DCS GUIDE
A-10C WARTHOG

By Chuck

LAST UPDATED: 19/01/2021

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Special thanks to Paul "Goldwolf" Whittingham for creating the guide icons.

The **Fairchild Republic A-10C Thunderbolt II** is a single-seat, twin turbofan engine, straight wing jet aircraft developed by Fairchild-Republic for the United States Air Force (USAF). It is commonly referred to by the nicknames "Warthog" or "Hog", although the A-10's official name comes from the Republic P-47 Thunderbolt, a World War II fighter-bomber effective at attacking ground targets. The A-10 was designed for close air support (CAS) of friendly ground troops, attacking armored vehicles and tanks, and providing quick-action support against enemy ground forces. It entered service in 1976 and is the only production-built aircraft that has served in the USAF that was designed solely for CAS. Its secondary mission is to provide forward air controller – airborne support, by directing other aircraft in attacks on ground targets. Aircraft used primarily in this role are designated OA-10.

The A-10 was intended to improve on the performance of the A-1 Skyraider and its lesser firepower. The A-10 was designed around the 30 mm GAU-8 Avenger rotary cannon. Its airframe was designed for durability, with measures such as 1,200 pounds of titanium armor to protect the cockpit and aircraft systems, enabling it to absorb a significant amount of damage and continue flying. Its short takeoff and landing capability permits operation from airstrips close to the front lines, and its simple design enables maintenance with minimal facilities. The A-10 served in the Gulf War (Operation Desert Storm), the American led intervention against Iraq's invasion of Kuwait, where the A-10 distinguished itself. The A-10 also participated in other conflicts such as in Grenada, the Balkans, Afghanistan, Iraq, and against Islamic State in the Middle East.

The A-10A single-seat variant was the only version produced, though one pre-production airframe was modified into the YA-10B twin-seat prototype to test an all-weather night capable version. In 2005, a program was started to upgrade remaining A-10A aircraft to the A-10C configuration, with modern avionics for use with precision weaponry. The U.S. Air Force had stated the F-35 would replace the A-10 as it entered service, but this remains highly contentious within the USAF and in political circles. With a variety of upgrades and wing replacements, the A-10's service life can be extended to 2040; the service has no planned retirement date as of June 2017.

RTFM, or "Read The F*cking Manual", is probably one of the most commonly used expressions in DCS… especially when the A-10C is involved.

These four letters represent what I hate the most about the flight sim community. "RTFM" is what you say to someone who asks for help when you want to get rid of him. The philosophy behind this is that experienced pilots expect new guys to do their homework before they ask questions, since 99 % of the time the answer will lie somewhere in the 671 pages long manual.

Is it fair? Yes and no. Some people genuinely dislike training new guys: it is a demanding task, it takes a lot of time and patience, and you need a structured approach and exceptional communication skills to keep it somewhat interesting. On the other hand, giving a complex answer to someone who does not have a basic understanding of aircraft systems may be a futile exercise. Sometimes, it is about ego: why would I give a new guy the answer when I had to read through the whole bloody manual to know this stuff?

Whatever the reason, I think that the "RTFM" philosophy only works with someone who already has a background in aviation and is already aware of what he needs to know to fly the aircraft. I believe that someone who has little to no background in aviation needs a little more handholding. There's **nothing wrong with that**: real life Warthog pilots are trained for weeks before they earn their wings. I don't expect you to reach that level of proficiency. After all, flight simulation is not a full-time job: it is just a hobby.

The Warthog manual is a terrific resource, but it is a long, tedious and dry read. It is easy to feel discouraged and give up on the A-10C. I can't tell you how many people I know who bought the A-10C, and realized with horror that they had to go through a huge paper brick to be able to do anything. Where to start? What is important? Is everything relevant? Can I skip some parts? Why do I need to learn this or that? All these questions overwhelm the majority of newcomers who give up and let the A-10 gather dust on their hard drive, cursing the Flight Sim gods for their cruelty and the 40 bucks that went down the drain.

Therefore, I decided to create this guide to help the average Joe to be able to operate the Hog to a decent level. The structure of this document is how I would give a course to someone who starts from scratch. Follow the guide section by section, and you should be able to know how to set up your controls, how the aircraft systems work, how to operate your machine, how to use your weapons, how to navigate and how to stay alive.

I **highly** recommend that you fly the A-10C with a Thrustmaster Warthog throttle and HOTAS (Hands On Throttle-and-Stick). It's expensive (550 bucks, yikes!), but for an aircraft like the Warthog with so many switches… it is a necessity more than a nice-to-have. In my opinion, it is an investment that is completely worth it if you are interested in flight sims since the quality and craftsmanship are top notch, and it just makes your life so much easier. You can fly the A-10C with a normal joystick, but be aware that you will have a **LOT** (read: shit-ton) of key bindings to remember. So, just remember… stay calm, don't panic, we'll go through it together.

We will first see what controls you will be playing with and a general layout of the cockpit. After, we'll see how to choose your loadout, fire up the aircraft, takeoff, fly and navigate. We'll get to know some fancy acronyms, see a couple of systems and how they work. Once you have all that unsavoury stuff crammed into your brain, we'll blow some stuff up (yay!), see how not to end up in a smoldering pile of ashes and how to get back on the ground in one piece.

Still awake? All right, let's get to it, shall we?

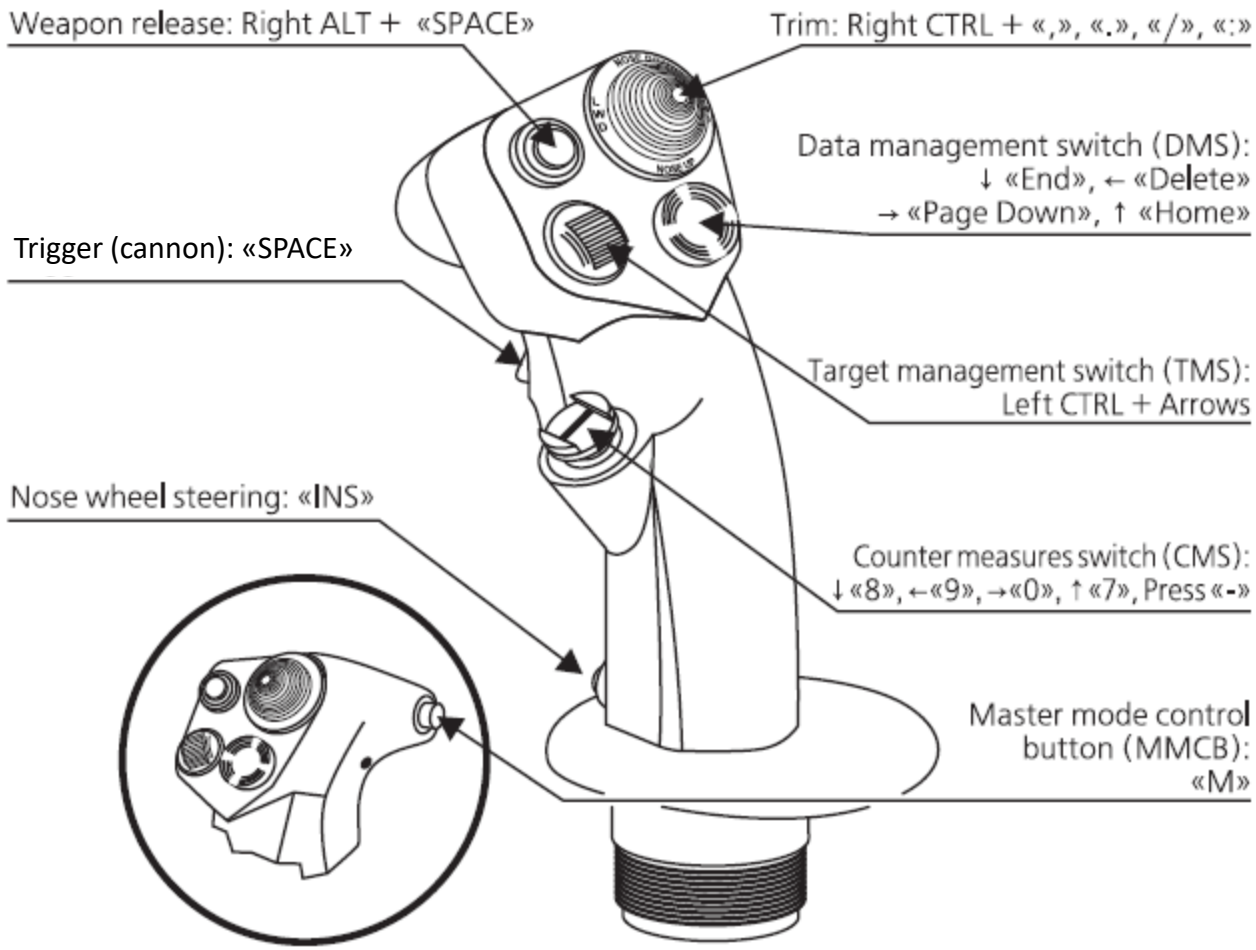
A-10C “Legacy” vs A-10C II “Tank Killer”

