control Panel

18- Control Augmentation System Control Panel

19- ILS/TACAN Control Panel



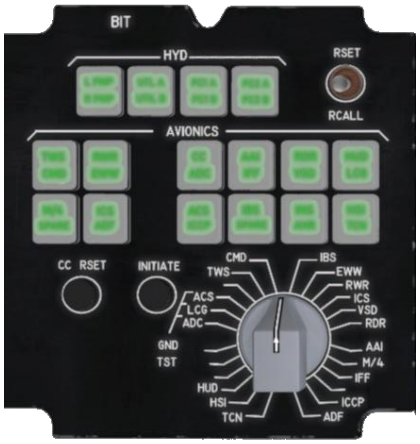
Left Console – F-15C

4.1.2.1.1 Ground Power Panel

This panel serves no purpose in BMS as none of its functionality is implemented yet.

4.1.2.1.2 BIT Control Panel

This panel serves no purpose in BMS as none of its functionality is implemented yet.



4.1.2.1.3 JTIDS Control Panel

This panel serves no purpose in BMS as none of its functionality is implemented yet.

4.1.2.1.4 KY-58 Control Panel

This panel serves no purpose in BMS as none of its functionality is implemented yet.

4.1.2.1.5 ICS Control Panel

This panel serves no purpose in BMS as none of its functionality is implemented yet.

4.1.2.1.6 Integrated Communications Control Panel (ICCP)

The controls of the ICCP include volume options for the TEWS as well as for Radio 2. In addition, radio antenna and priority options are available. The following features are implemented:

1- TEWS Threat Volume Knob

SimStepThreatVolumeUp
SimStepThreatVolumeDown

2- TEWS Missile Volume Knob

SimStepMissileVolumeUp
SimStepMissileVolumeDown

3- ICS Intercom Volume Knob

SimStepIntercomVolumeUp
SimStepIntercomVolumeDown

4- JTIDS Volume

SimStepComm2VolumeUp
SimStepComm2VolumeDown

5- Frequency Display switch (displayed R1 or R2 channel on the frequency/JTIDS indicators)

SimRadio2DisplayFrequencyR1
SimRadio2DisplayFrequencyR2

6- R2 Mode Selector knob

OFF Off
MAN Enables R2 manual frequency selection
CHAN Enables R2 preset channel frequency selection

SimRadio2ModeInc
SimRadio2ModeDec

7- R2 channel indicator (Channel 01-20)

SimCycleRadio2Channel

8- Manual Frequency Selector knobs *(when in MAN mode)*

SimRadio2Freq1Inc
SimRadio2Freq1Dec
SimRadio2Freq2Inc
SimRadio2Freq2Dec
SimRadio2Freq3Inc
SimRadio2Freq3Dec
SimRadio2Freq4Inc
SimRadio2Freq4Dec
SimRadio2Freq5Inc
SimRadio2Freq5Dec

For more information about radio operations, refer to the #UHF Communications System chapter.

4.1.2.1.7 IFF Antenna Selector Switch

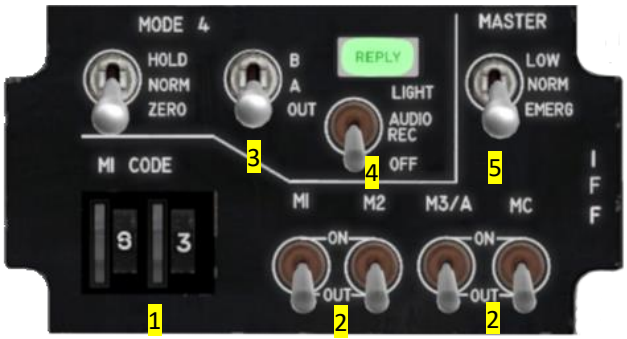
This switch selects between upper, lower or both IFF antennas.

SimAntennaSelectInc
SimAntennaSelectDec

This panel and its functionality is not fully implemented yet.

4.1.2.1.8 IFF Control Panel

The IFF CONTROL PANEL provide multiple options for IFF modifications and IFF backup settings.



1- **Mode 1 Backup Switches**

SimIFFBackupM1DigitInc
SimIFFBackupM1DigitDec

2- **Mode Selector Switches** *(Mode 3 only for now)*

SimIFFEnableInc
SimIFFEnableDec

3- **Mode 4 Switch Selector**

SimIFFMode4ReplyInc
SimIFFMode4ReplyDec

4- **Mode 4 Monitor Selector**

LIGHT	M4 reply light
AUDIO REC	Audio feedback

SimIFFMode4MonitorInc
SimIFFMode4MonitorDec

5- **IFF Master Switch**

LOW	System operates with reduced sensitivity.
NORM	System operates in full sensitivity.
EMERG	Selects normal sensitivity emergency operations. Allows the system to respond to interrogations in Modes 1, 2, 3/A, C and 4. The reply for modes 1 and 2 is the code selected on the applicable dials, while code 3/A transmits code 7700.

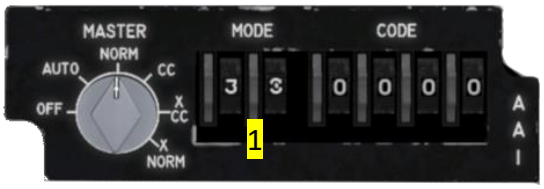
SimIFFMasterInc
SimIFFMasterDec

This panel and its functionality are not fully implemented yet.

4.1.2.1.9 Interrogator Panel

The INTERROGATOR PANEL sets the IFF interrogation code when interrogating other aircraft.

1- **Mode Selector Switches** (Mode 1, 2, 3, 4)



SimIFFBackupM3Digit1Inc
SimIFFBackupM3Digit1Dec
SimIFFBackupM3Digit2Inc
SimIFFBackupM3Digit2Dec

This panel and its functionality is not fully implemented yet.

4.1.2.1.10 TEWS Panel

The TACTICAL ELECTRONIC WARFARE SYSTEM (TEWS) control panel provides power to the RWR system. A functional RWR sensor inputs the CMD with threat information and (via Central Computer (CC) periodic updates), the RWR inputs ownship velocity and altitude data to optimize the dispensing patterns. The RWR also communicates with the CMD and updates materiel inventory data for the TEWS BIT display.

1- **RWR/ICS Mode**

SimF15EWRwrIcsCombat
SimF15EWRwrIcsTrng

2- **PODs Selector Switch**

SimF15EWPodsXmit SimF15EWPodsStby

3- **ICS Selector Switch**

SimF15EWIcsInc SimF15EWIcsDec

For more information about radar functionality please refer to the F-15C-34-1-1BMS.

4.1.2.1.11 Exterior Lights Control Panel

1- **Formation Lights OFF/BRT**

SimF15FormationLightsInc
SimF15FormationLightsDec

2- **Anti Collision Light ON/OFF**

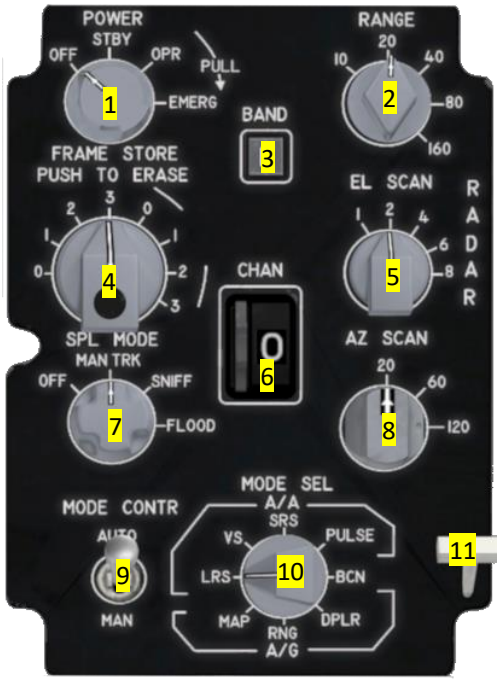
SimF15AntiCollisionOn
SimF15AntiCollisionOff

3- **Position Lights ON/OFF**

SimF15PositionLightsInc
SimF15PositionLightsDec

4.1.2.1.12 Radar Set Control (RSC) Panel

The RSC controls several functions of the APG-63 Radar.



