



McDonnell Douglas T-45C Goshawk



Made by Speedy

VNAO SIMULATIONS
T-45C GOSHAWK IR BUILD

Version 23.06.19

DISCLAIMER

This document has been created for recreational purposes only. Do not use for training or real life flying

The author of this document has never had access to restricted or classified documentation on the T-45C.

The author has never had access to OEM (Original Equipment Manufacturer) data related to the T-45C, its armament systems nor its defensive systems. All the information within this document is taken from public documentation (i.e. CNATRA Documents)

The procedures listed in this document are deliberately simplified for gameplay purposes due to the limitations of the DCS World simulation environment and the limitations of the VNAO T-45C Mod

This document is merely a free, personal project that is used for entertainment. This document is not meant nor designed to teach someone to fly a real T-45C

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VNAO Simulations



Part 1 - About the Developers



Is a group of US Naval Aviation enthusiasts that strive to emulate the strategic operations of USN carrier aviation while paying tribute to those brave individuals that serve and served in the United States Navy.

Please like them on Facebook and visit them on Discord.

At VNAO, they like Naval Aviation. They welcome virtual pilots from all walks of life. They are proud to be associated with retired military individuals as well as young future aviators just getting interested in the field of aviation.

VNAO is a flight simulator group. They fly in DCS World and utilize the modules for the F/A18C Hornet and the legendary F-14B Tomcat.

DCS World and its study-level aircraft modules offer the realism and immersion that VNAO aviators have come to expect from an excellent flight simulation. Carrier operations in DCS is possible and amazingly detailed.

In the VNAO, you control your destiny. If you just want to fly the aircraft and learn to land on the carrier, you can do that. If you would like to take your immersion to the next level and train to become an LSO (Landing Signal Officer), Airboss, or even a squadron leader, it is all up to you and your level of dedication.

VNAO is always looking to expand our horizons and increase our participation.

The sky is truly the limit.



Part 2 - Introduction

The T-45 Goshawk is a carrier-qualified version of the British Aerospace Hawk Mk.60. It was redesigned as a trainer for the United States Navy (USN) and United States Marine Corps (USMC). Changes were made to the Hawk in two stages. The Hawk was redesigned for carrier operations and submitted to the Navy for flight evaluation. The development flight trials resulted in further modifications.



The initial redesign included stronger landing gear and airframe to withstand the loads imposed by catapult launches and high sink-rate (14 ft/sec) landings. A catapult tow bar attachment was added to the oleo strut of the new two-wheel nose gear. Other additions were an arresting hook, an increased span tailplane, side-mounted air brakes, and the addition of stabilator vanes, known as 'Side Mounted Upper Rear Fuselage Strakes' (SMURFS - USN), to stabilize flow over the stabilator with speed brakes extended.





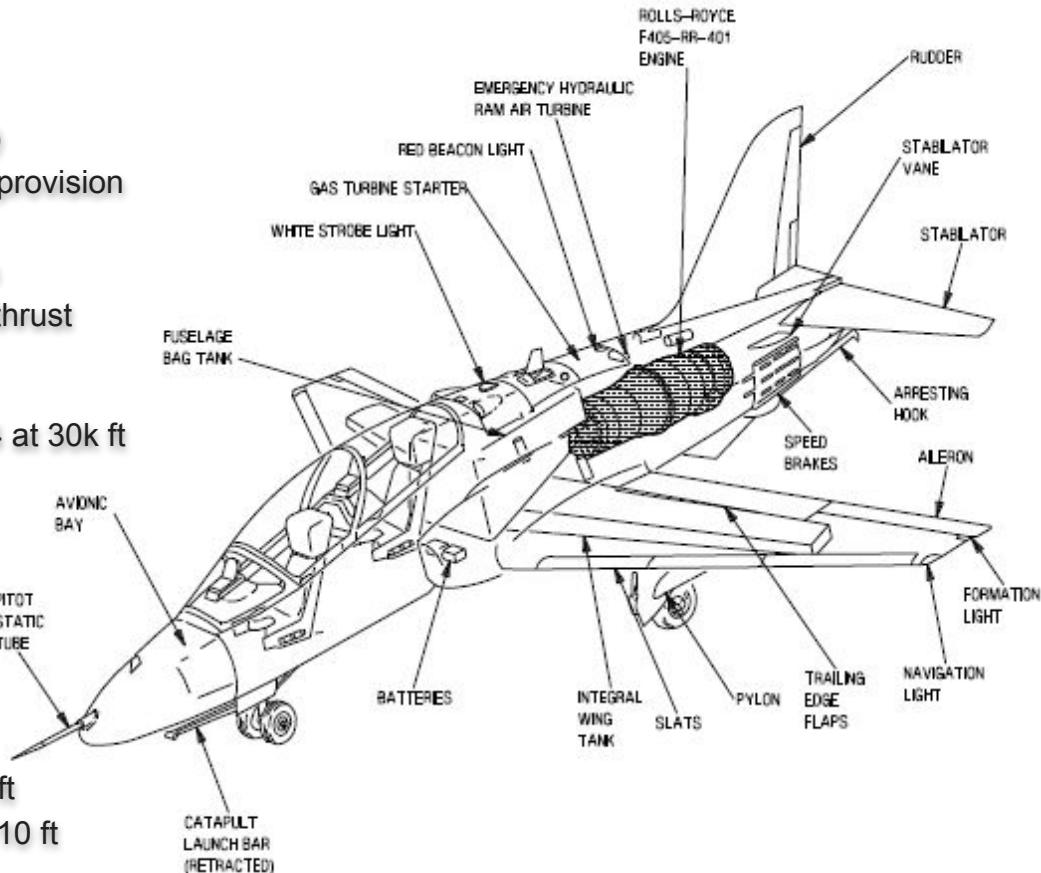
Part 2 - Introduction

General characteristics

- **Crew:** 2
- **Length:** 39 ft 4 in (11.99 m)
- **Wingspan:** 30 ft 9.75 in (9.3917 m)
- **Empty weight:** 9,394 lb (4,261 kg)
- **Gross weight:** 12,750 lb (5,783 kg)
- **Max takeoff weight:** 13,500 lb (6,123 kg)
- **Fuel capacity:** 3,159 lb internal fuel with provision for 2x 156 US gal drop tanks underwing
- **Powerplant:** 1 × Rolls-Royce Turbomeca F405-RR-401 turbofan engine, 5,527 lbs thrust

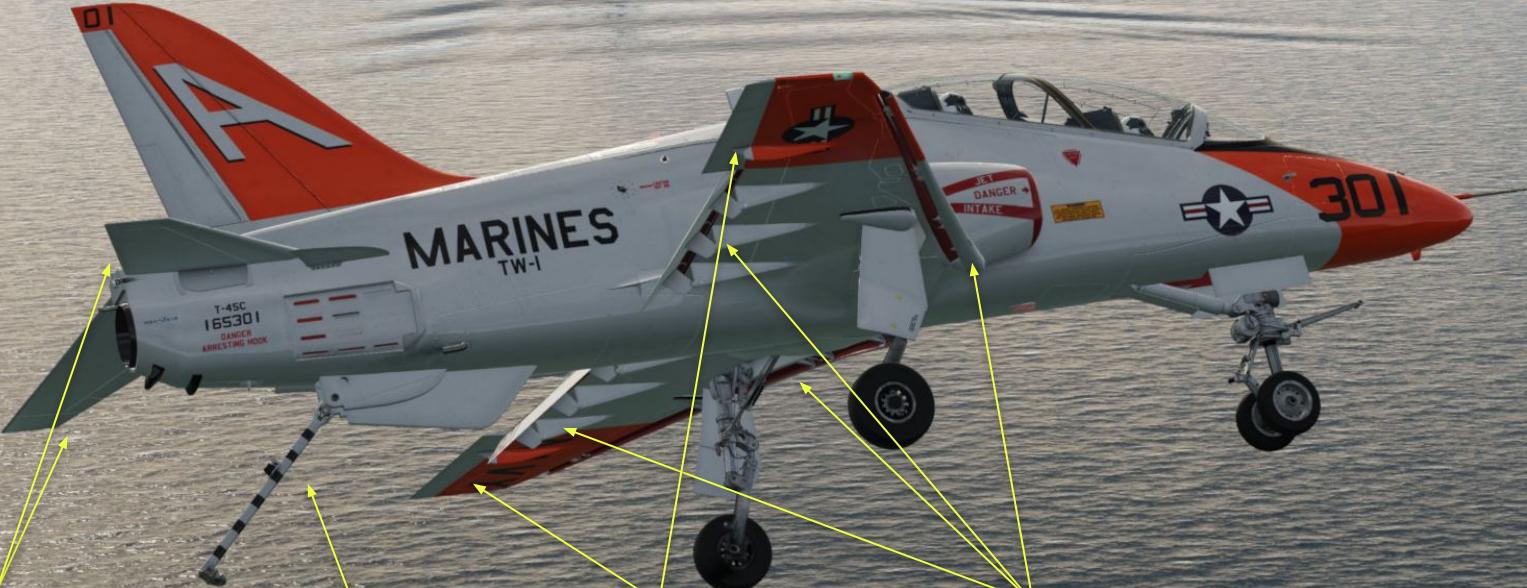
Performance

- **Maximum speed:** 543 kts at 8k ft / M0.84 at 30k ft
- **Carrier launch speed:** 121 kts
- **Never exceed speed:** 575 kts / M1.04
- **Range:** 700 nm
- **Service ceiling:** 42,500 ft (13,000 m)
- **g limits:** +7.33 / -3
- **Rate of climb:** 8,000 ft/min at sea level
- **Thrust/weight:** 0.41
- **Take-off distance to 50 ft (15 m):** 3,610 ft
- **Landing distance from 50 ft (15 m):** 3,310 ft