Throughout the guide, you will see certain sections that refer to the A-10C “Legacy” and A-10C II “Tank Killer” versions. The “Legacy” is the original version of the DCS A-10 released back in 2011. An expansion to the module was released in 2020, which includes new weapons, a Helmet-Mounted Cueing System (HMCS), a new 3D model, new HOTAS functions and various improvements to different systems across the board. Green and red tags as shown below specify whether a section is applicable exclusively to a version, and the absence of a tag means that the section is applicable to either version.

PART 1 – INTRODUCTION

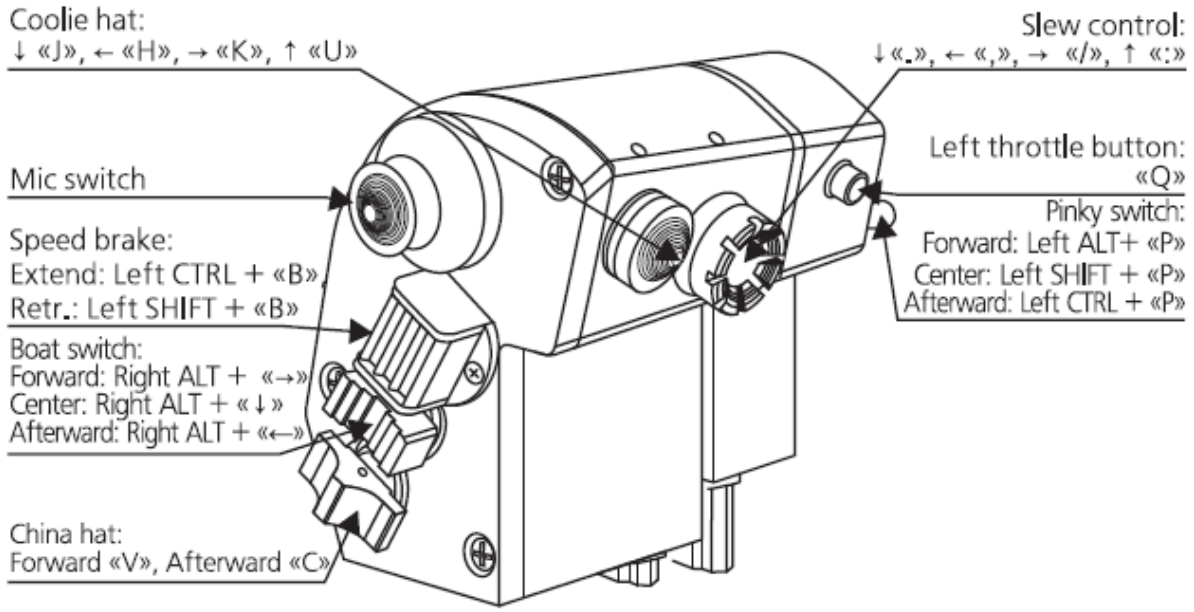
CONTROLS SETUP

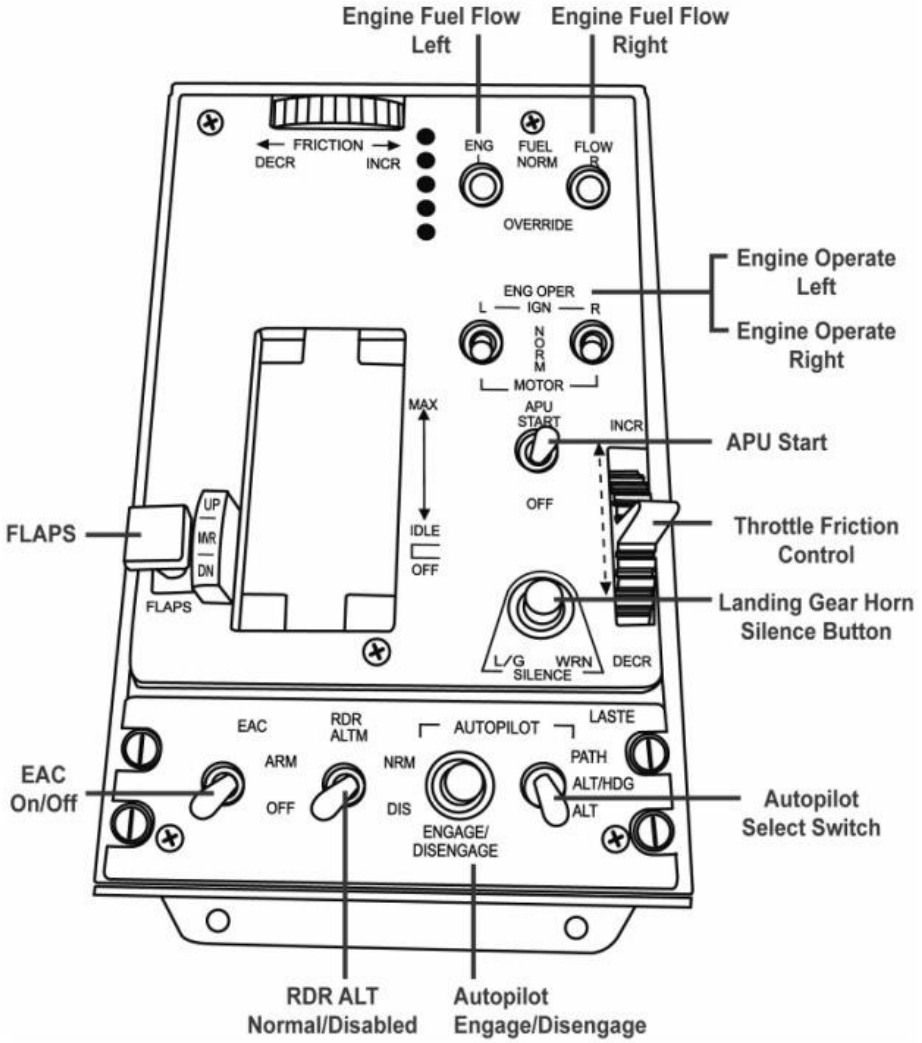
HOTAS: “**Hands On Throttle-And-Stick**”