1-	**Power Knob**	SimF15FCRPowerDec SimF15FCRPowerInc
2-	**Range Knob**	SimF15FCRRangeDec SimF15FCRRangeInc
3-	**Frequency Band Selector**	SimF15FCRBandDec SimF15FCRBandInc
4-	**Frames Switch**	SimF15FCRFramesDec SimF15FCRFramesInc
5-	**Elevation Scan Knob**	SimF15FCRScanDec SimF15FCRScanInc
6-	**Radar Channel Selector**	SimF15FCRChannelDec SimF15FCRChanneInc
7-	**Special Selector**	SimF15FCRSpecialDec SimF15FCRSpecialInc
8-	**Azimuth Scan Knob**	SimF15FCRAzimuthDec SimF15FCRAzimuthInc
9-	**Mode Select Knob**	SimF15FCRModeAuto SimF15FCRModeMan
10-	**Mode Selector**	SimF15FCRModeInc SimF15FCRModeDec
11-	**Flaps Selector**	SimF15FlapsRetract SimF15FlapsExtend

For more information about radar functionality please refer to the F-15C-34-1-1BMS.

4.1.2.1.13 Seat Adjust Switch

1- **Increase/Decrease Seat height**

SimSeatUp SimSeatDown

1

4.1.2.1.14 Non-Cooperative Target Recognition Enable Switch (NCTR)

This panel serves no purpose in BMS as none of its functionality is implemented yet.

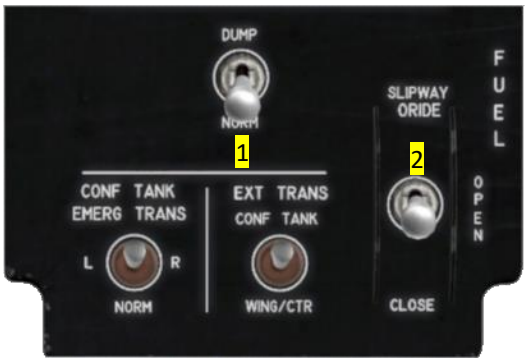
4.1.2.1.15 Fuel Control Panel

1- **Fuel Dump Switch**

SimFuelDumpDump SimFuelDumpNorm

2- **Slipway Switch** (Air-to-air Refueling door)

SimFuelDoorOpen SimFuelDoorClose



4.1.2.1.16 Throttle

1- Weapon Select Switch

2- BOAT Switch

3- Speedbrake Switch

4- Microphone Switch

5- Multifunction (Coolie) Switch

6- Target Designator Control

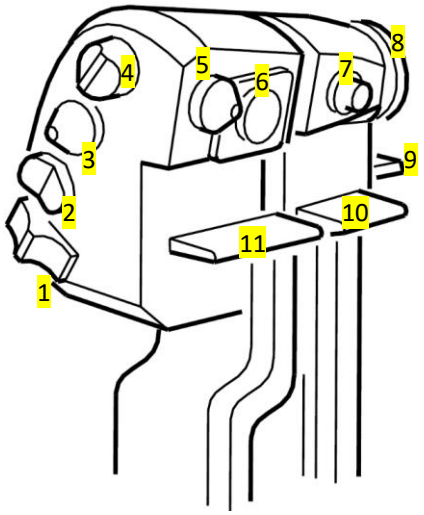
7- SBR Switch

8- Antenna Elevation Control

9- ECM Dispenser Switch

10- Finger Lift Switch Left

11- Finger Lift Switch Right



4.1.2.1.16.1 Weapon Select Switch

The Weapon Select Switch changes between carried ordnance.

GUN (20mm)	SimF15SelectGUN
SRM (Short Range Missiles)	SimF15SelectSRM
MRM (Medium Range Missiles).	SimF15SelectMRM

4.1.2.1.16.2 BOAT Switch

Select and rejects weapons. For MRM, it changes between AIM-7s and AIM-120s. For SRM, it cycles and steps over missiles.

FWD	SimF15BoatSwitchFWD
AFT	SimF15BoatSwitchAFT

4.1.2.1.16.3 Speedbrake Switch

Opens or closes the speedbrake.

FWD	SimF15SpeedbrakeFwd
AFT	SimF15SpeedbrakeAft

4.1.2.1.16.4 Microphone Switch

VHF and UHF Control.

FWD	SimF15MicrophoneFwd
AFT	SimF15MicrophoneAft

4.1.2.1.16.5 Multifunction (Coolie) Switch

LEFT/RIGHT SimF15CoolieLeftSimF15CoolieRight

Not implemented yet.

UP SimF15CoolieUp

When in Search, Coolie Up designates the target and enters highlight mode.
When in TWS, it steps to the next TWS contact.

DOWN SimF15CoolieDown

Slave/Bore for SRM.

4.1.2.1.16.6 Target Designator Control

Designates contacts when pressed.

PRESS	SimF15TargetDesignatorControl

4.1.2.1.16.7 SBR Switch

Not implemented yet.

4.1.2.1.16.8 Antenna Elevation Control

Increases/decreases antenna elevation

UP	SimF15RdrElevControlUp
DOWN	SimF15RdrElevControlDown

4.1.2.1.16.9 ECM Dispenser Switch

The ECM Dispenser switch engages manually countermeasures (Chaff/Flare).

UP	(Not used)	SimF15CounterMeasuresDispenserUp
CENTER	(Off)	SimF15CounterMeasuresDispenserCenter
DOWN	(Manual Dispense)	SimF15CounterMeasuresDispenserDown

4.1.2.1.16.10 Finger Lift Switches Left & Right

The finger lift switches engage the JFS to the engines.

LEFT ENGINE	SimF15FingerLiftEngineLeft
RIGHT ENGINE	SimF15FingerLiftEngineRight

For more information, please refer to the F-15C-34-1-1BMS.

4.1.2.1.17 Data Cartridge (DTC)

The F-15C DATA CARTRIDGE is a compact information storage device crucial to the aircraft's mission planning. It securely stores critical data such as flight plans, maps, and software updates. This portable cartridge ensures rapid and accurate data transfer between ground systems and the fighter jet, enhancing operational efficiency.

This panel serves no purpose in 3d. All flight related data will be loaded in the DTC via the DTC tab in the BMS UI.
For more information, please refer to the BMS User Manual, chapter 5.

4.1.2.1.18 Miscellaneous Control Panel

The MISCELLANEOUS CONTROL PANEL consists of Anti-Skid, Inlet Ramp and Roll Ratio options as well nose wheel lighting.

1- **Nose-wheel lighting switch**

LDG LIGHT	Landing light
OFF	Off
TAXI LIGHT	Taxi light
INC	SimLandingLightInc
DEC	SimLandingLightDec

2- **Anti-Skid switch**

NORM	On when the gear is down
PULSER	Turns off normal anti-skid protection, turns on the ANTI-SKID and MASTER CAUTION lights, and activates the brake pulser system.
OFF	Turns off the normal anti-skid and brake pulser systems.
INC	SimF15AntiSkidInc
DEC	SimF15AntiSkidDec

This panel and its functionality are not fully implemented yet.

4.1.2.1.19 Control Augmentation System (CAS) Control Panel

The automatic flight control system (AFCS) is enhanced by a dual-channel, three-axis control augmentation system (CAS). This system interprets electrical signals from control stick forces and rudder pedal positions to adjust control surface angles for desired flying qualities. CAS ensures controllability even with mechanical linkage loss, with dampening effects. CAS lights indicate failures or disengagement, and CAS switches offer roll, pitch, and yaw control positions.

1- **Altitude hold**

ON	SimF15AltHoldOn
OFF	SimF15AltHoldOff

2- **Attitude hold**

ON	SimF15AttHoldOn
OFF	SimF15AttHoldOff

3- **Takeoff Trim**

TOGGLE	SimF15TOTrimToggle

4- **Yaw Trim**

INC	SimF15YawInc
DEC	SimF15YawDec

5- **Roll Trim**

INC	SimF15RollInc
DEC	SimF15RollDec

6- **Pitch Trim**

INC	SimF15PitchInc
DEC	SimF15PitchDec

Refer to chapter 3.14.2 of this document for further information about the Autopilot of the F-15C.