Part 2 - Introduction



Stabilator

Hook

Ailerons

Flaps / Slats





Part 3 - Cockpit & Equipment

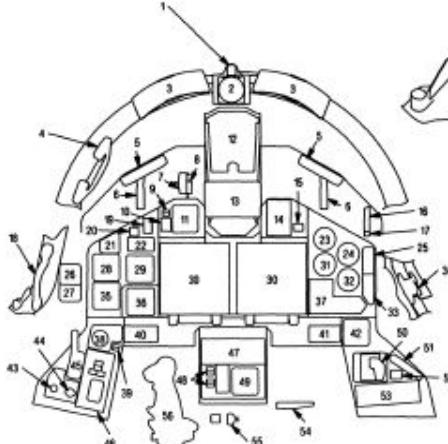
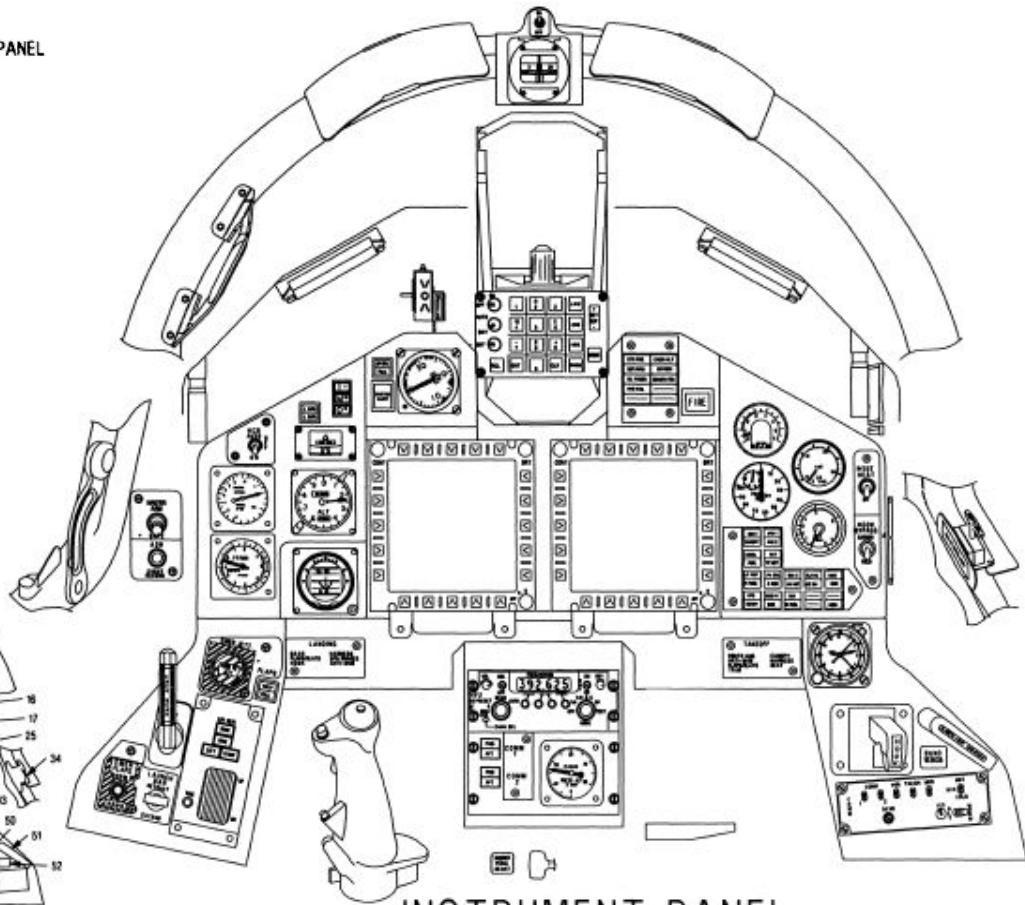




Part 3 - Cockpit & Equipment

Front Cockpit

INSTRUMENT PANEL



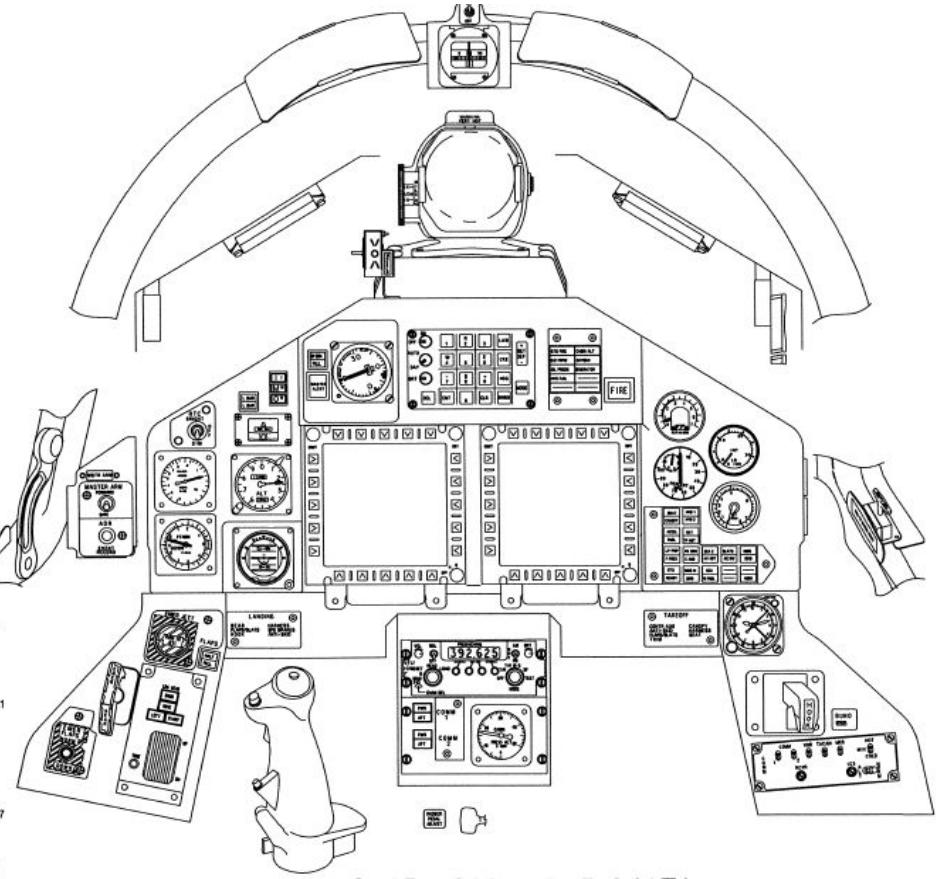
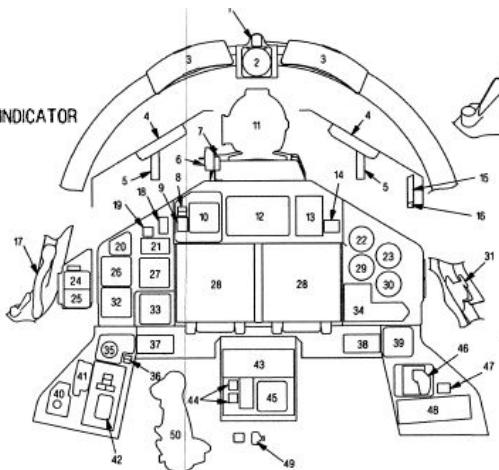
- 1. STANDBY COMPASS LIGHT SWITCH
- 2. STANDBY COMPASS
- 3. REAR VIEW MIRRORS
- 4. CANOPY GRAB HANDLE
- 5. GLARESHIELD/PANEL LIGHTS
- 6. MAP LIGHTS
- 7. ANGLE-OF-ATTACK INDEXER
- 8. WHEELS WARNING LIGHT
- 9. SPEED BRAKE LIGHTS
- 10. MASTER ALERT LIGHT
- 11. ANGLE-OF-ATTACK GAUGE
- 12. HUO
- 13. DEP
- 14. WARNING LIGHTS PANEL
- 15. FIRE WARNING LIGHT
- 16. COMPASS CORRECTION CARD
- 17. RADIO FREQUENCY CARD
- 18. CANOPY CONTROL LEVER
- 19. MARKER BEACON LIGHTS
- 20. LAUNCH BAR LIGHTS
- 21. VCR SWITCH
- 22. STANDBY TURN AND SLIP INDICATOR
- 23. FUEL FLOW INDICATOR
- 24. FUEL QUANTITY INDICATOR
- 25. PITOT HEAT SWITCH
- 26. MASTER ARM SWITCH
- 27. ADR EVENT RECORD BUTTON
- 28. STANDBY AIRSPEED INDICATOR
- 29. STANDBY BARO ALTIMETER
- 30. MFD
- 31. ENGINE RPM INDICATOR
- 32. EXHAUST GAS TEMPERATURE INDICATOR
- 33. HOOK BYPASS SWITCH
- 34. CANOPY MDC FIRING HANDLE
- 35. STANDBY VERTICAL SPEED INDICATOR
- 36. STANDBY ATTITUDE INDICATOR
- 37. WARNING/CAUTION/ADVISORY LIGHTS PANEL
- 38. EMERGENCY JETTISON BUTTON
- 39. FLAPS POSITION LIGHTS
- 40. LANDING CHECKLIST LIGHT PANEL
- 41. TAKEOFF CHECKLIST LIGHT PANEL
- 42. CLOCK
- 43. EMERGENCY FLAP SWITCH
- 44. LAUNCH BAR SWITCH
- 45. EMERGENCY LANDING GEAR HANDLE
- 46. LANDING GEAR CONTROL PANEL
- 47. UHF/VHF CONTROL PANEL NO. 1
- 48. COMM TRANSFER SWITCHES
- 49. CABIN PRESSURE ALTIMETER
- 50. ARRESTING HOOK HANDLE
- 51. PARKING BRAKE HANDLE
- 52. BUNO PLACARD
- 53. COMM CONTROL PANEL
- 54. RUDDER GUST LOCK LEVER
- 55. RUDDER PEDAL ADJUST KNOB
- 56. CONTROL STICK



Part 3 - Cockpit & Equipment

Rear Cockpit

1. STANDBY COMPASS LIGHT SWITCH
2. STANDBY COMPASS
3. REAR VIEW MIRRORS
4. GLARESHIELD/PANEL LIGHTS
5. MAP LIGHTS
6. ANGLE-OF-ATTACK INDEXER
7. WHEELS WARNING LIGHT
8. SPEEDBRAKE LIGHTS
9. MASTER ALERT LIGHT
10. ANGLE-OF-ATTACK GAUGE
11. GUNSIGHT
12. DEP
13. WARNING LIGHTS PANEL
14. FIRE WARNING LIGHT
15. COMPASS CORRECTION CARD
16. RADIO FREQUENCY CARD
17. CANOPY CONTROL LEVER
18. MARKER BEACON LIGHTS
19. LAUNCH BAR LIGHTS
20. RETICLE LIGHT SWITCH
21. STANDBY TURN AND SLIP INDICATOR
22. FUEL FLOW INDICATOR
23. FUEL QUANTITY INDICATOR
24. MASTER ARM OVERRIDE SWITCH
25. ADR EVENT RECORD BUTTON
26. STANDBY AIRSPEED INDICATOR
27. STANDBY BARO ALTIMETER
28. MFD
29. ENGINE RPM INDICATOR
30. EXHAUST GAS TEMPERATURE INDICATOR