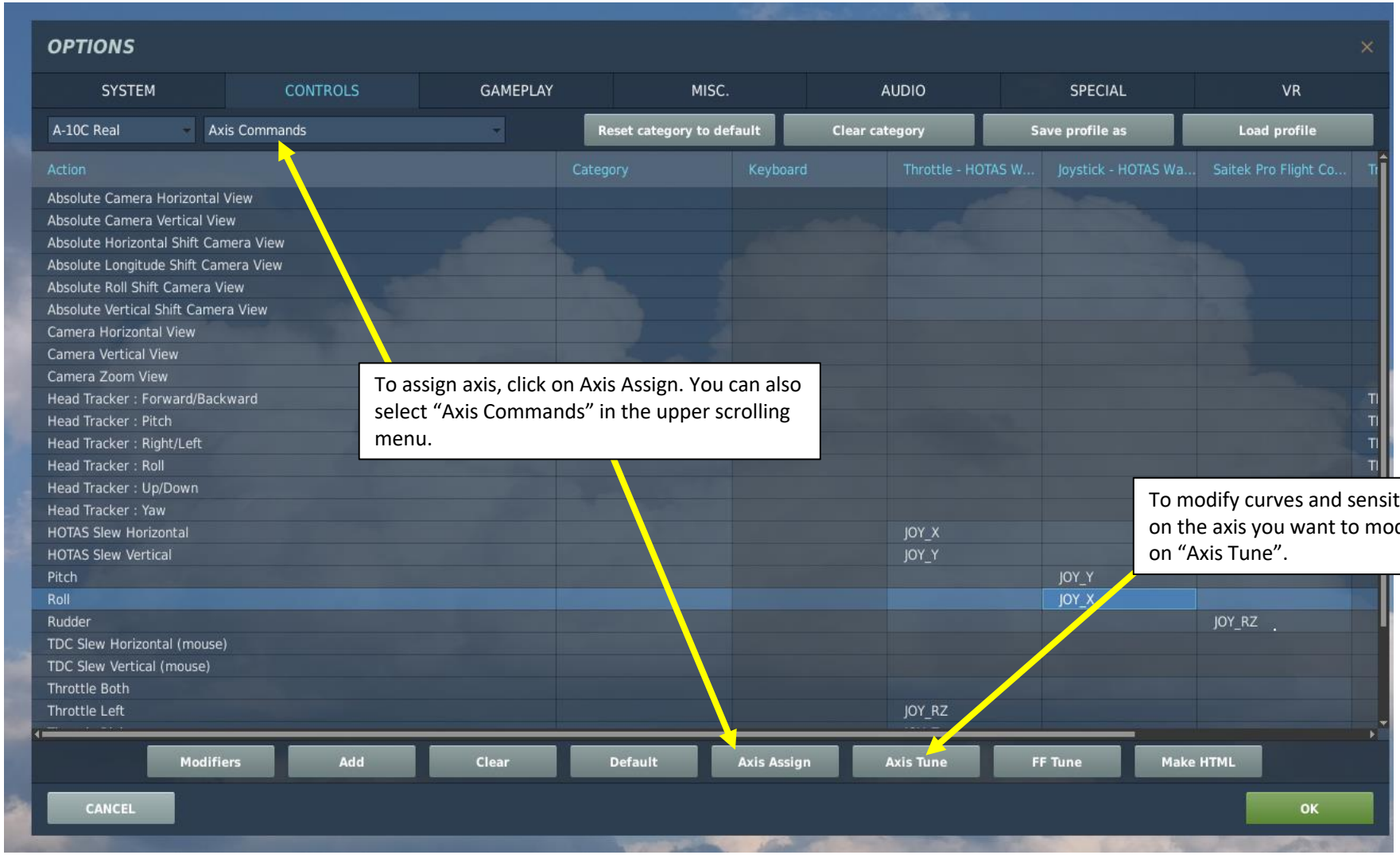
Zoom In Slow: L_Shift+TMS UP
Zoom Out Slow: L_Shift+TMS DOWN

CONTROLS SETUP





Note: In your controls, make sure you check your “Trim” controls since the default version of the game has your trim hat set to changing your view rather than trim the aircraft. Since most of you are probably equipped with a TRACKIR already, I suggest you make sure the Trim Hat Switch is set up properly.