This panel and its functionality are not fully implemented yet.

4.1.2.1.20 ILS/TACAN Control Panel

On the left console, the ILS/TACAN CONTROL PANEL houses the controls for the ILS. The panel features frequency selector knobs for choosing the ILS operational frequency. The inner knob designates units and tens (08 to 11 in 1-unit increments), while the outer knob adjusts the decimal counter. The hundreds digit is preset. The volume control knob manages the localizer signal's audio. Fully turning the knob counterclockwise deactivates the ILS system.

1- **TACAN Band switch** SimCycleBandAuxComDigit

2- **TACAN Mode switch**

A/A	Air-to-air mode	SimTACANAA
T/R	Transmit/receive mode	SimTACANTR

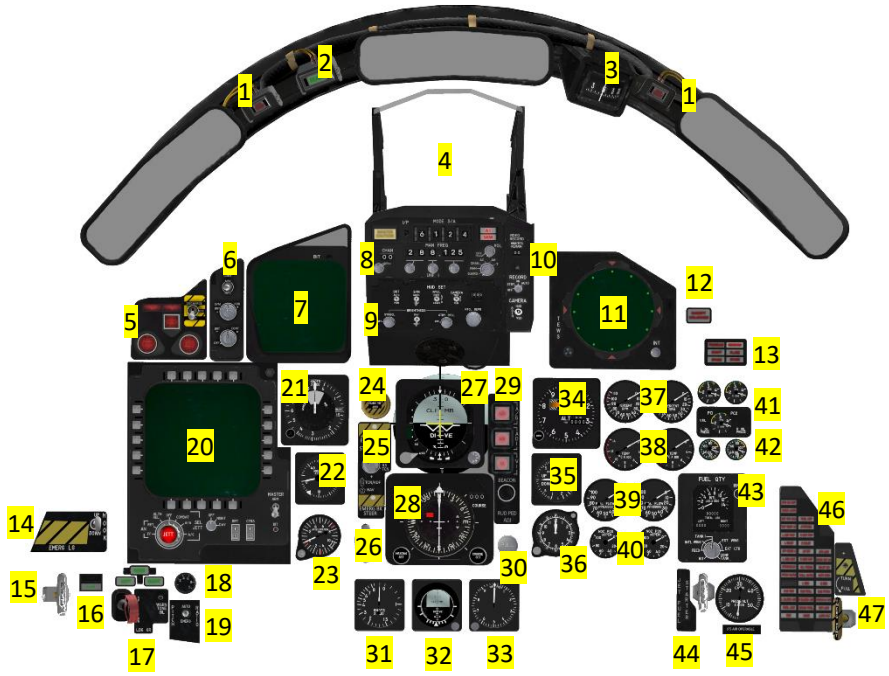
3- **TACAN channel switches** SimCycleLeftAuxComDigit SimCycleCenterAuxComDigit SimCycleRightAuxComDigit

SimDecLeftAuxComDigit SimDecCenterAuxComDigit SimDecRightAuxComDigit

4- **ILS Volume** SimILSUp SimILSDown

This panel and its functionality are not fully implemented yet.

4.1.2.2 Main Panel



Main Panel – F-15C

1- Lock/Shoot Lights
2- Air Refueling Ready Light
3- Standby Magnetic Compass
4- Head Up Display (HUD)
5- Fire Warning / Extinguishing Panel
6- VSD Adjustment Controls
7- Vertical Situation Display (VSD)
8- Main Communications Control Panel
9- Head Up Display Control Panel
10- Video Tape Recorder Control Panel
11- TEWS Display Unit
12- Canopy Unlocked Warning Light
13- Countermeasures Dispenser Lights
14- Arresting Hook Control Switch
15- Emergency Landing Gear Handle
16- Flap Position Indicator
17- Landing Gear Control Handle
18- Pitch Ratio Indicator
19- Pitch Ratio Select Switch
20- Multi-Purpose Color Display (MPCD) + Emergency Jettison Control Panel
21- Airspeed/Mach Indicator
22- Angle of Attack Indicator
23- Accelerometer
24- Emergency Jettison Button
25- Steering Mode Panel
26- Emergency Brake/Steering Control Handle
27- Attitude Director Indicator
28- Horizontal Situation Indicator
29- Master Mode Controls/Marker Beacon Panel
30- Rudder Pedal Adjust Release Knob
31- Standby Airspeed Indicator
32- Standby Attitude Indicator
33- Standby Altimeter
34- Altimeter
35- Vertical Velocity Indicator
36- Eight Day Clock
37- Engine Tachometers
38- Fan Turbine Inlet Temperature Indicators
39- Engine Fuel Flow Indicators
40- Engine Exhaust Nozzle Position Indicators
41- Hydraulic Pressure Indicators
42- Engine Oil Pressure Indicators
43- Fuel Quantity Indicator
44- Jet Fuel Starter (JFS) Control Handle
45- Cabin Pressure Altimeter
46- Caution Lights Panel
47- Emergency Vent Control Handle
48- Stick

4.1.2.2.1 Lock/Shoot Lights

The LOCK/SHOOT LIGHT illuminates steady or flashing if certain shooting conditions are met.

4.1.2.2.2 Air Refueling Ready Light

The AIR REFUELING READY LIGHT illuminates if the air-to-air refueling door is open.

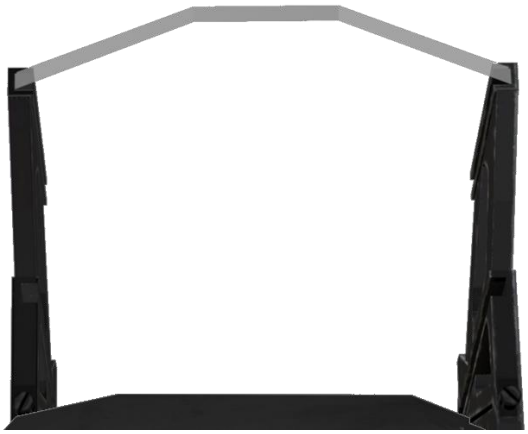
4.1.2.2.3 Standby Magnetic Compass

The STANDBY MAGNETIC COMPASS shows the current magnetic heading in degree.

4.1.2.2.4 Head Up Display (HUD)

The Electro-Optical HUD system generates symbolic flight and attack guidance and projects these symbols into the pilot's Field of View (FOV). Master mode buttons determine HUD display modes. In Air-to-Air master mode, the throttle weapon switch selects MRM, SRM, or GUN attack displays. The HUD provides a circular FOV covering 20° in azimuth and elevation, with the optical axis positioned 4° below the waterline. A standby reticle display on the HUD includes a 2-mil diameter aim dot and a 50-mil diameter circle around the dot, both depressible.

For more information, please refer to the F-15C-34-1-1BMS.



4.1.2.2.5 Fire Warning / Extinguishing Panel

This panel serves no purpose in BMS as none of its functionality is implemented yet.

4.1.2.2.6 VSD Adjustment Controls

The purpose of the controls for the VERTICAL SITUATION DISPLAY (VSD) are to adjust brightness, contrast and operating modes of the VSD.

1- **VSD Brightness** SimF15VsdBrightnessDecrease
SimF15VsdBrightnessIncrease

This panel and its functionality is not fully implemented yet.

4.1.2.2.7 Vertical Situation Display (VSD)

The VSD furnishes tactical situation presentations encompassing all radar modes. The specific display accessible on the indicator relies on the aircraft's operational master mode and the chosen munition.

For more information, please refer to the F-15C-34-1-1BMS.

4.1.2.2.8 Main Communications Control Panel

The MAIN COMMUNICATIONS CONTROL PANEL (UHF 1) is used for operating the UHF 1 radio. The controls on the panel include the main mode selector switch, main manual frequency selector knobs, and the main channel selector knob.

In addition, the IFF backup for Mode 3 as well as the MASTER CAUTION switch are located on the panel.