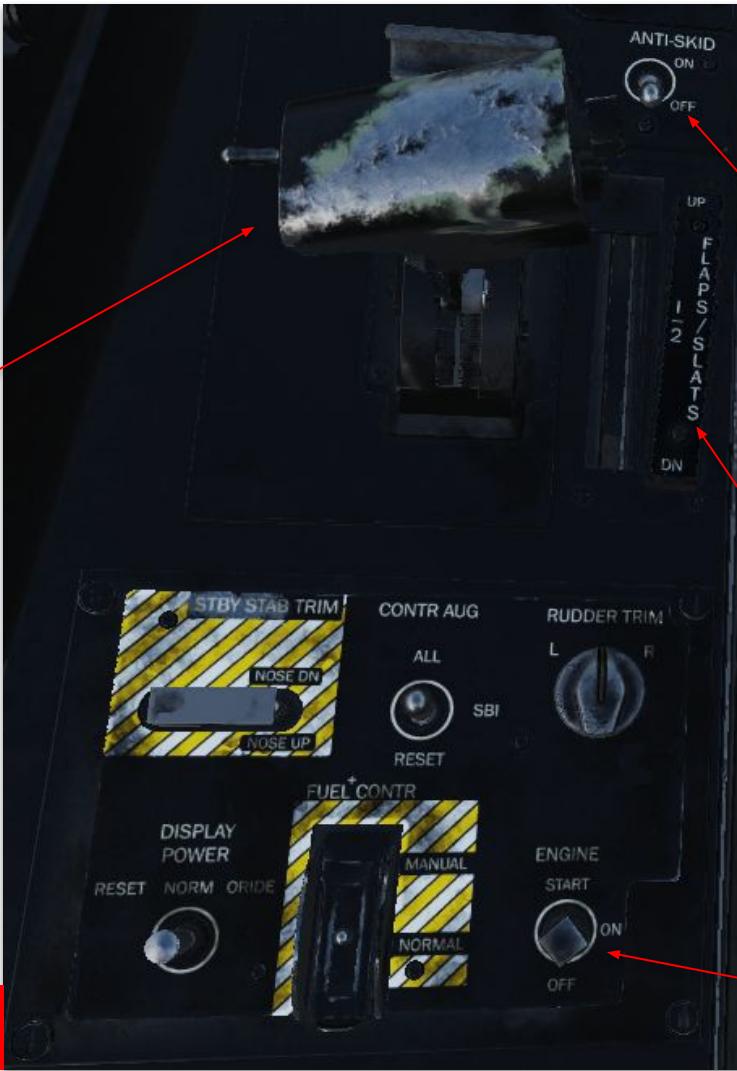
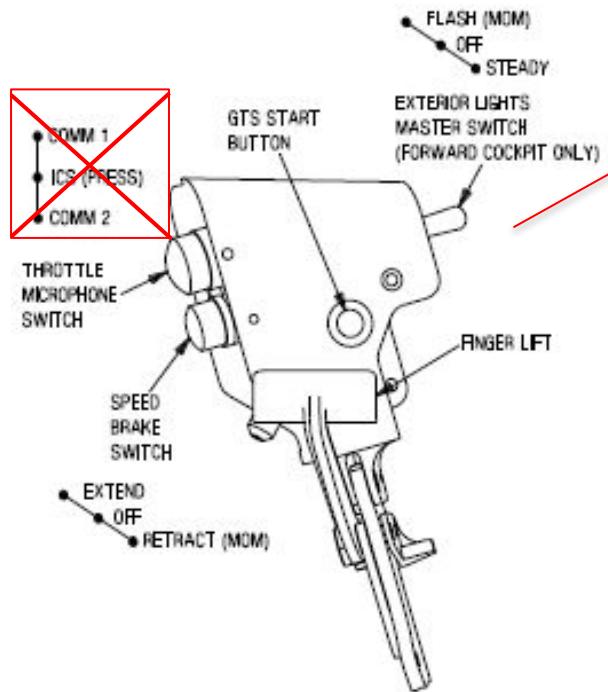
INSTRUMENT PANEL



Part 3 - Cockpit & Equipment

Left Panel - Rear

Throttle HOTAS Controls



Anti Skid Switch
Field Ops = ON
CV = OFF

Flaps/Slats Switch
UP / Half / Full

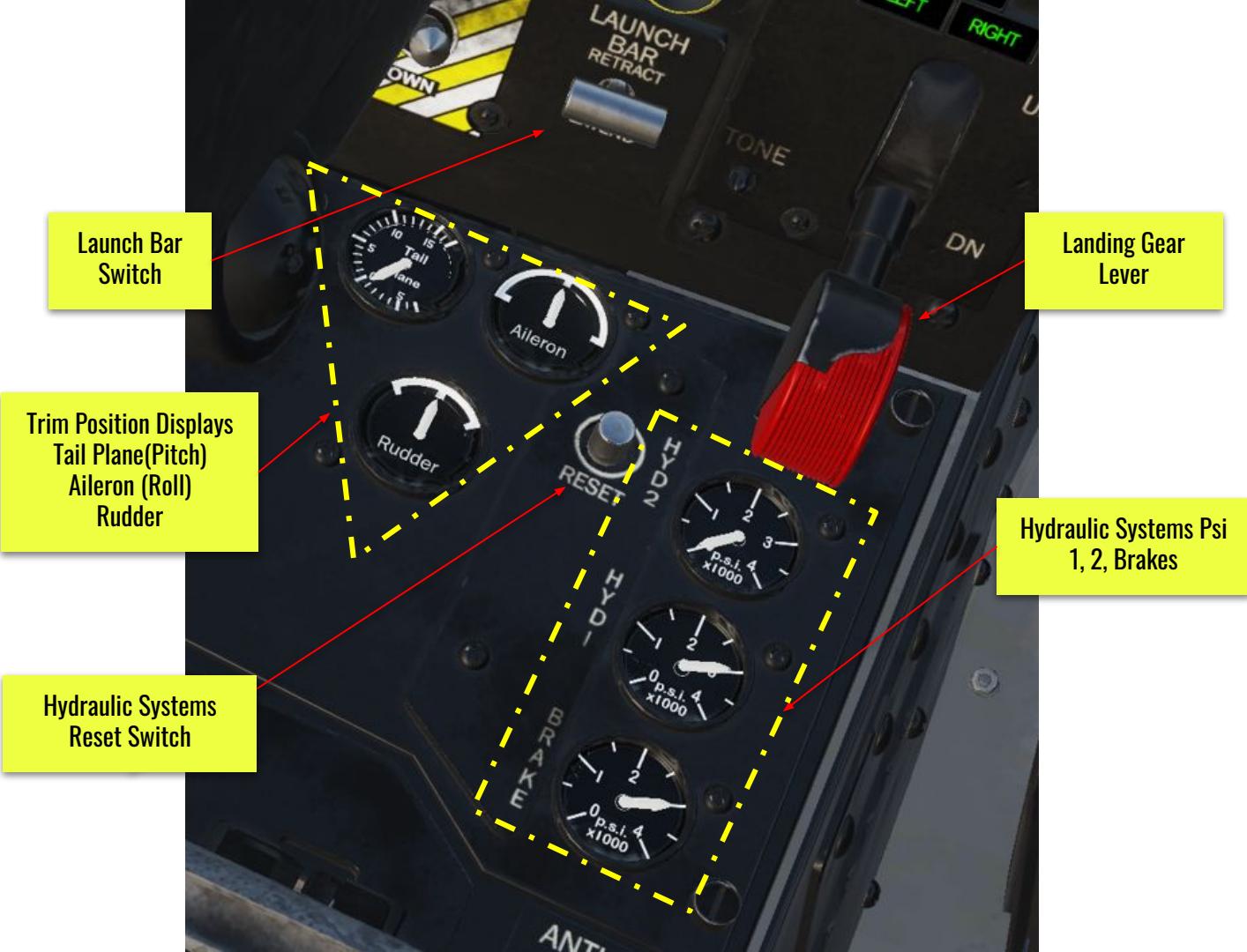
Engine Start/Operation
Switch

DCS Comm's only work while on the Ground



Part 3 - Cockpit & Equipment

Left Panel - Forward





Part 3 - Cockpit & Equipment

Front Panel - Left Side



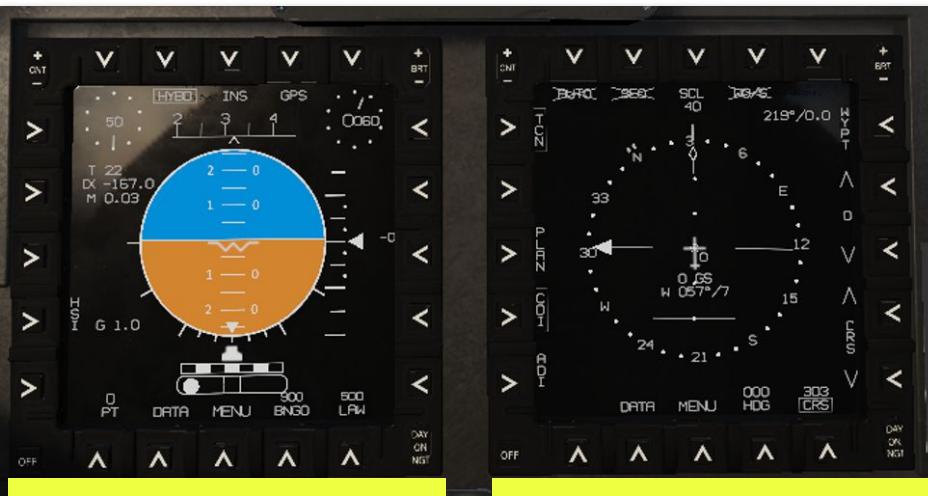


Part 3 - Cockpit & Equipment

Multifunction Displays

The T-45C is equipped with (2) two multi-function displays in both the front and back seat.

They can independently display different pages of information for the Pilot or IP.