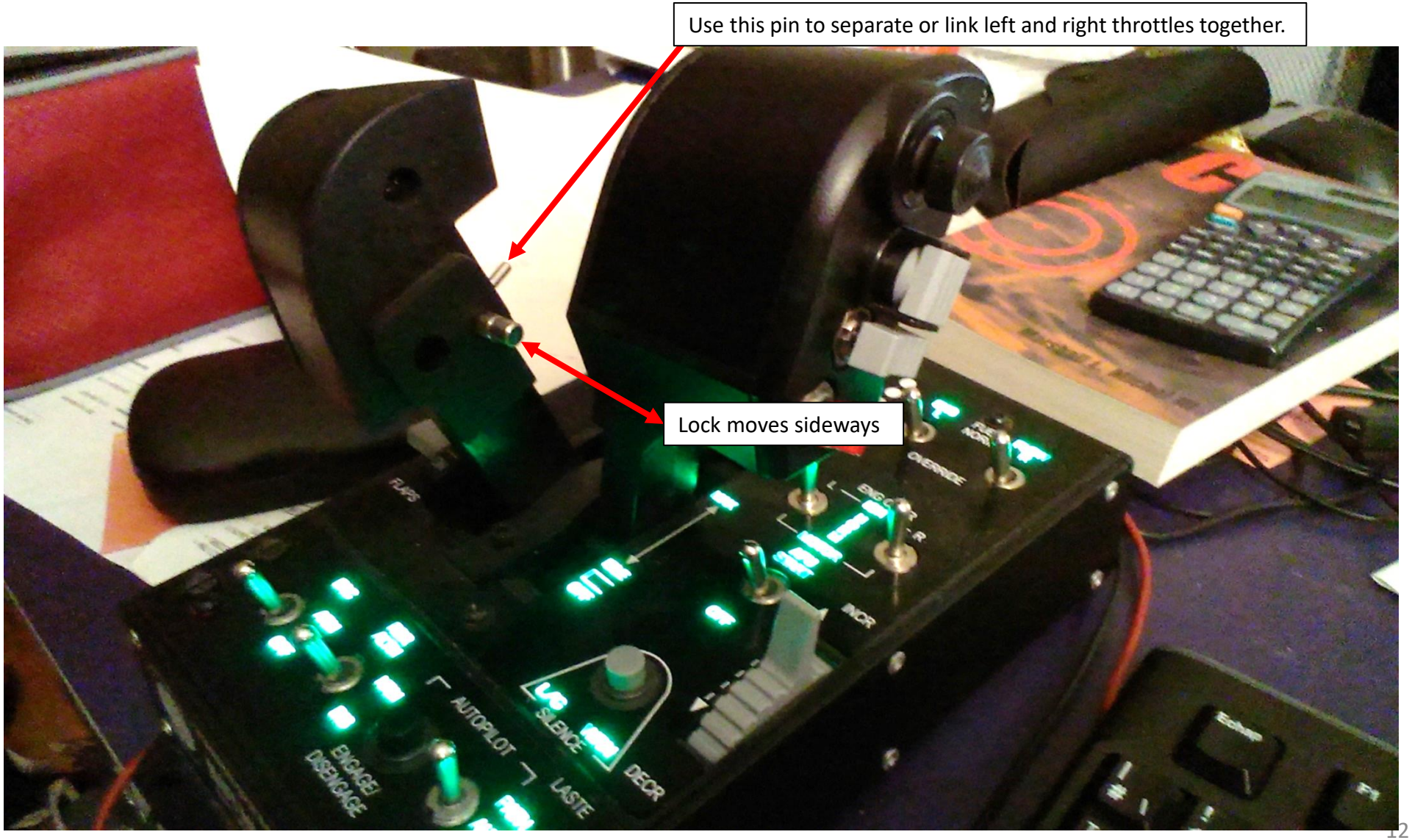


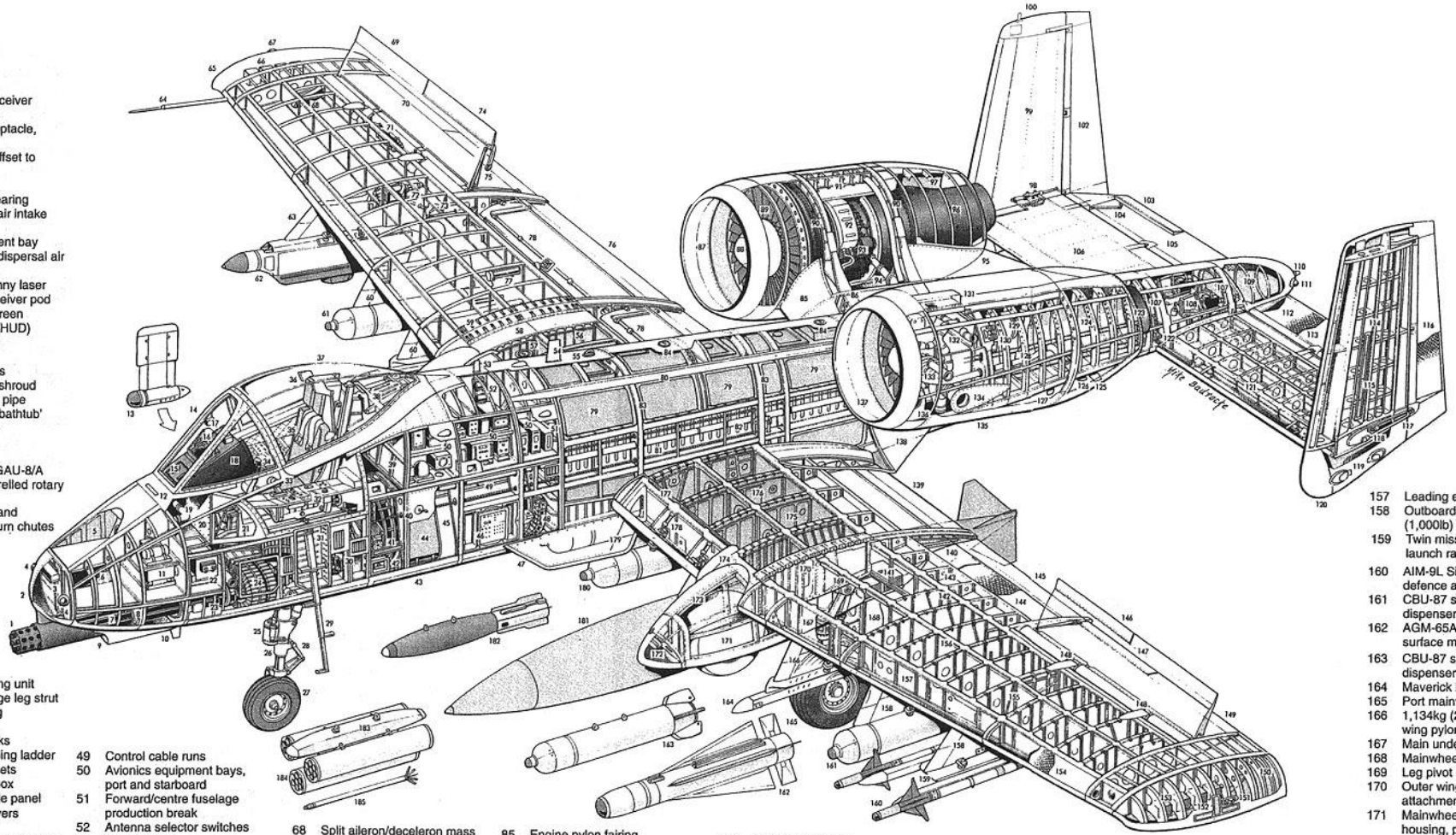
CONTROLS SETUP

BIND THE FOLLOWING AXES

- PITCH (DEADZONE AT 0, SATURATION X AT 100, SATURATION Y AT 100, CURVATURE AT 0)
- ROLL (DEADZONE AT 0, SATURATION X AT 100, SATURATION Y AT 100, CURVATURE AT 0)
- RUDDER (DEADZONE AT 0, SATURATION X AT 100, SATURATION Y AT 100, CURVATURE AT 0)
- THROTTLE BOTH – CONTROLS ENGINE RPM
- WHEEL BRAKE LEFT / RIGHT
- HOTAS SLEW HORIZONTAL / VERTICAL – CONTROLS YOUR TGP (TARGETING POD) ORIENTATION