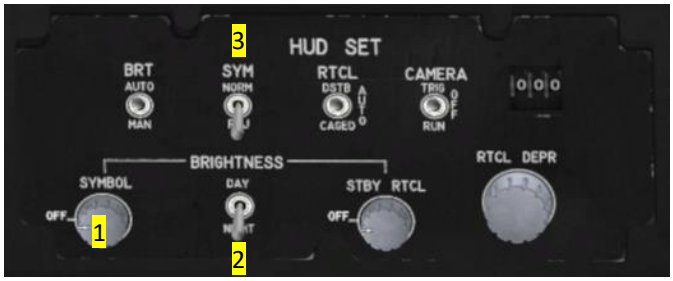
1-	**MAIN CHANNEL SELECTOR**		SimCycleRadioChannel	SimDecRadioChannel
2-	**MAIN MANUAL FREQUENCY SELECTOR KNOBS**		SimBupUhfFreq1Inc SimBupUhfFreq2Inc SimBupUhfFreq3Inc SimBupUhfFreq4Inc SimBupUhfFreq5Inc	SimBupUhfFreq1Dec SimBupUhfFreq2Dec SimBupUhfFreq3Dec SimBupUhfFreq4Dec SimBupUhfFreq5Dec
3-	**MASTER MODE UHF 1**			
	CHAN	(Selected Channel)	SimBupUhfModeInc	SimBupUhfMode
	GUARD	(Guard: 243.000)		
	MAN	Manual selected freq.		
4-	**MASTER CAUTION SWITCH**		ExtinguishMasterCaution	
5-	**IFF Backup Mode 3/A**		SimIFFBackupM1Digit1Inc SimIFFBackupM1Digit2Inc SimIFFBackupM3Digit1Inc SimIFFBackupM3Digit2Inc	SimIFFBackupM1Digit1Dec SimIFFBackupM1Digit2Dec SimIFFBackupM3Digit1Dec SimIFFBackupM3Digit2Dec
6-	**Volume UHF 1**		SimStepComm1VolumeUp	SimStepComm1VolumeDown

For more information about radio operations, refer to the #UHF Communications System chapter.

4.1.2.2.9 Head Up Display Control Panel

The HUD CONTROL PANEL provide different options to modify HUD symbology and HUD brightness options.

This panel and its functionality is not fully implemented yet.



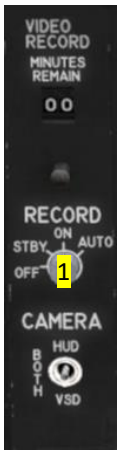
1-	**HUD Symbol Brightness knob**	SimSymWheelUp	SimSymWheelDown
2-	**HUD Day/Night mode switch**	SimHUDBritDay	SimHUDBritNight
3-	**DRIFT C/O Switch**	SimDriftCO	

This panel and its functionality are not fully implemented yet.

4.1.2.2.10 Video Tape Recorder Control Panel

The VIDEO TAPE RECORDER CONTROL PANEL enables recording options for the ACMI in BMS.
Please note that the ACMI recording is enabled by default in BMS.

1-	**RECORD MASTER MODE**	SimAVTRSwitchUp	SimAVTRSwitchDown



This panel and its functionality are not fully implemented yet.

4.1.2.2.11 Tactical Electronic Warfare System (TEWS) Display Unit

The F-15C is equipped with a TACTICAL ELECTRONIC WARFARE SYSTEM (TEWS) designed to detect, identify, and counter threats in the electromagnetic spectrum, enhancing the aircraft's survivability and mission effectiveness.

For more information, please refer to the F-15C-34-1-1BMS.

4.1.2.2.12 Canopy Unlocked Warning Light

The light illuminates when the aircraft canopy is unlocked.

4.1.2.2.13 Countermeasures Dispenser Lights

The COUNTERMEASURES DISPENSER LIGHTS indicate the status of internal countermeasures (Chaff/Flare).

For more information, please refer to the F-15C-34-1-1BMS.

4.1.2.2.14 Arresting Hook Control Switch

A retractable arresting hook is in the underside of the aft fuselage of the F-15C. It is electrically controlled, extended by gravity and a hydraulic dashpot, and retracted by utility hydraulic pressure.

1- **ARRESTING HOOK**

SimHookUp
SimHookDown

4.1.2.2.15 Emergency Landing Gear Handle

To initiate emergency gear extension, one needs to pull the EMERG LG handle situated on the left main instrument panel. This action bypasses the standard hydraulic and electrical controls, activating hydraulic release (via the JFS accumulator) for the doors and landing gear. Consequently, the landing gear descends freely into the down and locked configuration. It's important to note that the landing gear doors will stay open. To reset the emergency landing gear handle, rotate it 30° clockwise and then push it in.

1- **EMERGENCY LANDING GEAR HANDLE** AFAlternateGearReset

4.1.2.2.16 Flap Position Indicator

The FLAP POSITION INDICATOR illuminates when flaps status changes. YELLOW indicates the flaps are in transit. A GREEN light indicates the flaps are down.

4.1.2.2.17 Landing Gear Control Handle

The LANDING GEAR CONTROL HANDLE lowers the landing gear and includes the horn silencer.

If the landing gear is fully extended, the three lights “Left”, “Nose” and “Right” will illuminate.

1- **LANDING GEAR HANDLE** AFGearUp
AFGearDown

2- **WARN TONE SILENCER** SimWarnReset

4.1.2.2.18 Pitch Ratio Indicator

This panel serves no purpose in BMS as none of its functionality is implemented yet.

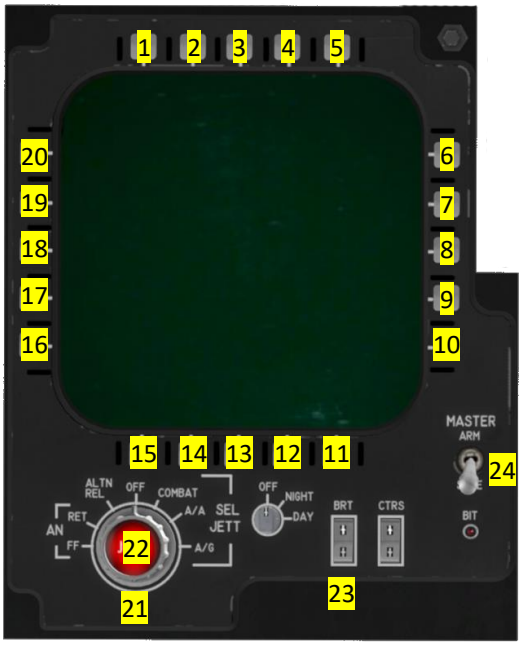
4.1.2.2.19 Pitch Ratio Select Switch

This panel serves no purpose in BMS as none of its functionality is implemented yet.

4.1.2.2.20 Multi-Purpose Color Display (MPCD) + Emergency Jettison Control Panel

The MULTI-PURPOSE COLOR DISPLAY (MPCD) enables the pilot to observe and manage weapon BIT, armament, or data transfer module systems. The MPCD control panel houses various controls that manage the functional parameters relevant to the MPCD's operation. Activating power involves turning the MPCD power knob to either the NIGHT or DAY position. The MPCD requires around 8 seconds to warm up. When powered up, the MPCD shows the last mode selected before shutdown. Accessing the system menu can be achieved by initiating the MPCD interrupted BIT or pressing the lower right select button on the control panel. Typically, "MENU" is displayed next to the lower right select button, unless the system menu is chosen. Within the system menu, the ARMT, BIT, WPN, and DTM menus can be chosen. For a comprehensive understanding of these menus, consult the appropriate system details in the TO 1F-15C-34-1-1BMS. The MPCD displays incorporate the following colors: green, amber, cyan, and white.

This panel and its functionality are not fully implemented yet.



1-20 - **Push Buttons (PB) 1-20** SimCBEOSB_1R up to SimCBEOSB_20R

21 - **SELECT JETTISON KNOB** SimF15JettSelInc SimF15JettSelDec

	OFF	Weapons cannot be jettisoned.
	COMBAT	Selects programmed selective jettison.
	A/A	Selects air-to-air selective jettison.