ADI

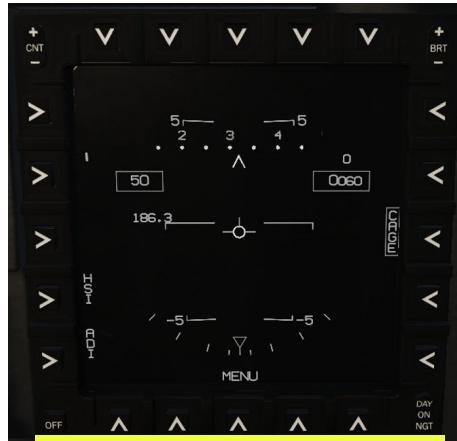
HSI



Stores Page



Engine Info

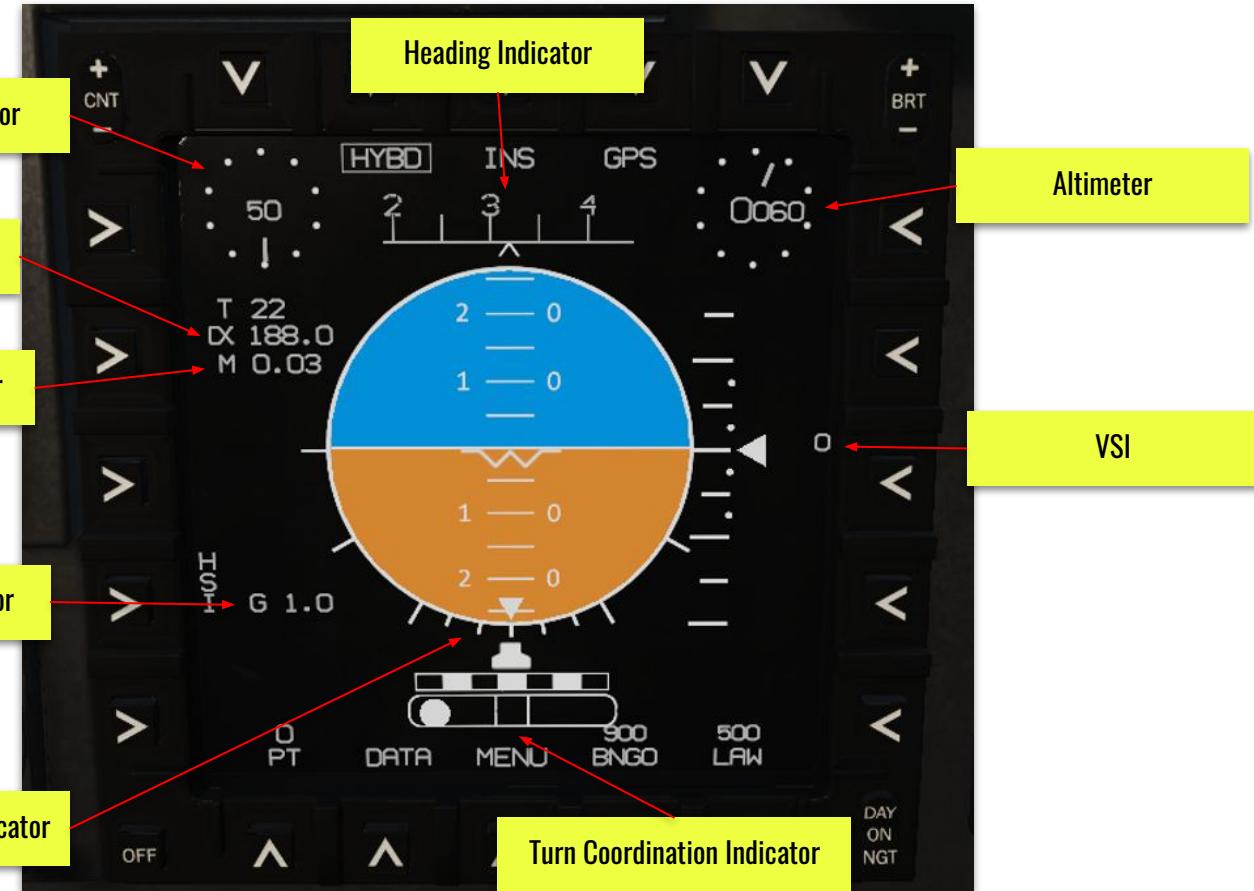


HUD Repeater



Part 3 - Cockpit & Equipment

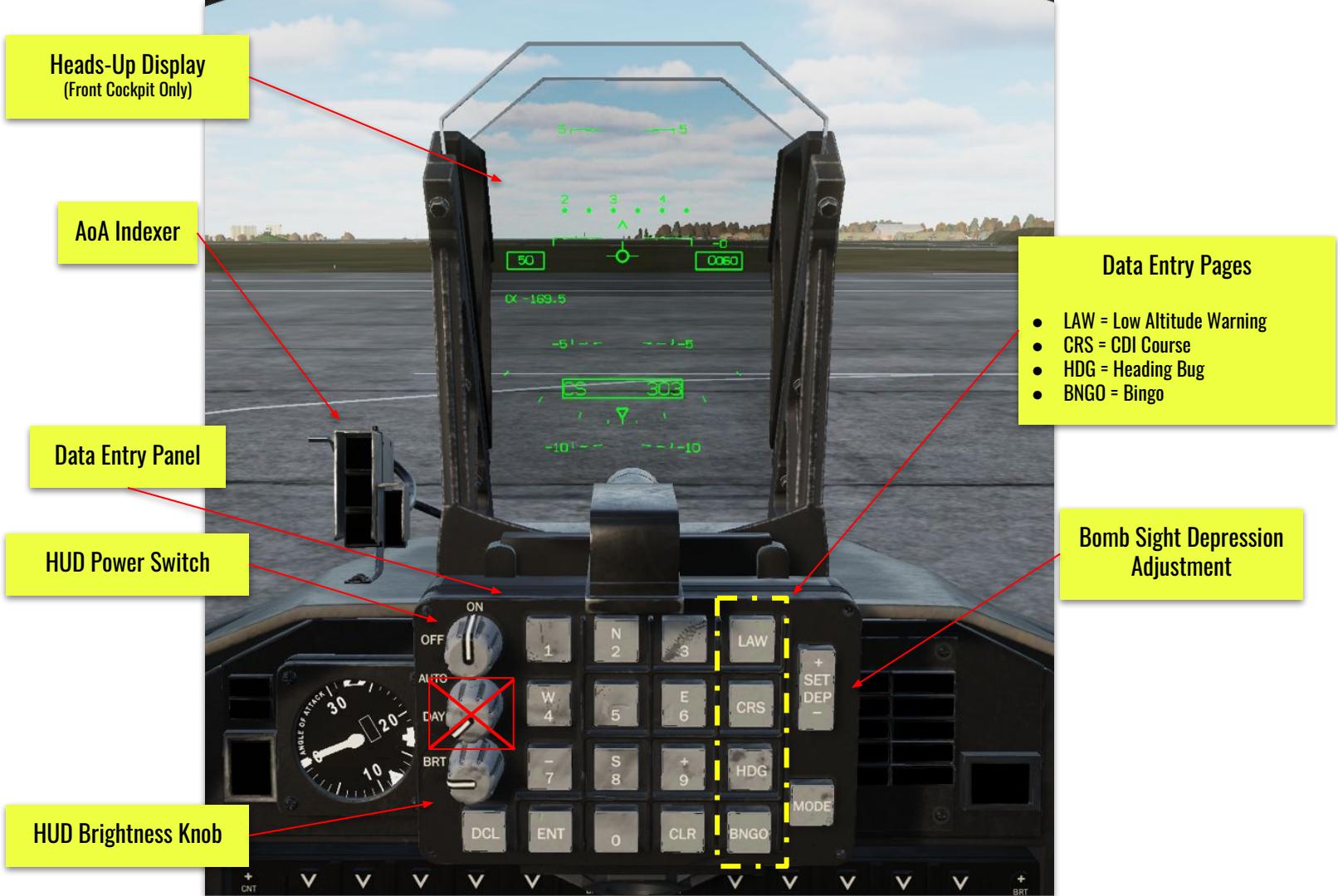
Multifunction Displays





Part 3 - Cockpit & Equipment

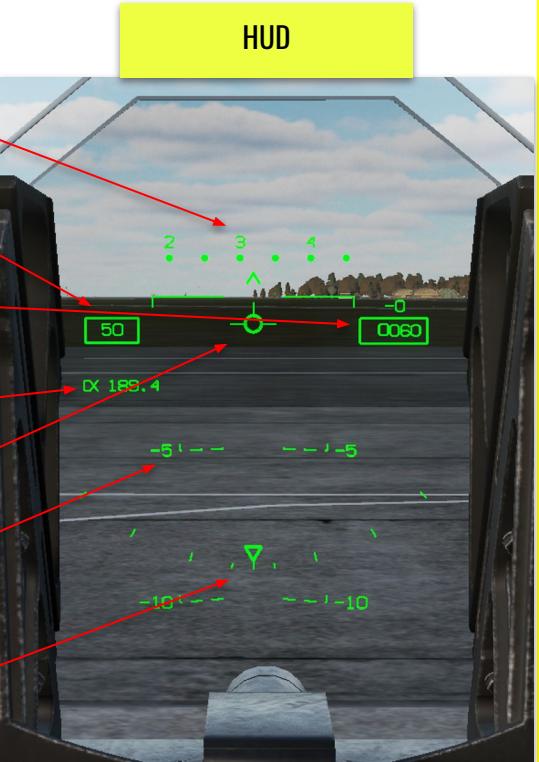
Front Panel



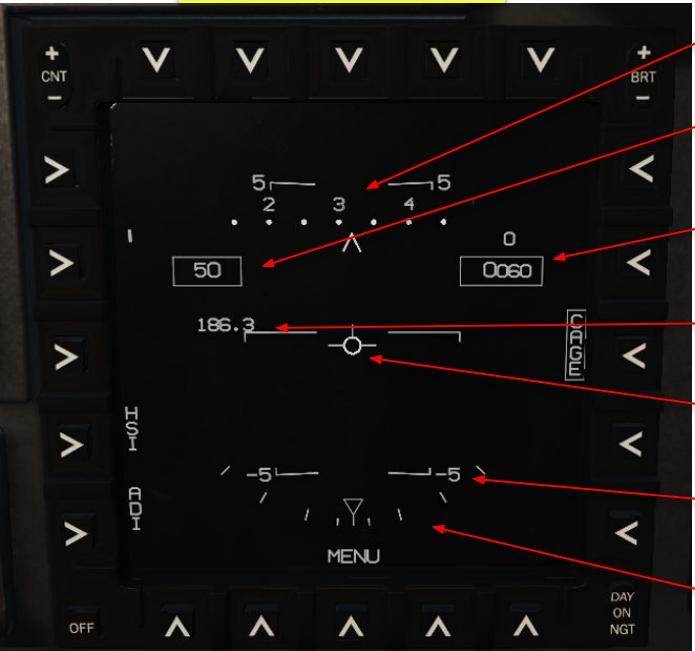


Part 3 - Cockpit & Equipment

Heads-Up Display



MFD HUD Repeater Page



Heading Indicator

Airspeed Indicator

VSI
Altimeter

AoA Indicator

Flight Path Marker

Pitch Ladder

Angle-of-Bank Indicator



Part 3 - Cockpit & Equipment

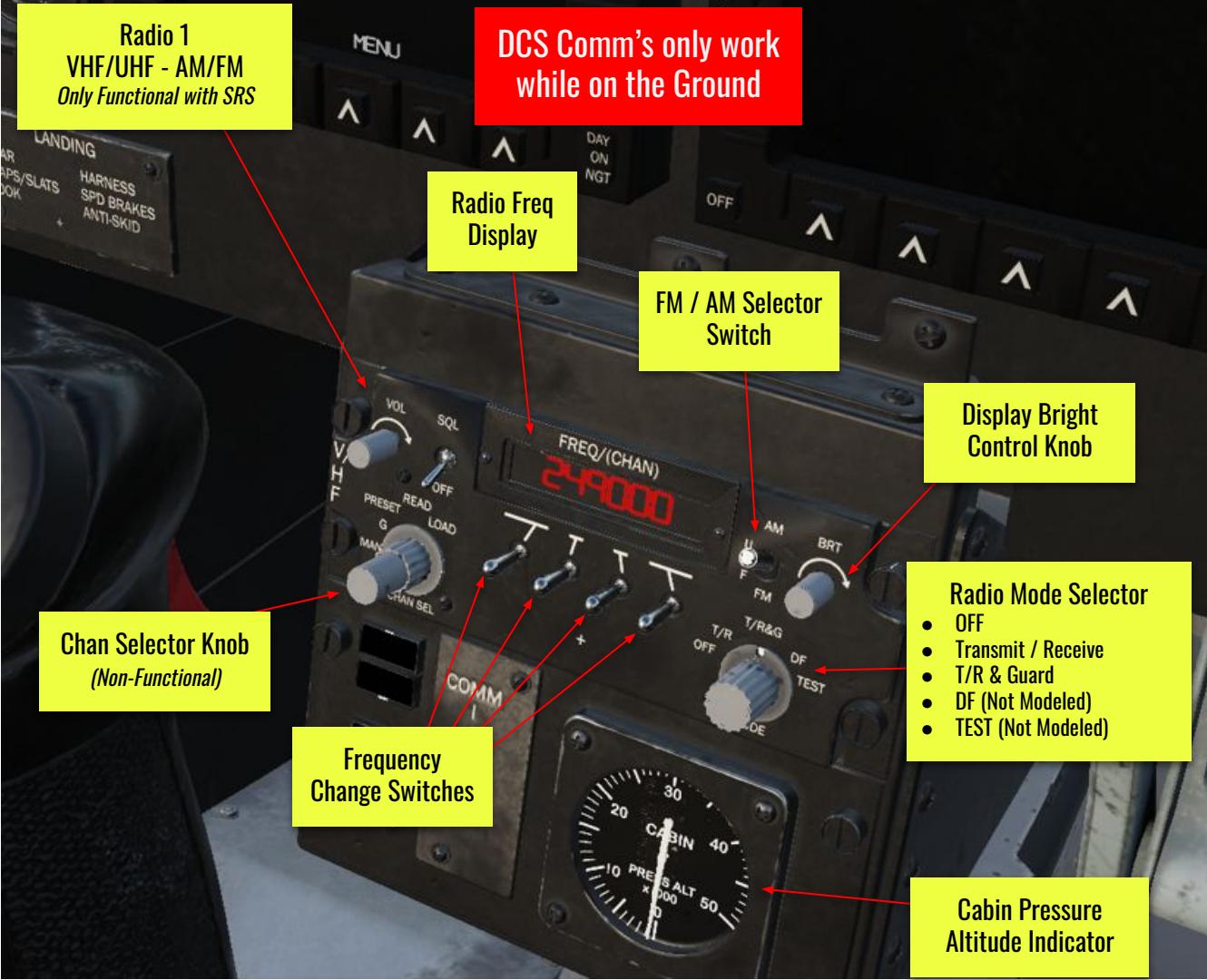
Front Panel - Right Side





Part 3 - Cockpit & Equipment

Front Panel - Low





Part 3 - Cockpit & Equipment

Right Panel - Forward

Nav (ILS) Radio
Left Knob: 1st 3 digits
Right Knob: last 2 digits

TACAN

Radio 2
VHF/UHF - AM/FM
Only Functional with SRS



Exterior Lighting Panel

- Landing / Taxi Light Switch



Part 3 - Cockpit & Equipment

Right Panel - Forward





Part 3 - Cockpit & Equipment

Right Panel - Rear



Exterior Lighting Panel

- Anti-Collision
- Nav Lights
- Tail Flood Light (*Not Modeled*)
- Wing Lights
- Formation Strips