CONTROLS SETUP



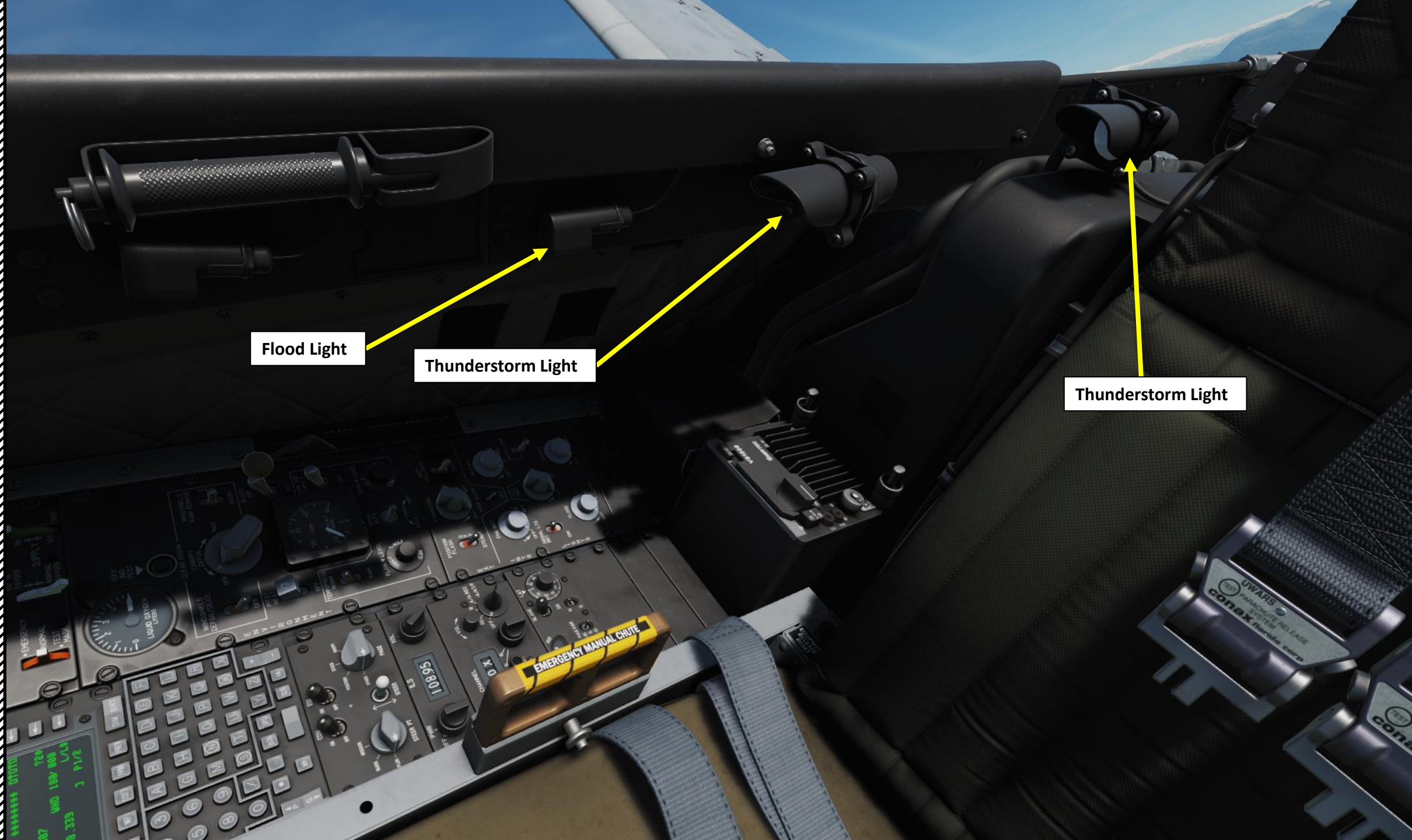


1 Cannon muzzle
2 Nose fairing
3 ILS antenna
4 Radar warning receiver (RWR) antennas
5 Air refuelling receptacle, open
6 Nosewheel bay offset to starboard
7 Cannon barrels
8 Rotary cannon bearing
9 Gun bay venting air intake
10 L-band antenna
11 Electrical equipment bay
12 Windscreen rain dispersal air duct
13 AAS-35 Pave Penny laser marked target receiver pod
14 Armoured windscreen
15 Head-up display (HUD) symbol generator
16 HUD screen
17 Stand-by compass
18 Instrument panel shroud
19 Air refuelling feed pipe
20 Titanium armour 'bathtub' cockpit enclosure
21 Rudder pedals
22 Battery
23 General Electric GAU-8/A 30mm seven-barrelled rotary cannon
24 Ammunition feed and cartridge case return chutes
25 Nosewheel steering unit
26 Nose undercarriage leg strut
27 Forward retracting nosewheel
28 Torque scissor links
29 Retractable boarding ladder
30 Ventilating air outlets
31 Ladder stowage box
32 Pilot's side console panel
33 Engine throttle levers
34 Control column
35 McDonnell Douglas ACES II ejection seat
36 Headrest and canopy breakers
37 Upward hinging cockpit canopy
38 Canopy hinge link
39 Growth space for additional avionics equipment
40 Incidence transmitter
41 Electro-luminescent formation lighting strip
42 Canopy emergency release
43 Ventral gun bay access panels
44 Ammunition drum, 1,174 rounds
45 Ammunition bay armoured lining
46 Electrical system servicing panel and circuit breakers
47 Wing root fuselage strake
48 Cartridge case return chute
49 Control cable runs
50 Avionics equipment bays, port and starboard
51 Forward/centre fuselage production break
52 Antenna selector switches
53 IFF antenna
54 UHF/TACAN antenna
55 Anti-collision light
56 Starboard wing integral fuel tank
57 Overwing tank filler
58 Machined wing skin/stringer panelling
59 Outer wing panel attachment bolted joint strip
60 Starboard wing weapons pylons, all pylons permanently fixed
61 CBU-87 submunition dispenser
62 AN/ALQ-131 ECM pod
63 Dedicated ECM pod pylon
64 Pitot head
65 Starboard down-turned wing tip fairing
66 Wing tip mounted ALE-40 chaff/flare launchers (four)
67 Starboard navigation (green) and strobe (white) lights
68 Split aileron/deceleron mass balance
69 Deceleron open position
70 Starboard aileron/deceleron
71 Deceleron hydraulic jack
72 Aileron hydraulic actuator
73 Control linkages
74 Aileron tab
75 Tab mass balance weight
76 Single-slotted two-segment trailing edge flaps
77 Outboard flap hydraulic jack
78 Flap synchronising shafts, gear driven
79 Fuselage self-sealing fuel cell, maximum internal fuel capacity 6,066 lit (1,334 Imp gal)
80 Fuselage main longeron
81 Longitudinal control cable and services duct
82 Conditioned air delivery duct
83 Wing attachment fuselage main frames
84 Fuselage tank gravity fillers
85 Engine pylon fairing
86 Pylon main frame attachment joint
87 Starboard intake
88 Intake conical fairing
89 Fan blades
90 Machined engine mounting frames
91 Nacelle frame structure
92 Engine oil tank
93 General Electric TF34-GE-100 turbofan engine
94 Rear engine mounting strut
95 Pylon trailing edge fillet fairing
96 Core engine (hot stream) exhaust duct
97 Fan air (cold stream) exhaust duct
98 Rudder hydraulic actuator
99 Starboard fin
100 X-band antenna
101 Rudder mass balance weight
102 Starboard rudder
103 Elevator tab
104 Tab control rod
105 Starboard elevator
106 Starboard tailplane
107 Tailplane attachment frames
108 Elevator tandem hydraulic actuators
109 Tailcone
110 Tail navigation light
111 Rear RWR receiving antennas
112 ECM antenna
113 Honeycomb elevator structure
114 Port fin structure
115 Formation lighting strip
116 Honeycomb rudder panel
117 Port rudder hydraulic actuator
118 Rear identification light
119 Navigational antennas
120 Fin ventral fairing, stressed as tail bumper
121 Tailplane three-spar and rib torsion box structure
122 Tail control links
123 Port engine exhaust duct
124 Tailboom frame structure
125 VHF/AM antenna
126 Fuel jettison outlet
127 VHF/FM antenna
128 Fuel jettison duct
129 Hydraulic reservoir
130 Port engine nacelle attachment fitting
131 Cooling system intake/exhaust duct
132 Engine bleed air ducting
133 Auxiliary Power Unit (APU)
134 APU exhaust
135 Hinged engine nacelle access door
136 Environmental control system equipment pack
137 Port engine intake
138 Trailing edge wing root fillet
139 Port inboard single-slotted flap segment
140 Flap guide rails
141 Undercarriage sponson fairing mounted ALE-40, 25-round chaff/flare launchers
143 Flap shroud structure
144 Honeycomb trailing edge panel
145 Outboard flap segment
146 Port deceleron, open position
147 Aileron tab
148 Aileron hinges
149 Port split aileron/deceleron
150 Down-turned wing tip fairing frame structure
151 Port navigation (red) and strobe (white) lights
152 Wing tip formation lighting strips
153 Port wing tip ALE-40 chaff/flare launchers (four)
154 Leading edge honeycomb panels
155 Wing rib structure
156 Centre spar
157 Leading edge spar
158 Outboard pylons, 454kg (1,000lb) capacity each
159 Twin missile carrier and launch rails
160 AIM-9L Sidewinder self-defence air-to-air missiles
161 CBU-87 submunition dispenser
162 AGM-65A Maverick air-to-surface missile
163 CBU-87 submunition dispenser
164 Maverick launch rail
165 Port mainwheel
166 1,134kg (2,500lb) capacity wing pylon
167 Main undercarriage leg strut
168 Mainwheel leg doors
169 Leg pivot mounting
170 Outer wing panel multi-bolt attachment joint
171 Mainwheel semi-recessed housing, protects airframe in the event of a wheels-up landing
172 Pressure refuelling connection
173 Port mainwheel fairing
174 Wing root slat endplate
175 Port wing integral fuel tank
176 Inner wing panel rib structure
177 Inboard leading edge slat
178 Slat hydraulic jacks
179 1,588kg (3,500lb) capacity fuselage pylon (three)
180 Fuselage weapons stations (three) two outboard or one centreline only used at any one time
181 2,271 lit (500 Imp gal) external fuel tank
182 Mk 82 AIR 227kg (500lb) retarded bomb
183 Triple ejector rack
184 LAU-68 7-round target marking rocket pod (OA-10)
185 2¾in FFAR