22 - **SELECT JETTISON BUTTON** SimF15JettToggle

23 - **MPCD Brightness** SimCBEOSB_BRT_R

24 - **MASTER ARM SWITCH** SimF15MasterArmSwitchOn SimF15MasterArmSwitchOff

	SAFE	Weapons cannot be employed.
	ARM	With the landing gear handle UP or the armament safety switch in OVERRIDE, power is applied to the master arm switch which in turn provides power for weapon release and gun firing. The gun cross is displayed on the HUD.

For more information, please refer to the F-15C-34-1-1BMS.

4.1.2.2.21 Airspeed/Mach Indicator

The AIRSPEED/MACH INDICATOR features a calibrated airspeed and Mach number indicator in combination. This setup involves a stationary airspeed scale, graduated from 50 to 1000 knots, alongside a rotating Mach number scale. These scales are synchronized to maintain their correct correlation throughout all altitudes, allowing a single pointer to indicate both readings. Below 200 knots, only airspeed is shown. For alignment purposes, there is a movable index mark and an index set knob provided. The indicator's functionality relies on electrical signals originating from the air data computer. Windows on the instrument panel will exhibit an "OFF" flag in the event of power loss or if the display data is deemed invalid. Additionally, if the Mach display is not valid, a "MACH" flag will be shown.

4.1.2.2.22 Angle of Attack (AOA) Indicator

The AOA INDICATOR operates based on electrical signals received from the probe. It then presents the indicated AOA in a range spanning from 0 to 45 units. A T-shaped marker is adjusted to align with the optimal landing approach AOA, which typically falls within 20 to 22 units. On the instrument's interface, a window shows an OFF flag in the event of power loss. There's also a triangular index marker situated at the maximum scale, but it remains non-functional.

4.1.2.2.23 Accelerometer

The ACCELEROMETER gauges and exhibits momentary positive and negative normal acceleration "g" loads. It also keeps a record of the highest positive and negative loads experienced since the instrument was last reset. However, it's important to note that the g loads measured by the accelerometer at the instrument are not as precise as the g loads displayed on the Head-Up Display (HUD).

4.1.2.2.24 Emergency Jettison Button

The EMERGENCY JETTISON BUTTON is positioned at the center of the instrument panel, to the left of the ADI (Attitude Director Indicator). When this button is pressed, it triggers the simultaneous jettisoning of all pylons containing cartridges, along with any AIM-120/AIM-7 missiles. Although the button is designed to return to its normal position via spring-loading, a mechanism is incorporated to detect if the button becomes jammed in the jettison position.

Under standard circumstances, only the black color on the interior edge of the button guard is visible above the button. However, if the button becomes stuck in the jettison position, a yellow color becomes visible in the switch guard beneath the black color.

1- **EMERGENCY JETTISON BUTTON** SimF15EmergJettToggle

4.1.2.2.25 Steering Mode Panel

The STEERING MODE PANEL is adjacent to the ADI. The panel contains a steering mode knob which selects the source of information or mode to be displayed on the HSI (Horizontal Situation Indicator), ADI (Attitude Director Indicator), and HUD (with ADI master mode selected).

1- **STEERING MODE KNOB** SimHSIModeInc SimHSIModeDec

NAV	Navigation Mode
TCN	TACAN Mode

For more information, please refer to the F-15C-34-1-1BMS.

4.1.2.2.26 Emergency Brake/Steering Control Handle

This panel serves no purpose in BMS as none of its functionality is implemented yet.

4.1.2.2.27 Attitude Director Indicator (ADI)

The ATTITUDE DIRECTOR INDICATOR (ADI) consists of the items indicated. The attitude sphere displays pitch and bank. The pitch markings on the sphere are in graduations of 5°, the bank markings are in graduations of 10° with the large markings indicating each 30°. Signals are received from the INS or AHRS attitu de reference system. Either system can be selected by placing the attitude reference system selector knob t-0 the desired position. If bus power to the indicator is lost, the indicator automatically selects AHRS as the source of attitude reference, bypassing the attitude reference selector knob. The pitch trim knob is used to adjust the sphere to indicate zero pitch when the aircraft is pitched to the desired attitude. The pitch and bank steering bars are driven by signals from the Central Computer (CC). The bank steering bar provides command steering information to intercept TACAN radiale and navigation computer destinations. The bank steering bar and glideslope indicator are used in conjunction with the instrument landing set (ILS). The course warning flag or glideslope warning flag appear in view if the bank steering bar or glideslope indicator displays are unreliable because of a lost or weak signal. The ADI provides continuous BIT monitoring. The OFF-warning flag on the indicator comes into view if power to the unit is lost, if there is a loss of synchro signal to the pitch or roll servo, if there exists an excessive servo error, or if the ADI is receiving an invalid signal."

This panel and its functionality are not fully implemented yet.

4.1.2.2.28 Horizontal Situation Indicator (HSI)

The HSI provides a horizontal or plan view of the aircraft with respect to the navigation situation. The aircraft symbol in the center of the HSI is the airplane superimposed on a compass rose. The compass card rotates so that the aircraft heading is always under the top of the lubber line. Index marks are provided every 45° around the perimeter of the compass card.

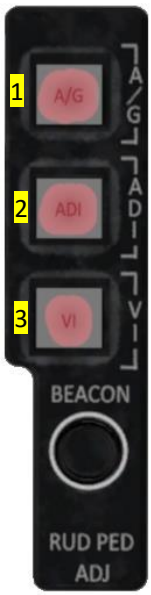
Four modes of navigational operation are displayed on the HSI. These modes are selected by the steering monde knob (see previous chapter).

1-	**HEADING SELECTOR KNOB**	SimHsiHdgInc SimHsiHdgDec
2-	**COURSE SELECTOR KNOB**	SimHsiCrsInc SimHsiCrsDec

This panel and its functionality are not fully implemented yet.

4.1.2.2.29 Master Mode Controls/Marker Beacon Panel

The purpose the MASTER MODE CONTROLS are to change between Air-to-Air and Air-to-Ground master modes.



1-	A/G	Air-To-Ground mode	SimF15AGSwitchToggle
2-	ADI	ADI Mode	SimF15ADISwitchToggle
3-	VI	VI Mode	SimF15VISwitchToggle

For more information, please refer to the F-15C-34-1-1BMS.

4.1.2.2.30 Rudder Pedal Adjust Release Knob

This panel serves no purpose in BMS as none of its functionality is implemented yet.

4.1.2.2.31 Standby Airspeed Indicator

The STANDBY AIRSPEED INDICATOR operates directly from pitot-static pressures. It has a fixed scale of 60-850 knots and a rotation pointer.

4.1.2.2.32 Standby Attitude Indicator

The STANDBY ATTITUDE INDICATOR is a self-contained electrically driven gyro-horizon type instrument. The OFF flag appears if there is a power loss to the indicator or the gyro is caged. The gyro is caged by pulling the knob. Do not turn the knob to lock the gyro in the caged position. The gyro cages to 0° pitch and roll regardless of airplane attitude. The caged position is approximately 4°nose up from the normal ground attitude and the gyro will process 4° nose down after uncaging. Power should be applied to the instrument for at least 1 minute before caging. The indicator displays roll through 360°. Pitch display is limited by mechanical stops at 90° climb and 78° dive. As the aircraft climbs or dives, the pitch attitude changes smoothly until the stop is reached when the gyro tumbles 180° in roll.

This panel and its functionality are not fully implemented yet.

4.1.2.2.33 Standby Altimeter

The STANDBY ALTIMETER operates directly from a static pressure source.

This panel and its functionality are not fully implemented yet.

4.1.2.2.34 Altimeter

The ALTIMETER is driven by electrical signals from the air data computer (ADC). The indicator is a counter-pointer type. A window on the face of the dial provides a digital readout of altitude in 20-foot increments. An OFF flag will be displayed in this window if electrical power is lost, or the display is not valid.

1- ALTIMETER PRESSURE KNOB SimAltPressInc
SimAltPressDec

This panel and its functionality are not fully implemented yet.

4.1.2.2.35 Vertical Velocity Indicator

The VERTICAL VELOCITY INDICATOR is driven by electrical signals from the air data computer. A window on the instrument will display an OFF flag if electrical power is lost, or the display is not valid.