IFF Panel (Not Modeled)

Power Panel

- Battery 1 & 2
- Generator Switch

Interior Light Panel

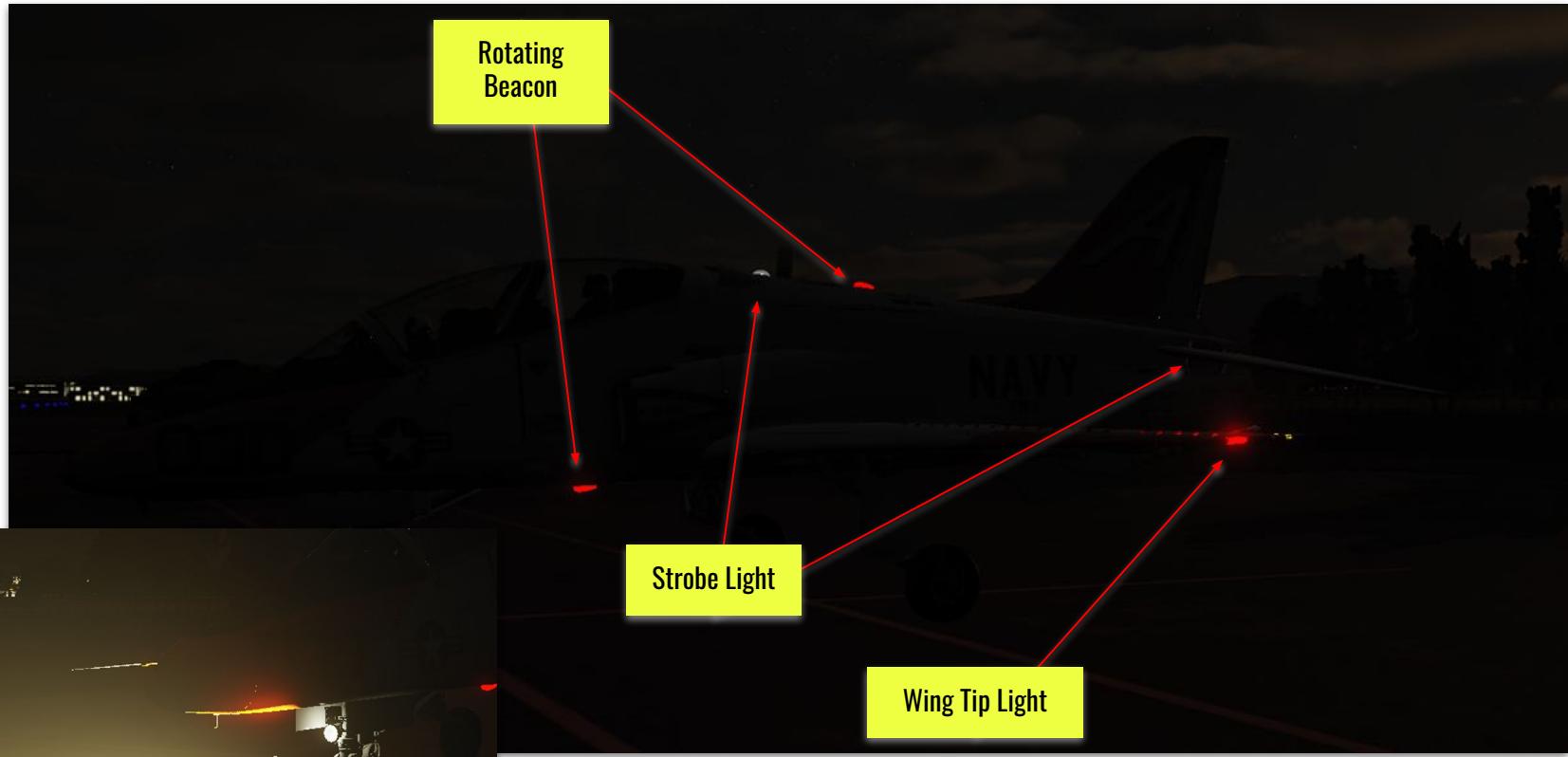
- Main Instrument Panel
- Console
- Flood Light



Part 3 - Cockpit & Equipment



Exterior Lights



LDG / Taxi
Light



Part 4 - Navigation Equipment





Current Navigational Limitations

- Waypoint / Steerpoint Editing
 - Currently the MOD does not allow you to edit waypoints from within the Aircraft.
 - The flightplan can be created/edited from within ME ONLY.
- ILS / ICLS
 - The MOD is only equipped for standard airfield ILS.
 - The NAV radio is the ILS radio.



Part 4 - Navigation Equipment

Navigational Displays & Equipment

Horizontal Situation Indicator



Heads-Up Display



1. ILS Radio
2. TACAN



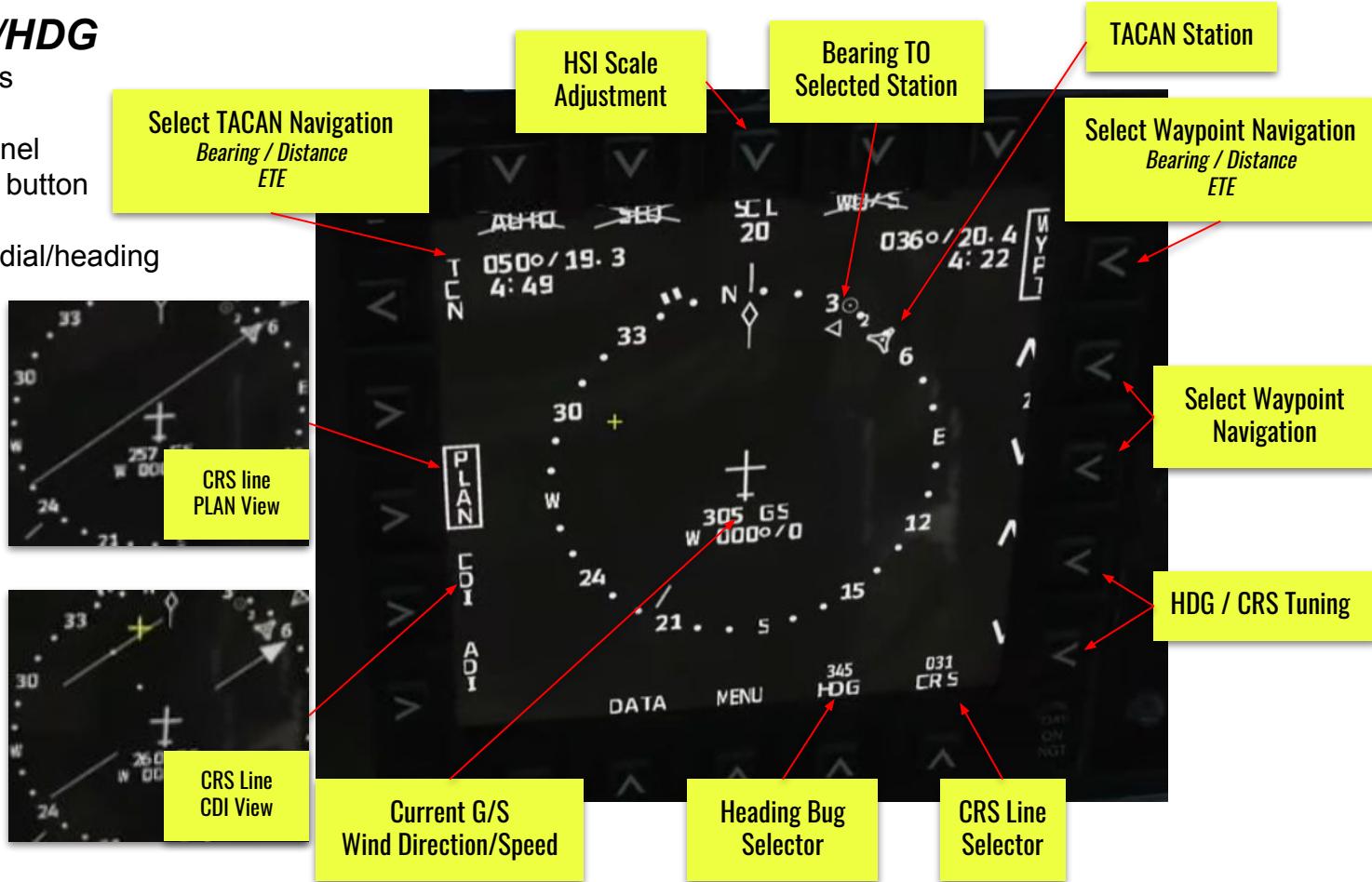


Part 4 - Navigation Equipment

Horizontal Situation Indicator

Edit CRS/HDG

- Use Tuning Buttons
- Use Data Entry Panel
 - Press CRS/HDG button
 - Enter desired Radial/heading
 - Press ENT





Part 4 - Navigation Equipment



ILS System

1. Tune ILS Station on NAV Radio
2. Select ILS on MFD HSI Page
3. Tune Localizer with CRS on DEP
4. Follow Glideslope / Localizer Needles on HUD & ADI MFD page