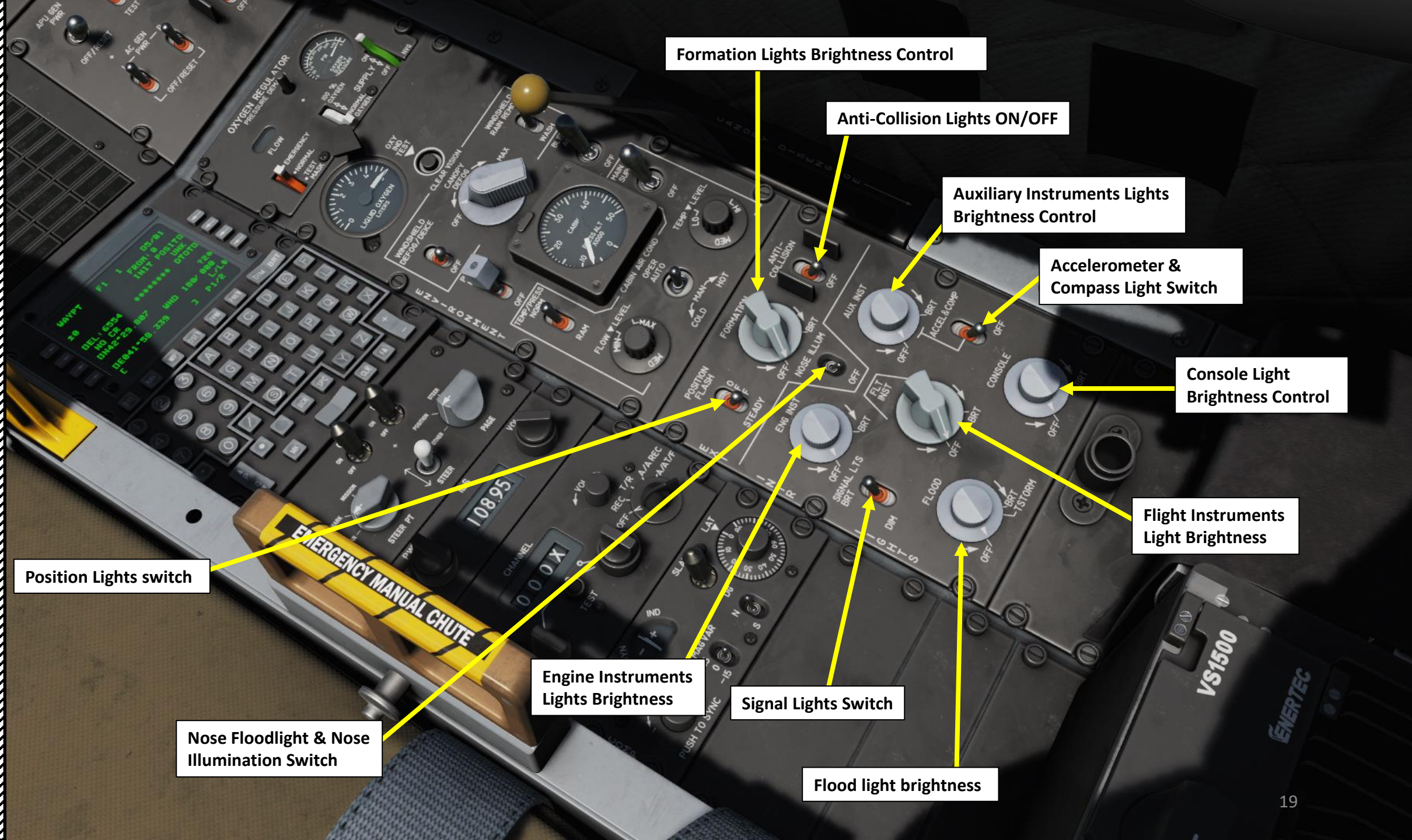
PART 3 – COCKPIT & GAUGES

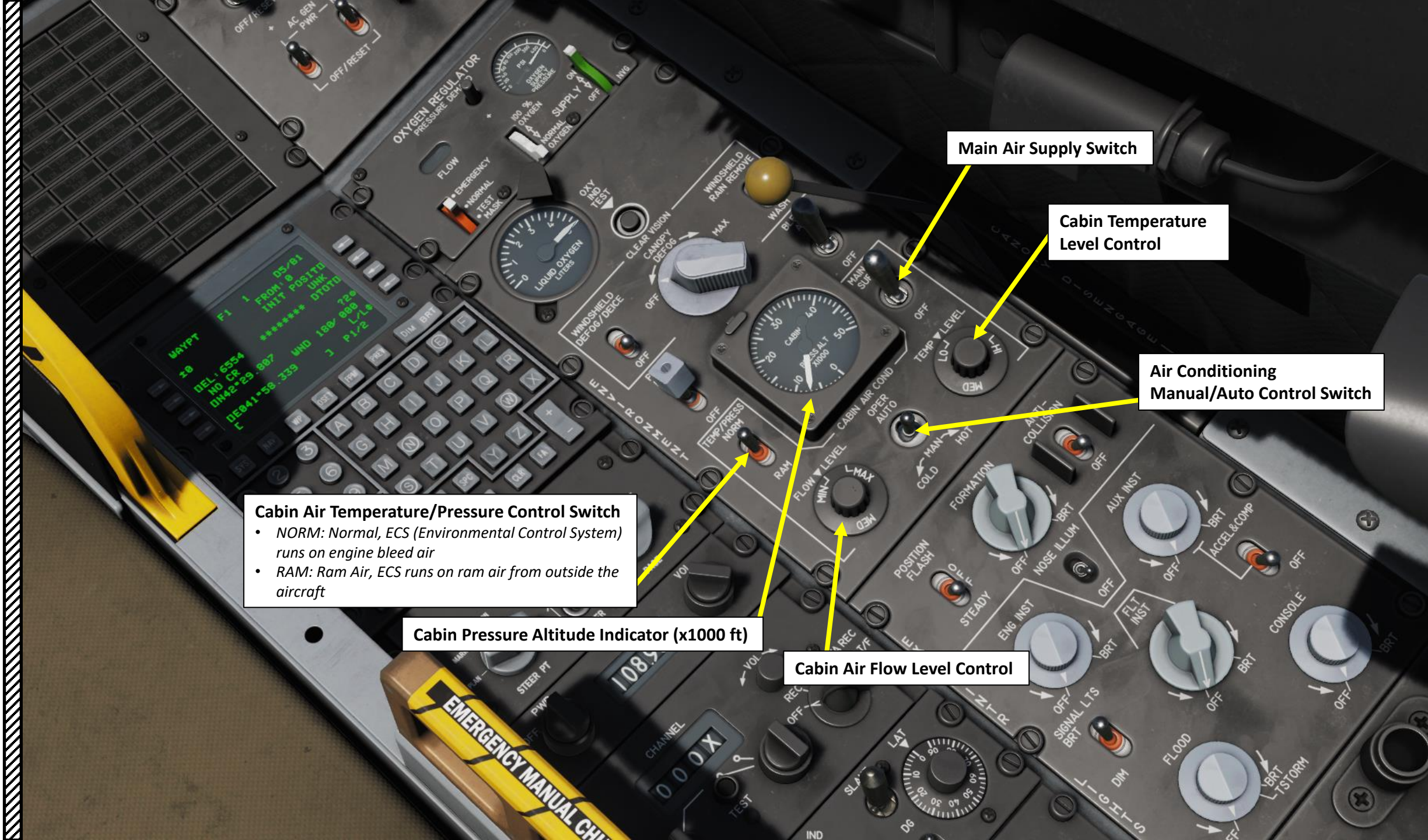

FIRE < L ENG > PULL
FIRE <APU> PULL
FIRE < R ENG > PULL
FIRE EXTING DISCH
SBY AIR
ACTIVE
A240±120
CLIMB
ALT
NOT SOI
FAN

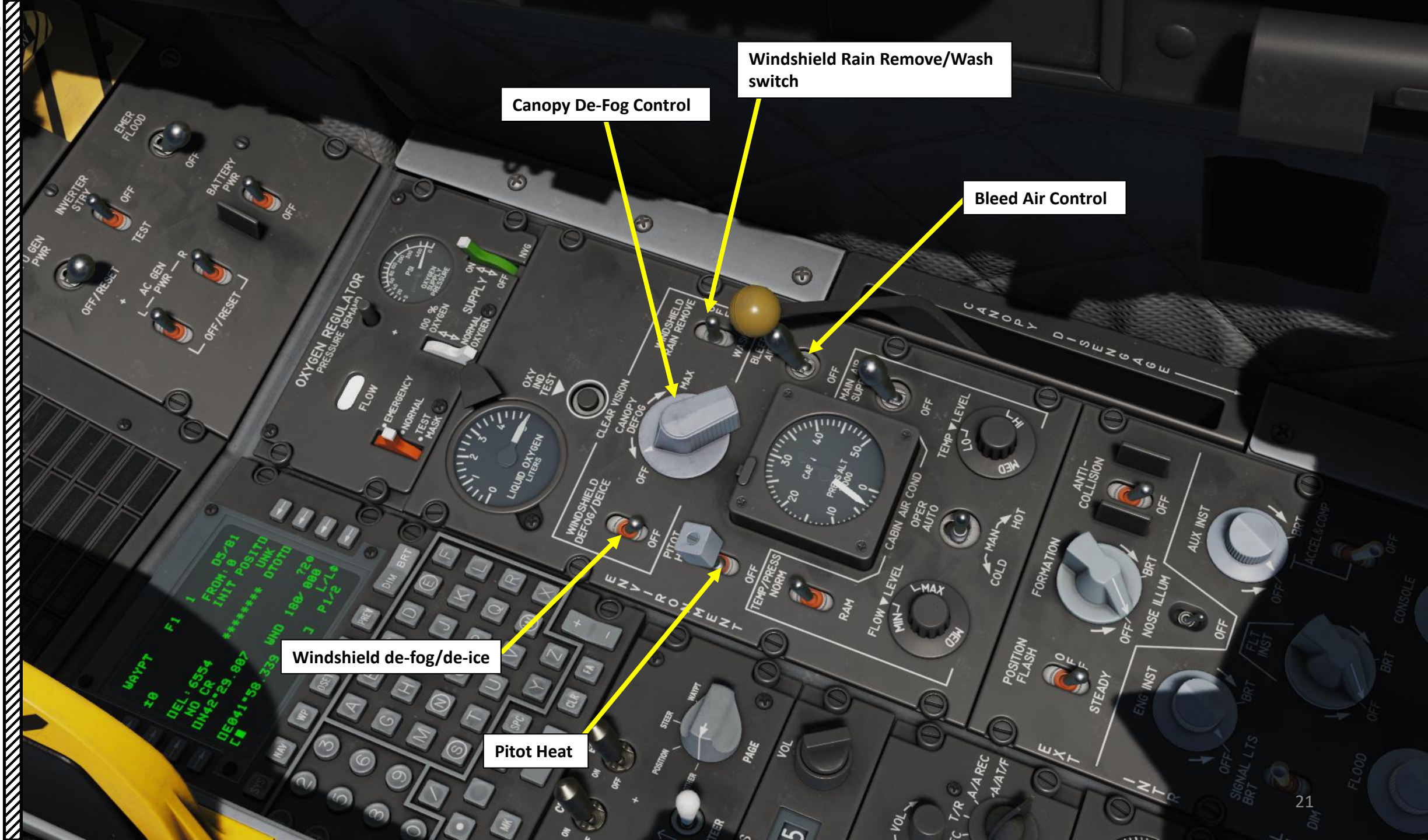

Pitot Tube


Flood Light
Thunderstorm Light
Thunderstorm Light
EMERGENCY MANUAL CHUTE

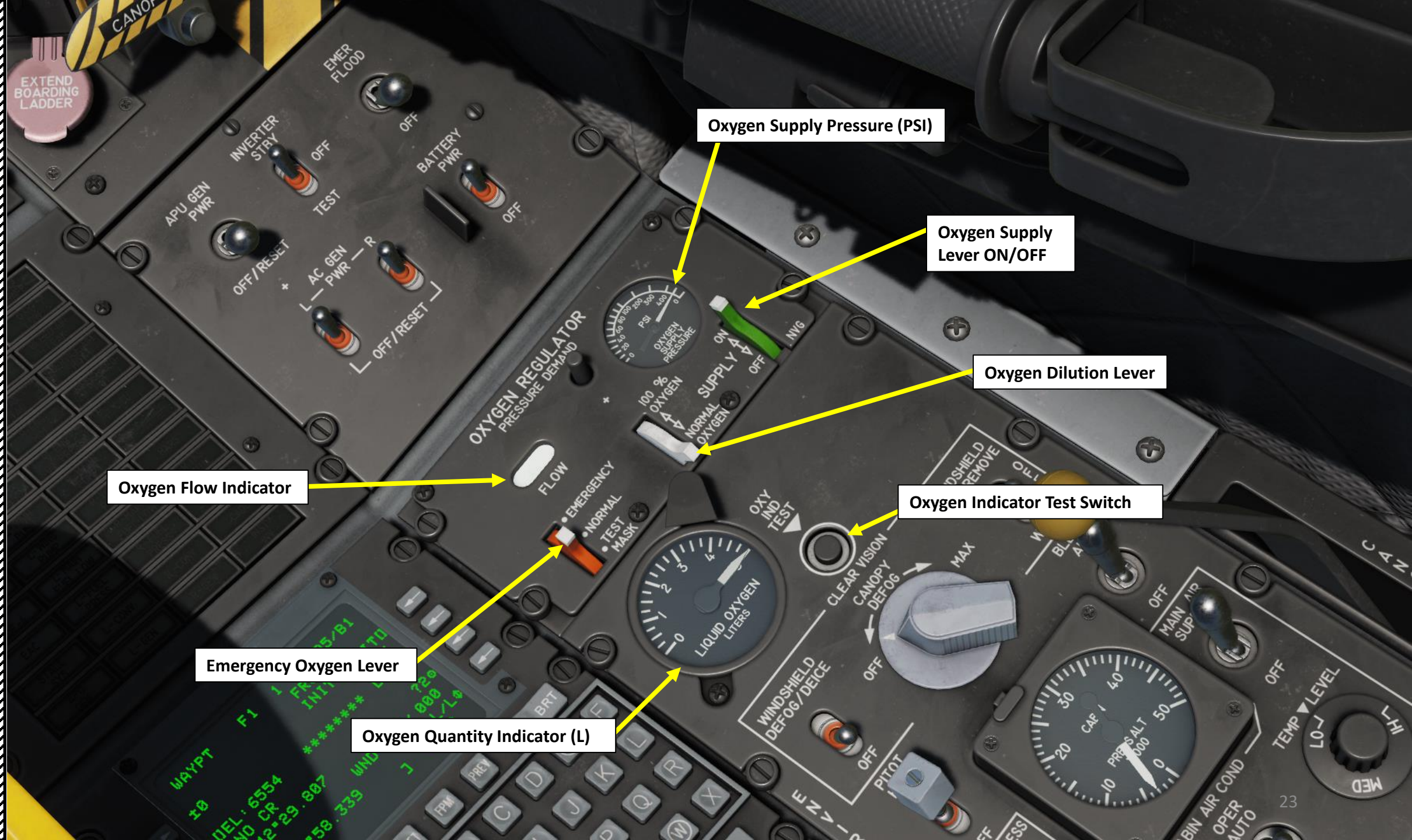

Ejection Seat Handle
PULL TO EJECT
EMERGENCY MANUAL CHUTE