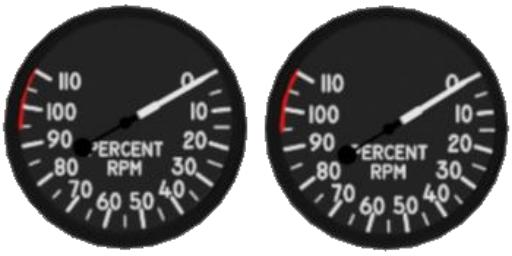
This panel and its functionality are not fully implemented yet.

4.1.2.2.36 Eight Day Clock

The EIGHT DAY CLOCK indicates the actual Zulu (Z) time in BMS.

4.1.2.2.37 Engine Tachometers

The ENGINE TACHOMETER has a pointer display and the rpm signal is supplied by the engine alternator. RPM is expressed in percent from 0-100.



4.1.2.2.38 Fan Turbine Inlet Temperature Indicators

The FAN TURBINE INLET TEMPERATURE INDICATORS displays the temperature for each turbine from 0-1400°C.

4.1.2.2.39 Engine Fuel Flow Indicators

The FUEL FLOW INDICATOR is a digital indicator which displays the total fuel flow to the engines, including AB, in pph. The indicator has a range of 0-100,000 pph.

4.1.2.2.40 Engine Exhaust Nozzle Position Indicators

The NOZ POS indicator displays the position of the CENC exhaust nozzle drive shafts which are calibrated from 0 percent (closed) to 100 percent (fully open).

4.1.2.2.41 Hydraulic Pressure Indicators

The HYDRAULIC PRESSURE INDICATORS displays the pressure from 0-4000 PSI.

4.1.2.2.42 Engine Oil Pressure Indicators

An amber HYDRAULIC light on the caution light panel and the MASTER CAUTION light come on when any hydraulic systems caution light on the BIT panel comes on. PC1A, PC1B, PC2A, PC2B, UTL A and UTL B lights on the BIT panel come on when their respective RLS valve actuates to shut off that circuit. The L PMP or R PMP light comes on when the respective utility hydraulic pump output pressure is low. An indication of a PC pump failure or low pressure is illumination of both the A and B bit lights for that system. When the HYDRAULIC light is illuminated resetting the MASTER CAUTION light also resets the HYDRAULIC light.

This panel and its functionality are not fully implemented yet.

4.1.2.2.43 Fuel Quantity Indicator

A combination pointer-counter fuel quantity indicator is on the lower right side of the main instrument panel. The pointer indicates total internal fuel (with readings multiplied by 1000). The upper counter marked TOTAL LBS indicates total internal fuel plus CFT and external fuel. The two lower counters, marked LEFT and RIGHT, and a selector switch provide individual tank monitoring and a check of the indicator. An OFF flag will be displayed if no electrical power is available. Erroneous fuel indications resulting from fuel slosh will occur during and immediately following maneuvering flight.

1- Fuel Selector SimF15FuelSelectDec SimF15FuelSelectInc

This panel and its functionality are not fully implemented yet.

4.1.2.2.44 Cabin Pressure Altimeter

The CABIN PRESSURE ALTIMETER caution light illuminates when the cockpit pressure altitude is above 30,000 feet.

This panel serves no purpose in BMS as none of its functionality is implemented yet.

4.1.2.2.45 Jet Fuel Starter (JFS) Control Handle

Pulling the handle straight out discharges one JFS accumulator. Rotating the handle 45° CCW and pulling discharges both accumulators, or the remaining accumulator if one has already been discharged. The handle is spring loaded to return to its normal position.

1- JET FUEL STARTER CONTROL HANDLE SimF15JfsStart1
SimF15JfsStart2

4.1.2.2.46 Caution Lights Panel

The CAUTION LIGHTS PANEL provide indications of system malfunctions and important information to be noted. They illuminate red. Corrective action deenergizes all warning indications.

4.1.2.2.47 Voice Warning System

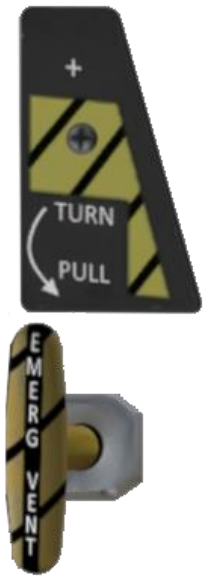
The VOICE WARNING SYSTEM (VWS) provides a warning message, a caution message, or discrete messages. The fixed volume voice message does not blank other audio and, therefore, may not be heard.

This functionality is not fully implemented yet.

4.1.2.2.48 Emergency Vent Control Handle

The EMERCENCY VENT CONTROL HANDLE, when turned 45° CCW electrically dumps cabin pressure. Extension of the handle shots off ECS air in the cockpit, diverts all ECS cooling air to the avionics and allows ram air to enter the cockpit.

This panel serves no purpose in BMS as none of its functionality is implemented yet.



4.1.2.2.49 Stick

1- Autopilot/Steering Disengage Switch (Paddle Switch)

2- Nose Gear Steering Button

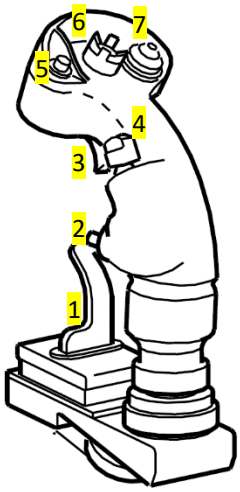
3- Trigger

4- Auto Acquisition Switch/Air Refueling Release

5- Weapon Release Button

6- Castle Switch

7- Trim Button



For more information, please refer to the F-15C-34-1-1BMS.

4.1.2.2.49.1 Autopilot/Steering Disengage Switch (Paddle Switch)

Activates the Autopilot (in ADI mode). Enables countermeasures (MAN1) in A/A or A/G mode.

Toggle	SimF15PaddleSwitch

4.1.2.2.49.2 Nose Gear Steering Button

Activates the "Nose Gear Steering" while on the ground.
In ACM mode, it uncages the AIM-9 missile.

Toggle	SimF15NoseGearSteering

4.1.2.2.49.3 TRIGGER

Fires the 20mm Gun.

First Trigger Detent	SimF15FirstTriggerIdent
Second Trigger Detent	SimF15SecondTriggerIdent

4.1.2.2.49.4 AUTO ACQUISITION SWITCH/AIR REFUELING RELEASE

Fwd
When in Highlight mode (~STT or SAM), it enters in TWS.
When in Search, it enters in Supersearch mode.
When in TWS, it steps azimuth.

Aft
If TDC pressed and hold i.e. designate command is true, then enters NDTWS.

Down
Goes back to Search Mode, also called Return To Search (RTS). It drops all locked tracks and enters the search mode selected on the Radar Control Panel.

FWD	SimF15AutoAcqSwitchFwd
AFT	SimF15AutoAcqSwitchAft
DOWN	SimF15AutoAcqSwitchDown

4.1.2.2.49.5 WEAPON RELEASE BUTTON

Release the chosen ordnance.

Toggle	SimF15WeaponRelease

4.1.2.2.49.6 CASTLE SWITCH

UP
TDC control to VSD display (Cursor symbol)

Aft ≤ 1sec.
TDC control to SIT display (Cursor symbol)

Right
Last SIT display or toggle self-centered/decentered

Left
Expand selection

UP	SimF15CastleUp
DOWN	SimF15CastleDown
LEFT	SimF15CastleLeft
RIGHT	SimF15CastleRight

4.1.2.2.49.7 TRIM BUTTON

The aircraft can be trimmed about all three axes.