Part 5 - Start Up Procedure



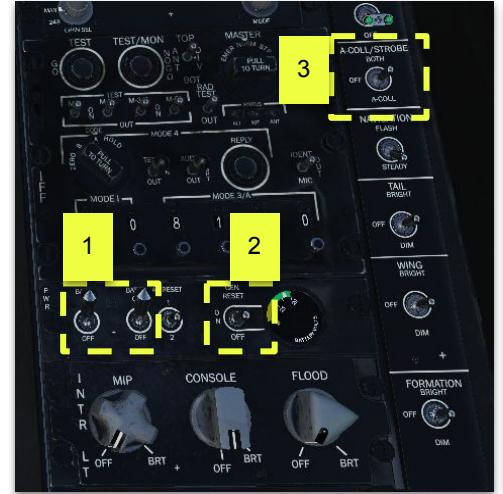


Part 5 - Start Up Procedure

Cold Start

Engine Start Procedure

1. Batt 1 & 2 switches - ON
2. Gen - OFF
3. A. Coll / Strobe Switch - ON
4. Left MFD - ON / Engine Page
5. Engine switch - ON
6. Ext. Lights Master Switch - ON
7. Gas Turbine Starter - ON (GTS Light ON)
8. Engine Switch - Start (HOLD)
9. Throttle - IDLE @ 20% RPM
10. Engine Instruments
 - a. N1 RPM - 100%
 - b. N2 RPM - 55%
 - c. FF - 500 - 600 pph





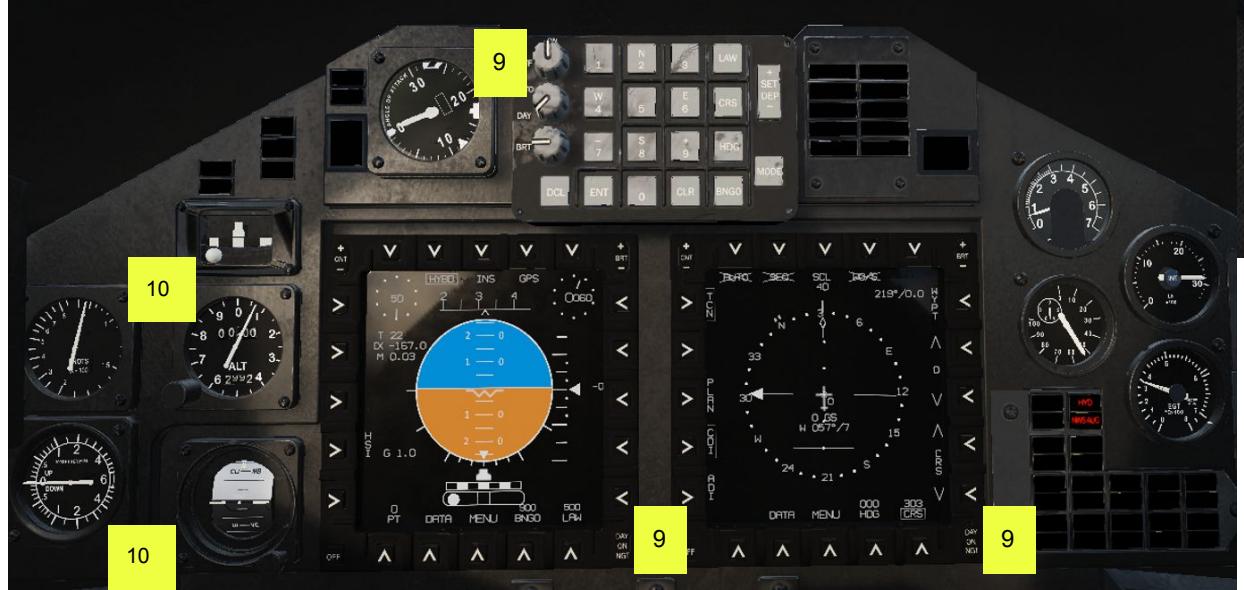
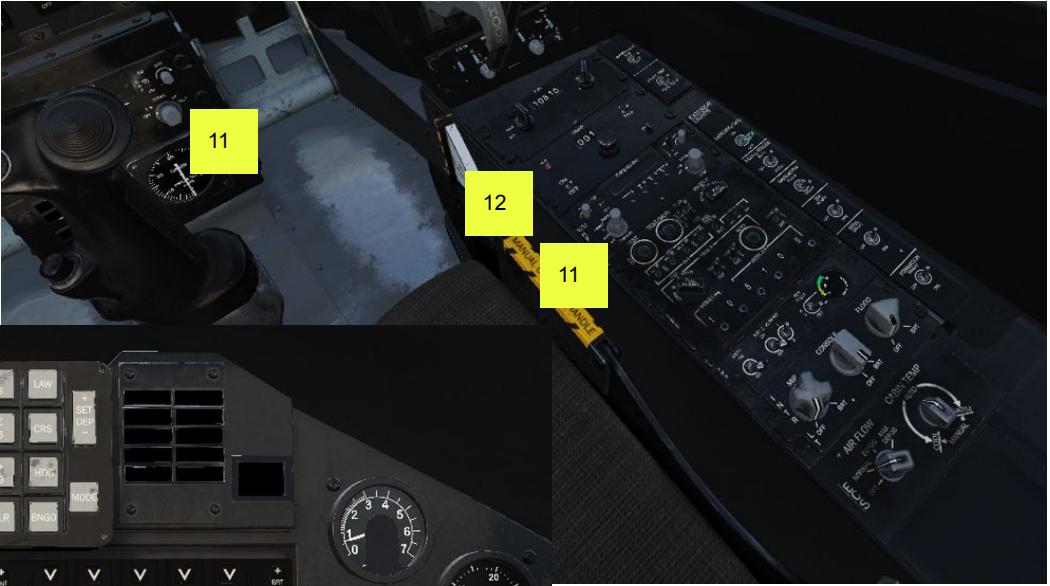
Cold Start



Part 5 - Start Up Procedure

Engine Start Procedure

9. HUD / MFD's - ON
10. Flight Instruments
 - a. ADI
 - b. Altimeter- Uncaged
- Set to Field Elevation
11. Radio's 1 & 2 - T/R
12. TACAN - ON / SET





Part 5 - Start Up Procedure



Pre-Taxi

Pre-Taxi Procedure

1. HYD Reset Button
 2. TRIM
 3. LAW, BINGO
 4. Flaps
 5. Parking Brake
- PRESS, HYD 2 Shows 3k psi
 - 3° NOSE UP
 - SET
 - HALF
 - OFF





Part 5 - Start Up Procedure



Pre-Taxi

Pre-Taxi Procedure

6. Pitot Heat Switch -ON
7. Anti-Skid
 - a. Field -ON
 - b. CV Ops -OFF
8. Canopy -Closed
9. Ejection Seat -ARMED





Part 6 - Take-Off

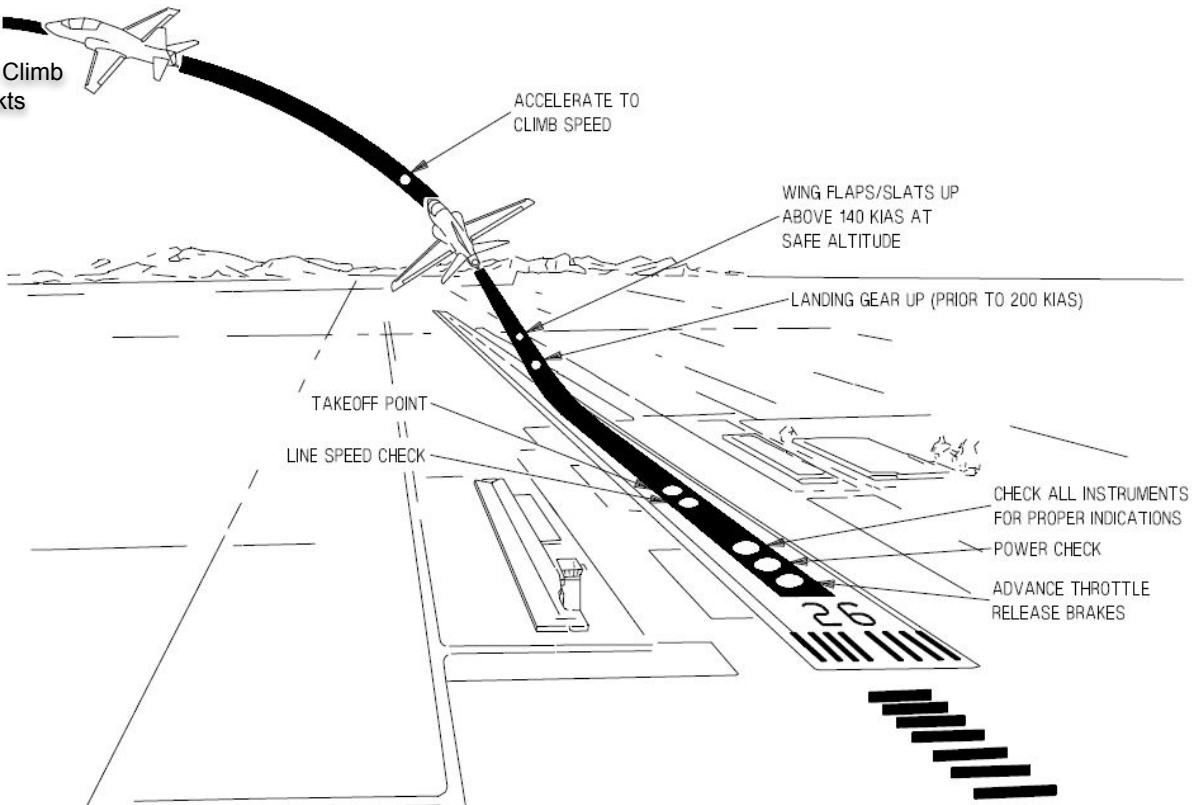




Part 6 - Take-Off

Take-Off

1. Brakes - HOLD
2. Throttle - 85%
3. Engine Instruments - STEADY
4. Warnings & Cautions - NONE
5. Brakes - Release
6. Throttle - MAX Power
7. Rotate - 130 kts
8. VSI - Positive Rate of Climb
9. Landing Gear - UP prior to 200 kts
10. Flaps - Full UP





Part 7 - Field Landing





Part 7 - Field Landing

Approach & Landing

Over Head Brake

1. Approach

- a. Speed - 300 kts
- b. Altitude - 1,500ft AGL

2. Break

- a. Level Turn - +3G
- b. Throttle - IDLE
- c. Speed Brakes - OUT FULL

3. Downwind

- a. Flaps - FULL @ <200 kts
- b. Gear - Down @ <200 kts
- c. Altitude - Maintain 1,500ft AGL
- d. Speed - 150 kts