Emergency Manual Chute Control Handle

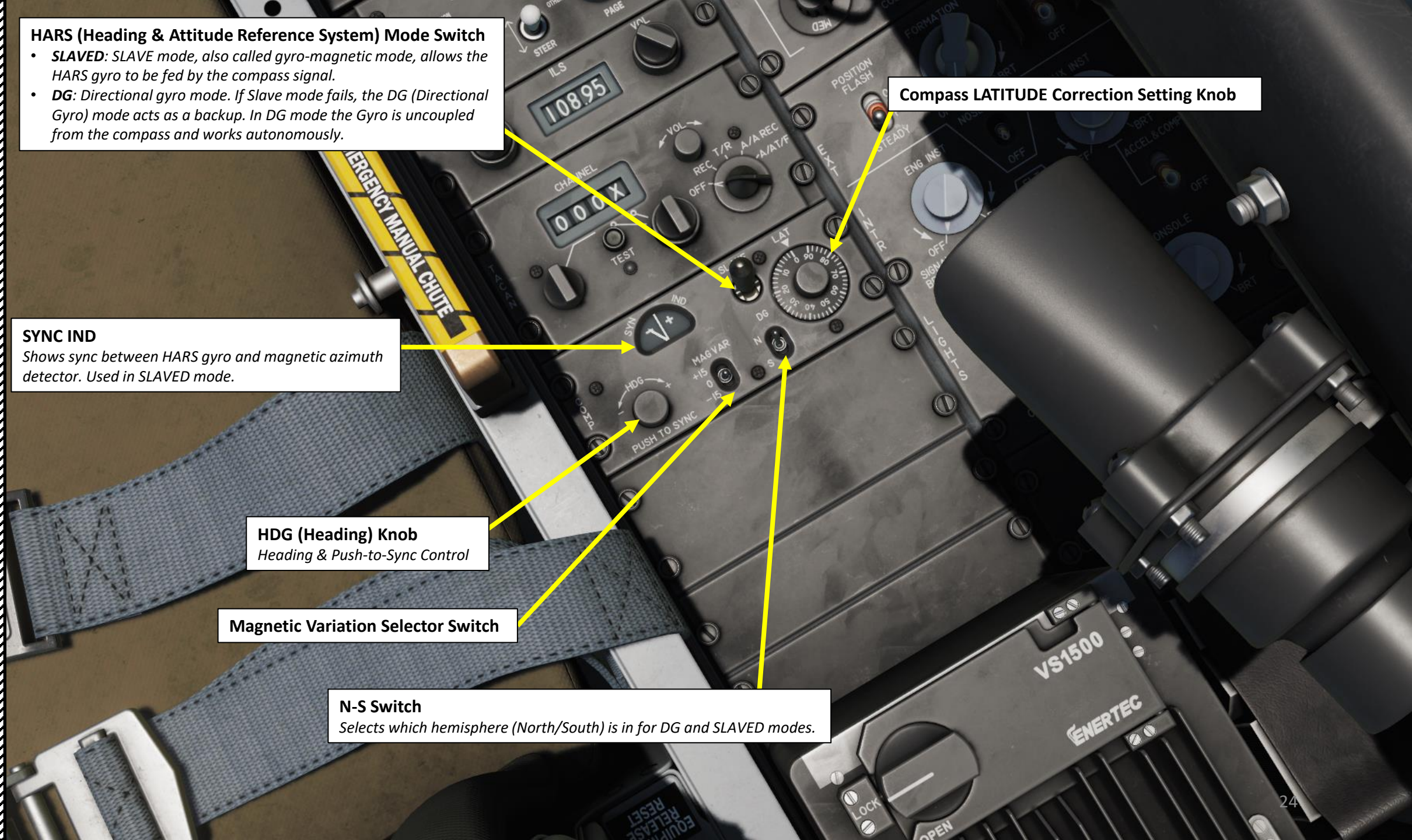

Formation Lights Brightness Control
Anti-Collision Lights ON/OFF
Auxiliary Instruments Lights Brightness Control
Accelerometer & Compass Light Switch
Console Light Brightness Control
Flight Instruments Light Brightness
Position Lights switch
Engine Instruments Lights Brightness
Signal Lights Switch
Nose Floodlight & Nose Illumination Switch
Flood light brightness
EMERGENCY MANUAL CHUTE