UP	SimF15TrimUp
DOWN	SimF15TrimDown
LEFT	SimF15TrimLeft
RIGHT	SimF15TrimRight

4.1.2.3 Right Console

1- Oxygen Regulator

2- Engine Control Panel

3- Navigation Control Panel

4- TEWS Power Control Panel

5- Compass Control Panel

6- Outlet Panel

7- ECS Panel

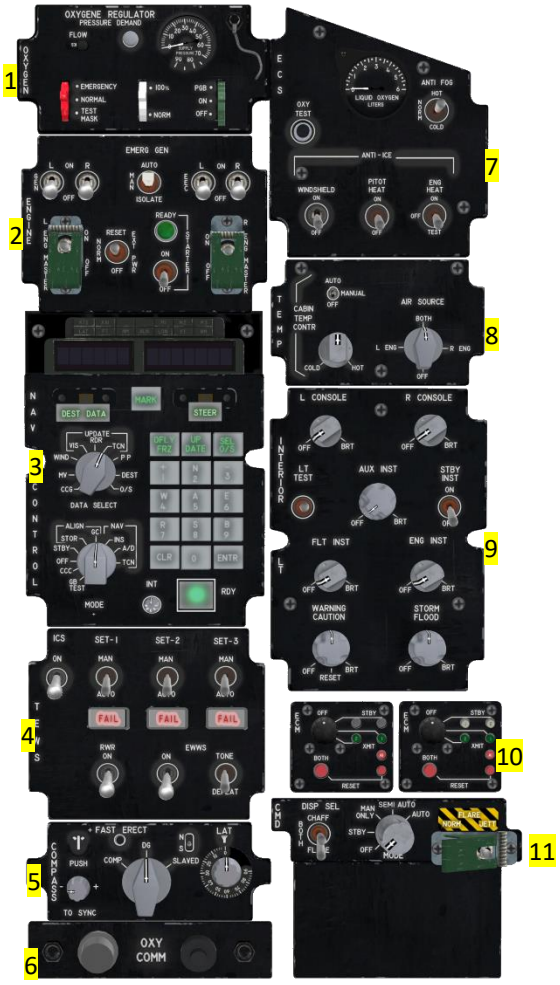
8- Temperature Panel

9- Interior Lights Control Panel

10- TEWS Pod Control Panel

11- Countermeasure Dispenser Control Panel

12- Canopy Control Handle



4.1.2.3.1 Oxygen Regulator

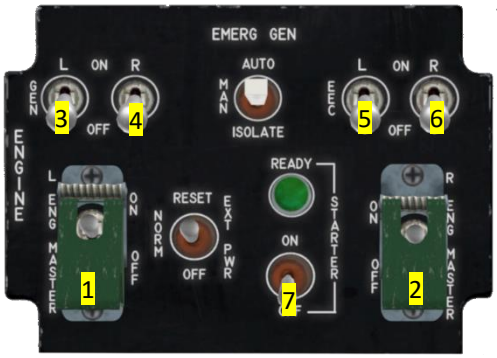
The OXYGEN REGULATOR automatically controls the pressure and flow rate of normal oxygen based on demand and cockpit altitude.

1- **OXYGEN SUPPLY** SimOxySupplyOn
SimOxySupplyOff

This panel and its functionality are not fully implemented yet.

4.1.2.3.2 Engine Control Panel

Engine Master Switches



Two guarded engine master switches are located on the engine control panel. Placing either switch to ON (with electrical power available), directs power to the fuel transfer pumps. Each switch directs power to its corresponding airframe mounted engine fuel shutoff valve. The engine master switch must be ON before corresponding engine can be coupled to the JFS. Placing the switch to OFF decouples the engine from the JFS. If engine control/essential power is not available, placing an engine master switch OFF will not shut off its airframe mounted engine fuel shutoff valve.

1- Left Engine Master Switch SimF15EngineMasterSwitchLeftIncrease
SimF15EngineMasterSwitchLeftDecrease

2- Right Engine Master Switch SimF15EngineMasterSwitchRightIncrease
SimF15EngineMasterSwitchRightDecreas

Generator Control Switches

Once activated, the generator control switches enable power to the aircraft.

3- Left Generator Control Switch SimF15GeneratorControlSwitchLeftIncrease
SimF15GeneratorControlSwitchLeftDecrease

4- Right Generator Control Switch SimF15GeneratorControlSwitchRightIncrease
SimF15GeneratorControlSwitchRightDecrease

Engine Electronic Control (EEC) switches

5- Left EEC Switch SimF15EecSwitchLeftOn
SimF15EecSwitchLeftOff

6- Right EEC Switch SimF15EecSwitchRightOn
SimF15EecSwitchRightOff

Jet Fuel Starter (JFS) switch

The jet fuel starter switch is on the engine control panel located on the right console. It has positions of ON and OFF. During engine start, the JFS is automatically shut down after both engines are started; however, it can be shutdown at any time by placing the switch OFF.

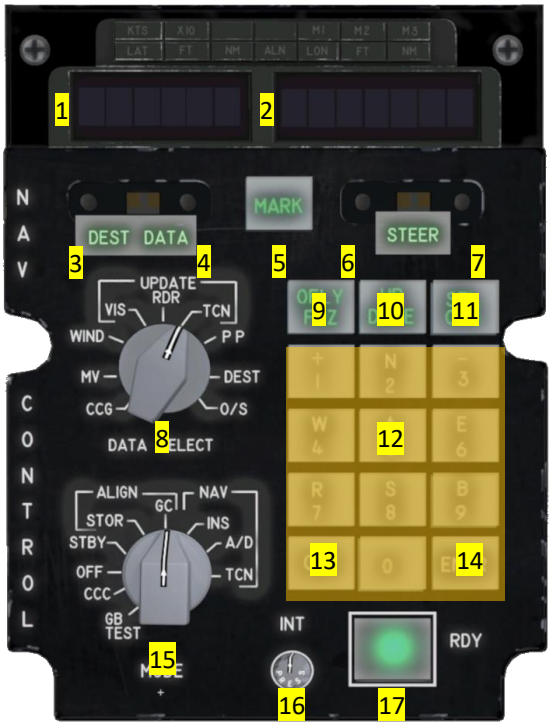
The JFS ready light is on the engine control panel located on the right console. The light indicates the, JFS is ready to be engaged. The light goes out when the JFS shuts down.

7-	JFS Switch On/Off/Toggle	SimF15JfsStarterSwitchOn SimF15JfsStarterSwitchOff SimF15JfsStarterSwitchToggle
	JFS Start 1	SimF15JfsStart1
	JFS Start 2	SimF15JfsStart2

This panel and its functionality are not fully implemented yet.

4.1.2.3.3 Navigation Control Indicator (NCI) Panel

The pilot may update the initialized value of any of the 15 waypoint Programmed Time of Arrivals (PTAs) via the NCI.



1-	Latitude coordinates display	
2-	Longitude coordinates display	
3-	Destination Data Counter dec.	SimF15NciDestDataDec
4-	Destination Data Counter inc.	SimF15NciDestDataInc
	B Takeoff Airbase	
	1-11 Steerpoints	
	M1-3 Markpoints (n/)	
5-	Mark Button *(n/i)*	SimF15NciMark
6-	Steer Counter decrease	SimF15NciSteerDataDec
7-	Steer Counter increase	SimF15NciSteerDataInc
8-	Data Select Knob	SimF15NciDataSelectDec SimF15NciDataSelectInc

CCC- Allows the programming and readout of CC (Central Computer) data. Entry of tacan channel, latitude, longitude, magnetic variation and altitude is performed in this mode.

WIND- Selects wind data for entry and display from the CC.

VIS- Allows a visual overfly present position update when a valid CC signal is present. If the CC signal is invalid, then allows an INS visual overfly update if the INS postion is selected with the mode selector knob.

PP- Selects present position latitude and longitude entry and display.

DEST- Allows entry and display from the CC of latitude, longitude, and altitude for any of the 12 destinations or three mark positions selected on the destination data counter.

O/S- Allows the entry and display from the CC of offset distances in feet north-south and east-west, or offset range in miles and tenths and bearing with respect to the destination selected on the destination data counter, or the corresponding altitude of the offset point.

9- Overfly Freeze Button *(n/i)* SimF15NumpadOFly

10- Update Button *(n/i)* SimF15NumpadUpdate

11- Select Offset Button *(n/i)* SimF15NumpadSel

12 - Keyboard Buttons 0-9 SimF15NciNumpad0 up to SimF15NciNumpad9

13 - Keyboard Button Clear SimF15NciClr

14 - Keyboard Button Enter SimF15NciEntr

15- Mode Selector Knob SimF15NciModeDec SimF15NciModeInc

OFF- Power is removed from the INS

GC- Gyrocompass alignment enables the INS to achieve a high alignment accuracy. Approximately 3 minutes after placing the mode selector knob to GC, the INS is coarse aligned to best available true heading (BATH).