4. Base Turn "Perch"

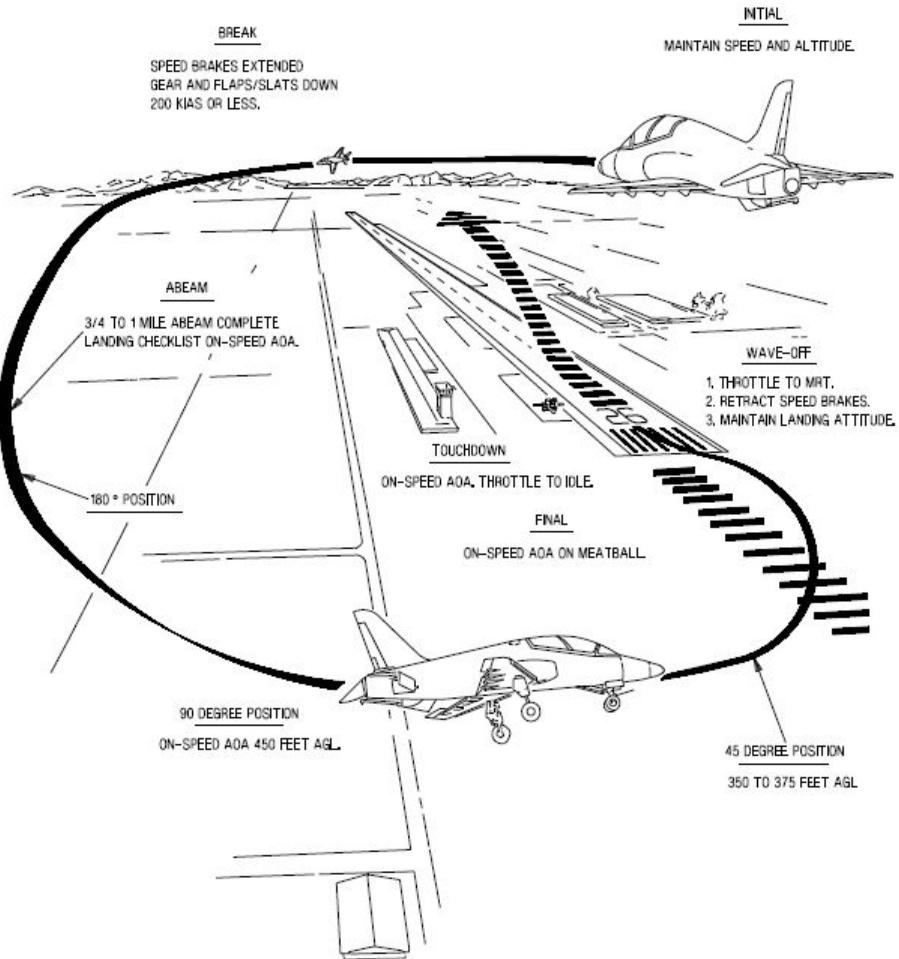
- a. Attitude - 30° Bank
- 3° Descent
- b. Speed - 140 kts

5. Final Turn

- a. Attitude - 30° Bank
- 3° Descent
- b. Speed - On speed / On AoA

6. Final

- a. Attitude - Wings LEVEL
- b. FPM - Touch down Point
- c. Speed - On Speed / On AoA





Part 8 - Carrier Operations

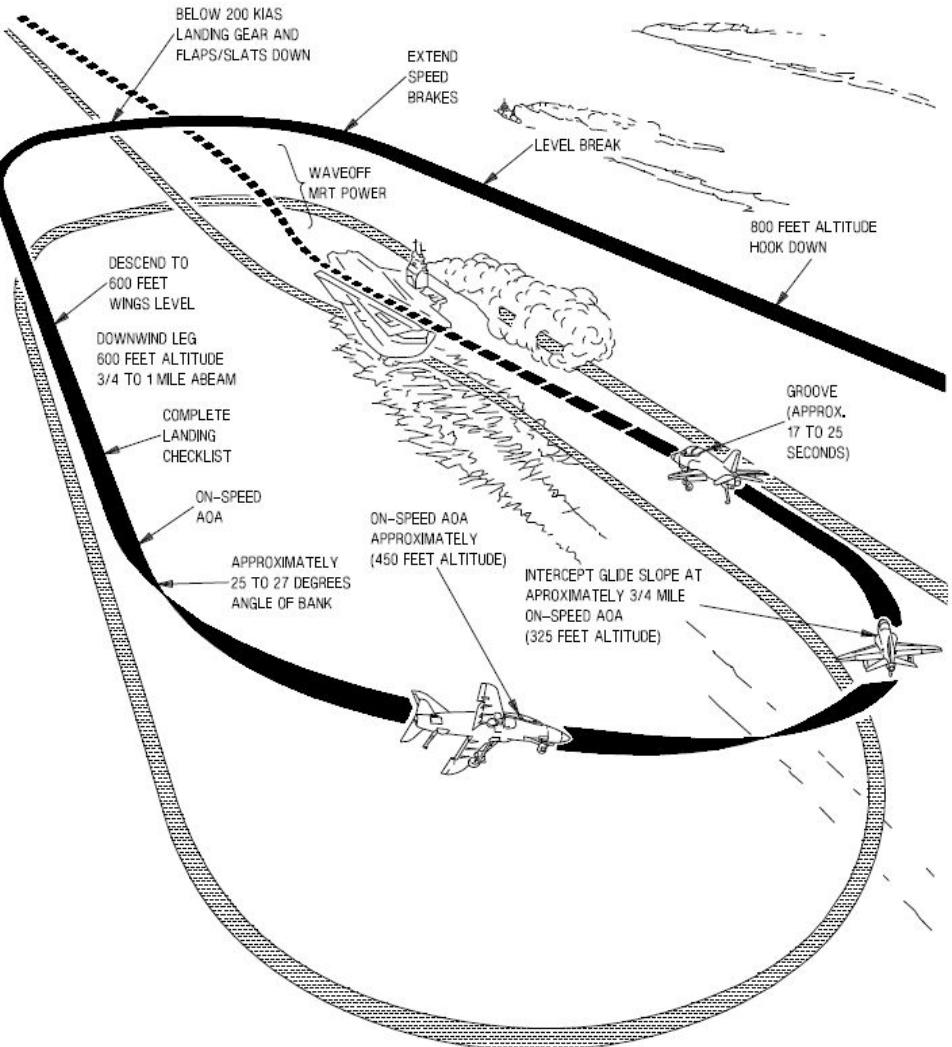




Part 8 - Carrier Operations

CV Ops Approach & Landing

1. Approach
 - a. Speed - 300 kts
 - b. Altitude - 800 AGL
 - c. Hook - DOWN
2. Break
 - a. Level Turn - +3G
 - b. Throttle - IDLE
 - c. Speed Brakes - OUT FULL
3. Downwind
 - a. Flaps - FULL @ <200 kts
 - b. Gear - Down @ <200 kts
 - c. Altitude - 600 ft AGL
 - d. Speed - On speed / On AoA
4. Base Turn "Perch"
 - a. Attitude - 27° Bank
 - 3° Descent
 - b. Speed - On speed / On AoA
5. Final Turn
 - a. Attitude - 27° Bank
 - b. Glidepath - Intercept & Follow
 - c. Speed - On speed / On AoA
6. Final
 - a. Speed - On Speed / On AoA
 - b. FLOS - Follow





Part 9 - Weapons Systems





Overview



The T-45C also has the ability to carry the BDU-33D/B practice bomb as well as the M274 Smoke Training Rockets on the underwing hardpoints. It also has an Internal Gun simulator that will display the appropriate symbology on the Heads-Up Display, but not actually shoot any projectiles.

BDU-33



M274





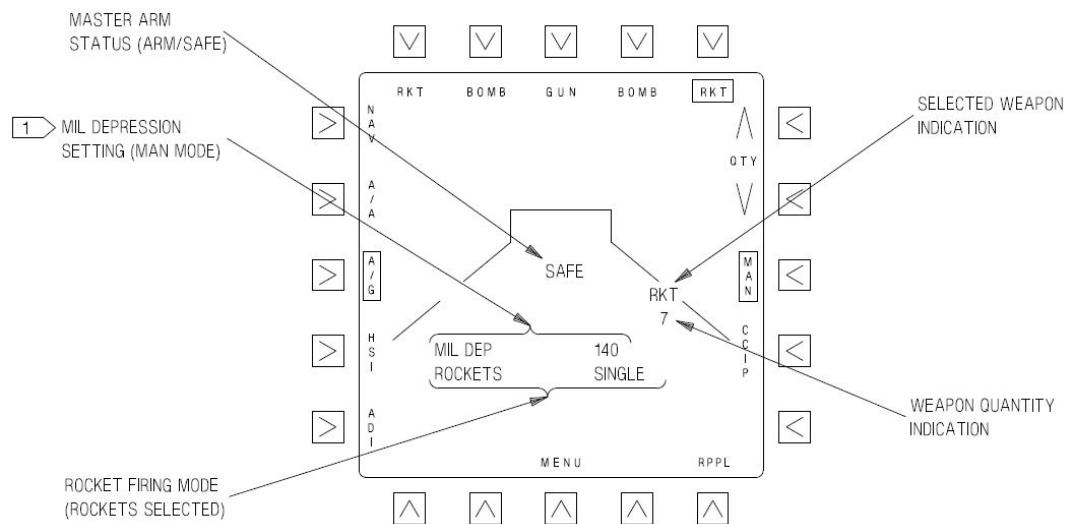
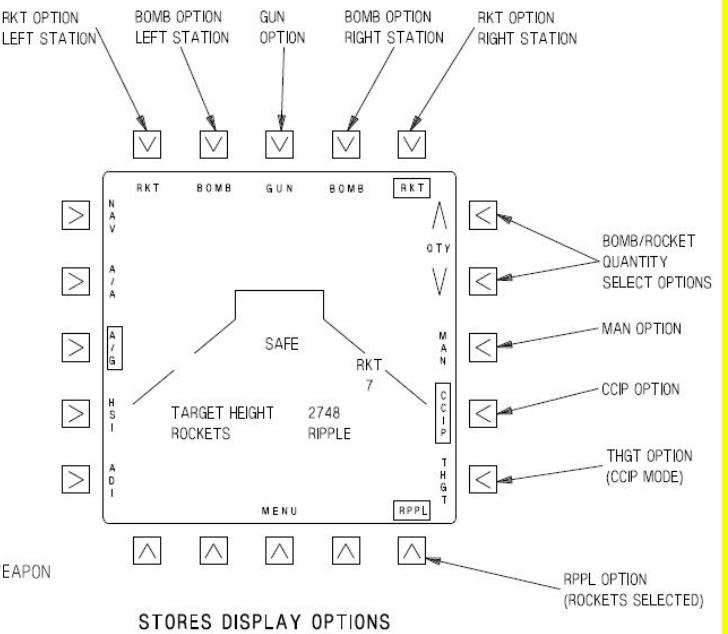
Part 9 - Weapons Systems

Overview

Stores MFD Page Symbology

1 TARGET HEIGHT SETTING (CCIP MODE)

STORES SYMBOLIC





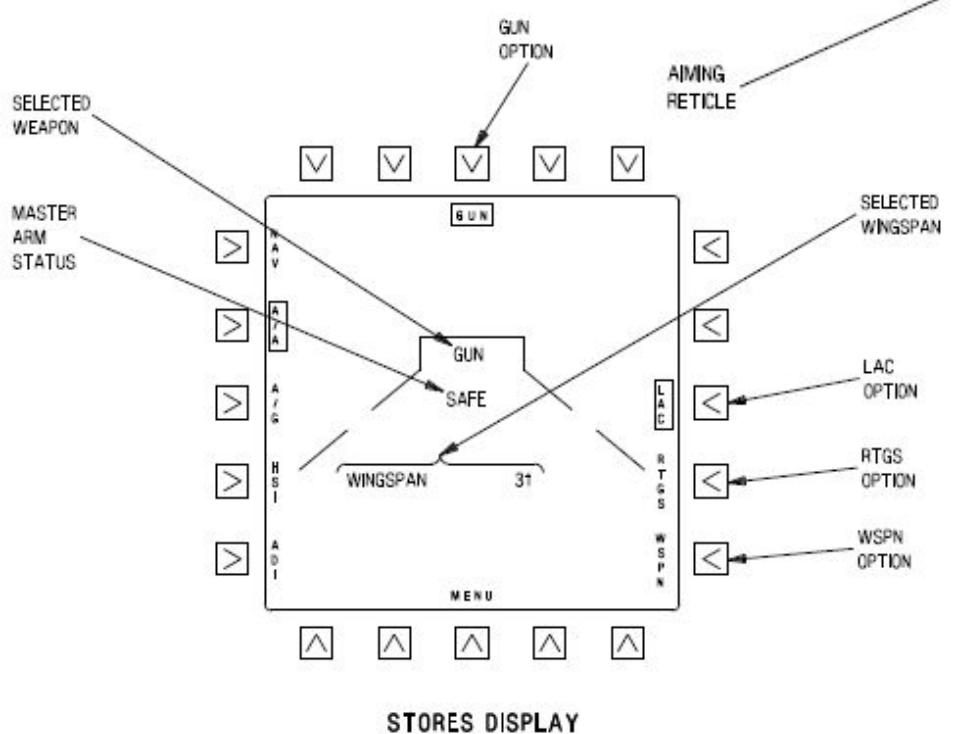
Part 9 - Weapons Systems

Air to Air Systems

Wingspan

The manually set wingspan is used to calibrate the aiming reticle for accuracy at 1,000 ft range.

To edit, press WSPN and enter desired wingspan using DEP.



- **LAC = Lead Angle Computed**

- The LAC submode is used for tracking a non-maneuvering target by keeping the target inside the aiming reticle pipper. Target wingspan should be kept on the inner radius of the reticle, thus ensuring that the target is at a range of 1,000 feet.

- **RTGS = Real Time Gun Sight**

- The RTGS submode is used for tracking a maneuvering target by aiming and keeping the reticle pipper ahead of the target (snapshot).
- The aiming reticle is software positioned on the point that a shell would reach if it had been fired "t_f" seconds ago, where "t_f" is the time it takes the shell to travel 1,000 feet.

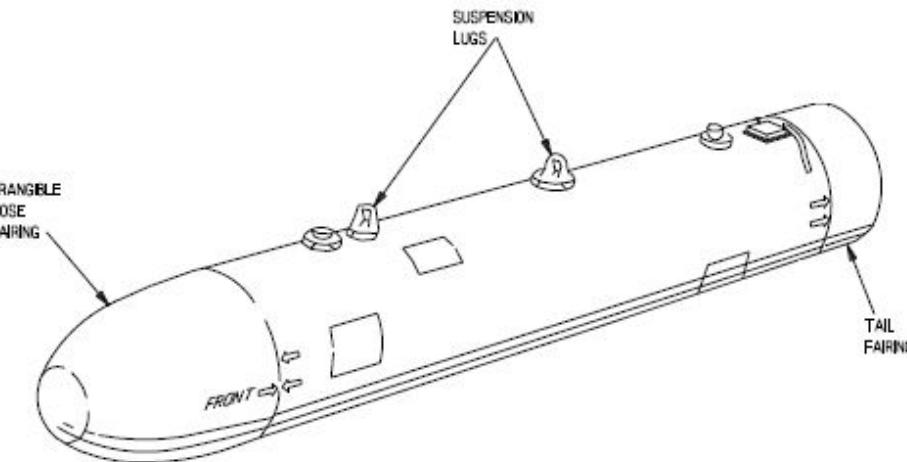


Part 9 - Weapons Systems



The M274 warhead is a smoke/flash signature practice warhead used for pilot/gunner training missions. A single dispenser can be mounted on each hard point.

It is designed to emulate the ballistic characteristic of the Hydra 70 unguided rockets employed by NATO militaries.





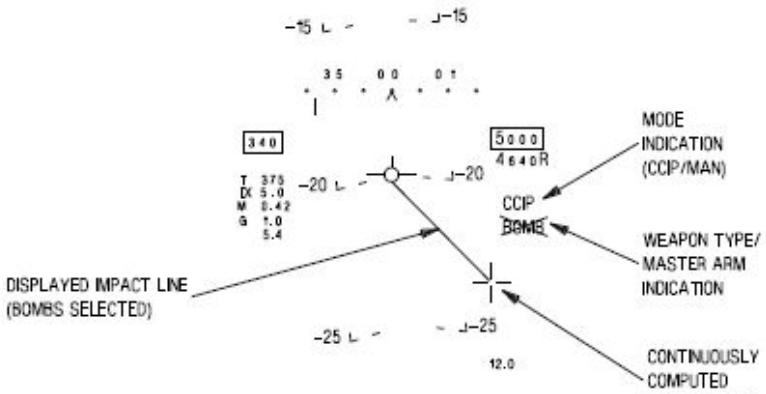
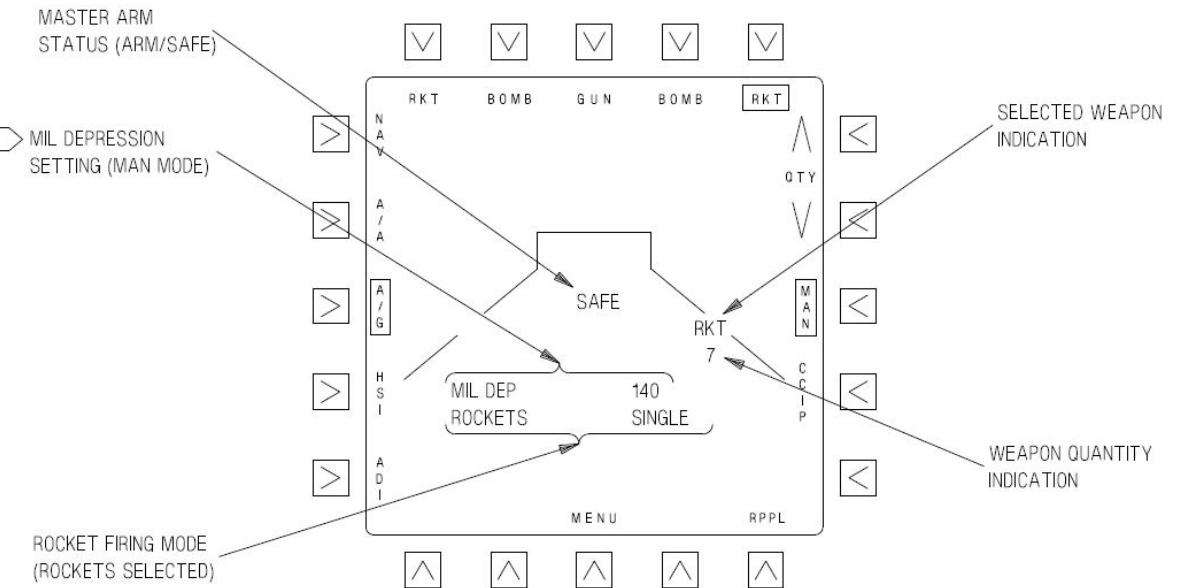
Part 9 - Weapons Systems

Air-to-Ground Systems

Practice Rockets

1. Master Arm ON
2. A/G Mode Selected
3. RKT SELECTED
4. RPL Mode SET as Desired

Ready to Release Weapons





Part 9 - Weapons Systems

Air-to-Ground Systems

The BDU-33 is an inert, releasable training munition with the same weight and drag profile as the Mk. 82 general-purpose bomb.

Upon impact, the BDU-33 releases a smoke cloud that can be used to identify the impact point.

The BDU-33 can be loaded in sets of six on the A/A37B-3 multiple ejector bomb rack.





Part 9 - Air-to-Ground Systems

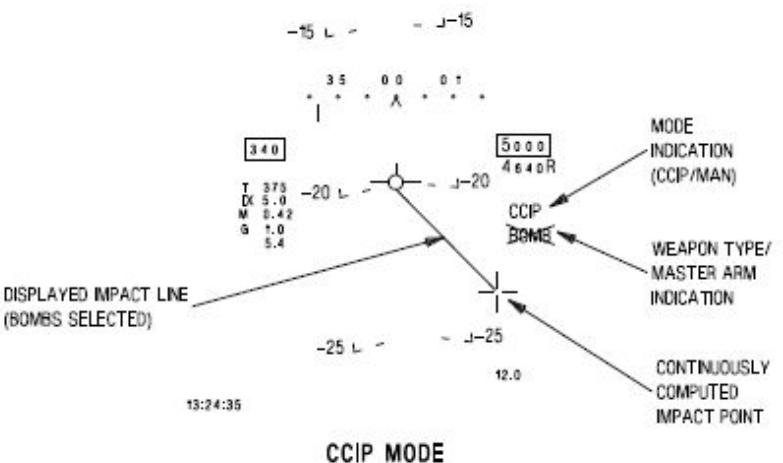


Practice Bombs

1. Master Arm ON
2. A/G Mode Selected
3. Bomb SELECTED

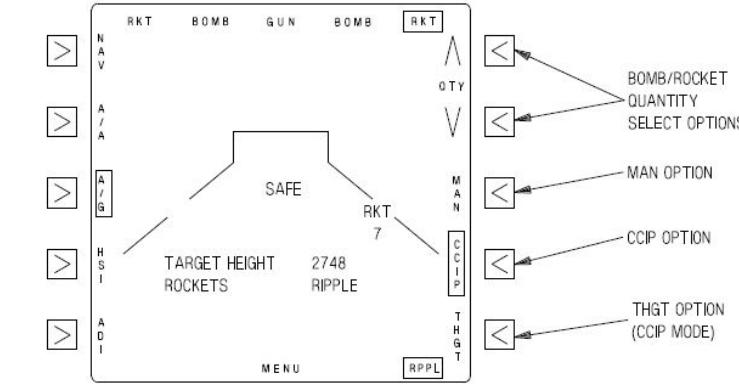
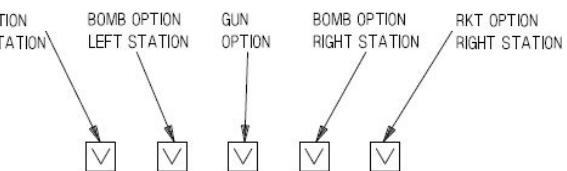
TARGET HEIGHT SETTING (CCIP MODE)

Ready to Release Weapons



STORES SYMBOLS

RKT OPTION LEFT STATION BOMB OPTION LEFT STATION GUN OPTION BOMB OPTION RIGHT STATION RKT OPTION RIGHT STATION



STORES DISPLAY OPTIONS

BOMB/ROCKET QUANTITY SELECT OPTIONS

MAN OPTION

CCIP OPTION

THGT OPTION (CCIP MODE)

RPPL OPTION (ROCKETS SELECTED)