INS- Primary navigation mode. In this mode, the INS solves the navigation problem by sensing aircraft accelerations, applying appropriate corrections and determining aircraft velocity and position. Steering to destination is computed in the CC based on inertially derived present position.

16- NCI Light Intensity SimF15NciLightIntensityDec SimF15NciLightIntensityInc

17- NCI Ready Button SimF15NciRdy

Please refer to the BMS F-15 checklists (After Engine Start procedures) for the Alignment process.

This panel and its functionality are not fully implemented yet.

4.1.2.3.4 TEWS Power Control Panel

The TEWS CONTROL PANEL supplies power to the RWR (Radar Warning Receiver) system, ICS (Internal Countermeasures Set) and EWWS (Electronic Warfare Warning System).

For more information, please refer to the F-15C-34-1-1BMS

1-	RADAR POWER ON	SimF15TEWSRwrPwrOn	SimF15TEWSRwrPwrOff
2-	EWWS POWER ON	SimF15TEWSEwwsPwrOn	SimF15TEWSEwwsPwrOff
3-	EWWS TONE/DEFEAT	SimF15TEWSEwwsDefeat	SimF15TEWSEwwsTone
4-	ICS POWER ON	SimF15TEWSIcsPowerOn	SimF15TEWSIcsPowerOff
5-	SET 1	SimF15TEWSSet1Man	SimF15TEWSSet1Auto
6-	SET 2	SimF15TEWSSet2Man	SimF15TEWSSet2Auto
7-	SET 3	SimF15TEWSSet3Man	SimF15TEWSSet3Auto

4.1.2.3.5 Compass Control Panel

This panel serves no purpose in BMS as none of its functionality is implemented yet.

4.1.2.3.6 Outlet Panel

This panel serves no purpose in BMS as none of its functionality is implemented yet.

4.1.2.3.7 Environmental Control System (ECS) Panel

The ENVIRONMENTAL CONTROL SYSTEM (ECS) provides conditioned air and pressurization, for the cockpit and avionics, windshield anti-fog and anti-ice, anti-G, canopy seal, and fuel pressurization. The ECS uses engine bleed air from both engines for normal operation. Cooling for the avionics, with the air source knob OFF or the cockpit temperature switch OFF, automatically switches to ram air. Ram air cooling is automatically supplied to the avionics whenever compressor inlet duct pressure drops.

This panel and its functionality are not fully implemented yet.

1- ANTI ICE SimAntiIceInc SimAntiIceDec

This panel and its functionality are not fully implemented yet.

4.1.2.3.8 Temperature Panel

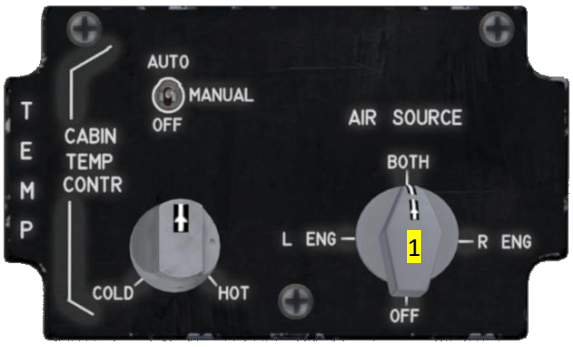
1- Air Source knob SimF15AirSourceToggle

OFF- Shuts off bleed air from both engines.

L ENG- Shuts off bleed air from the right engine.

R ENG- Shuts off bleed air from the left engine.

BOTH- Shuts off bleed air from both engines.

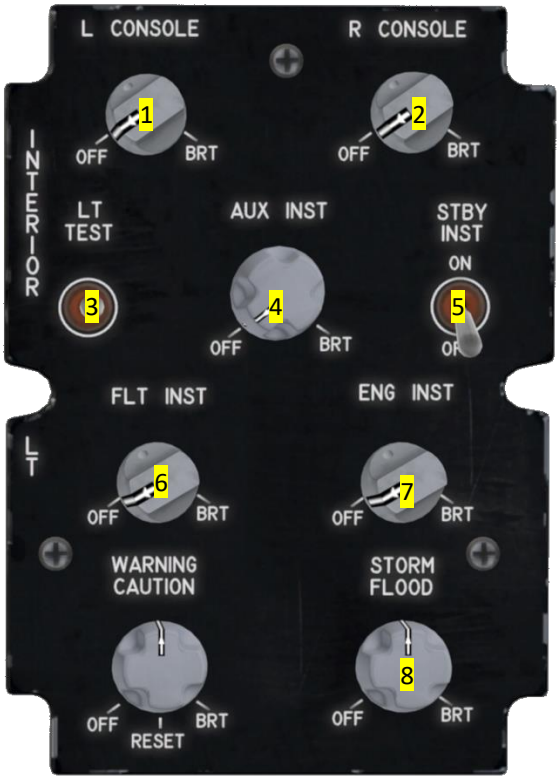


This panel and its functionality are not fully implemented yet.

4.1.2.3.9 Interior Lights Control Panel

The INTERIOR LIGHTS CONTROL PANEL controls all cockpit lighting.

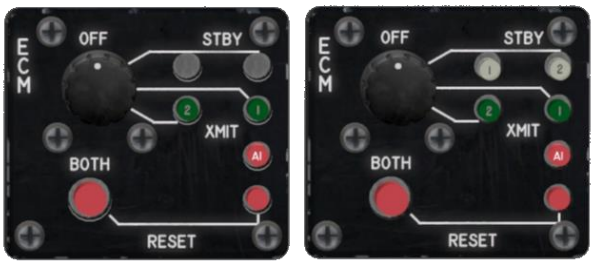
This panel and its functionality are not fully implemented yet.



1-	Left Console Light	SimF15LightLeftConsoleDec SimF15LightLeftConsoleInc
2-	Right Console Light	SimF15LightRightConsoleDec SimF15LightRightConsoleInc
3-	Light Test switch	SimF15LightTestPress
4-	Auxiliary Light	SimF15LightAuxInstrDec SimF15LightAuxInstrInc
5-	Standby Instrument Light	SimF15LightStbyInstOff SimF15LightStbyInstOn
6-	Flight Instrument Light	SimF15LightFlightInstrDec SimF15LightFlightInstrInc
7-	Engine Instrument Light	SimF15LightEngInstDec SimF15LightEngInstInc
8-	Flood Light	SimF15FloodLightDec SimF15FloodLightInc

4.1.2.3.10 TEWS Pod Control Panel

This panel serves no purpose in BMS as none of its functionality is implemented yet.



4.1.2.3.11 Countermeasures Dispenser Control Panel

The COUNTERMEASURES DISPENSER CONTROL PANEL purpose is to enable certain modes to the ALE-45 dispenser set.

For more information, please refer to the F-15C-34-1-1BMS.

1-	**DISPENSER SELECTION**	SimF15Ale45DispSelInc	SimF15Ale45DispSelDec
2-	**DISPENSER MODE**	SimF15Ale45ModeSelInc	SimF15Ale45ModeSelDec
3-	**FLARE JETTISON**	SimF15Ale45FlareEmergJettInc	SimF15Ale45FlareEmergJettDec

4.1.2.3.12 Canopy Control Handle

The CANOPY CONTROL HANDLE opens or closes/locks the canopy.

1-	**CANOPY**	AFCanopyToggle

5. Normal Procedures

This section is planned to provide the actions required for normal operation of the F-15 aircraft in future BMS versions. Amplification is included only when special considerations or techniques should be observed. A complete knowledge of Section EMERGENCY PROCEDURES, and Section OPERATING LIMITATIONS, is required prior to flight.

For normal procedures (Ramp Start, Taxi, Takeoff, Landing, etc.) please refer to the BMS F-15 checklist TO1F-15C-1CL-1 BMS, “SECTION N” for further details.

This section will be improved in further BMS versions.

6. Air Refueling Procedures

Work in progress.

7. Emergency Procedures

Work in progress.

8. Glossary

Work in progress.