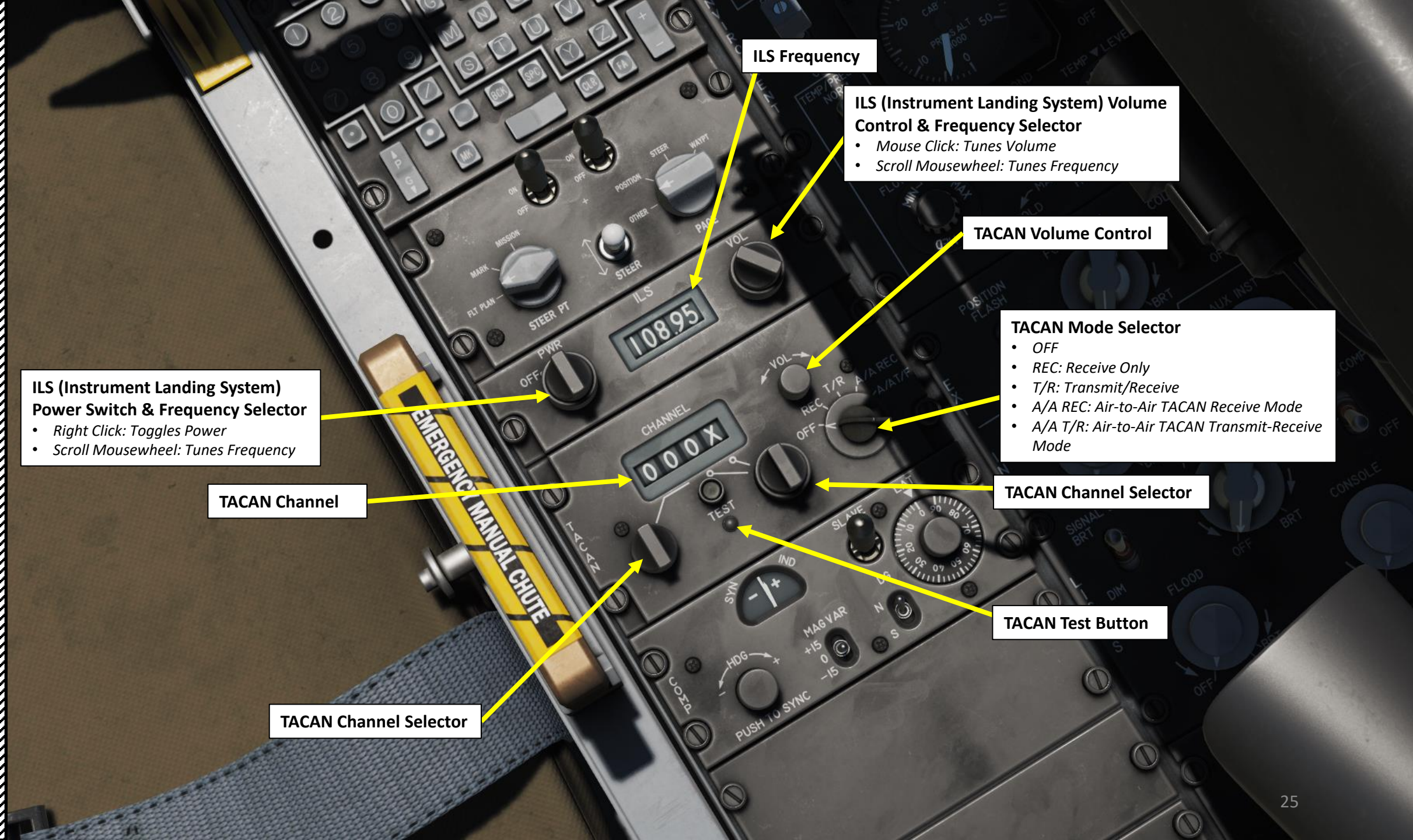

Main Air Supply Switch
Cabin Temperature Level Control
Air Conditioning Manual/Auto Control Switch
Cabin Air Temperature/Pressure Control Switch
• NORM: Normal, ECS (Environmental Control System) runs on engine bleed air
• RAM: Ram Air, ECS runs on ram air from outside the aircraft
Cabin Pressure Altitude Indicator (x1000 ft)
Cabin Air Flow Level Control
OXYGEN REGULATOR
CABIN AIR COND
OPER AUTO
TEMP/PRESS NORM RAM
EMERGENCY MANUAL CHI

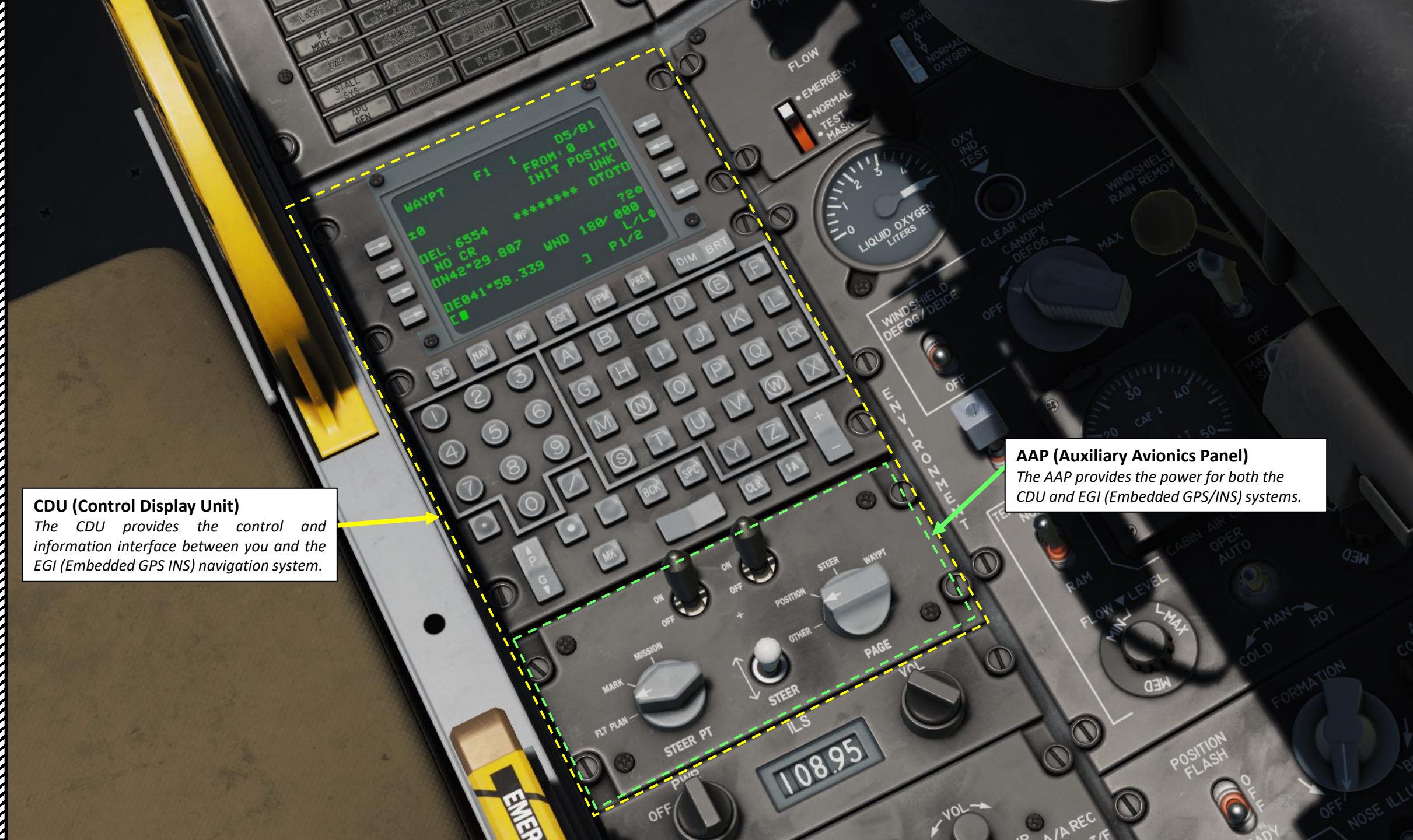

Canopy De-Fog Control
Windshield Rain Remove/Wash switch
Bleed Air Control
Windshield de-fog/de-ice
Pitot Heat

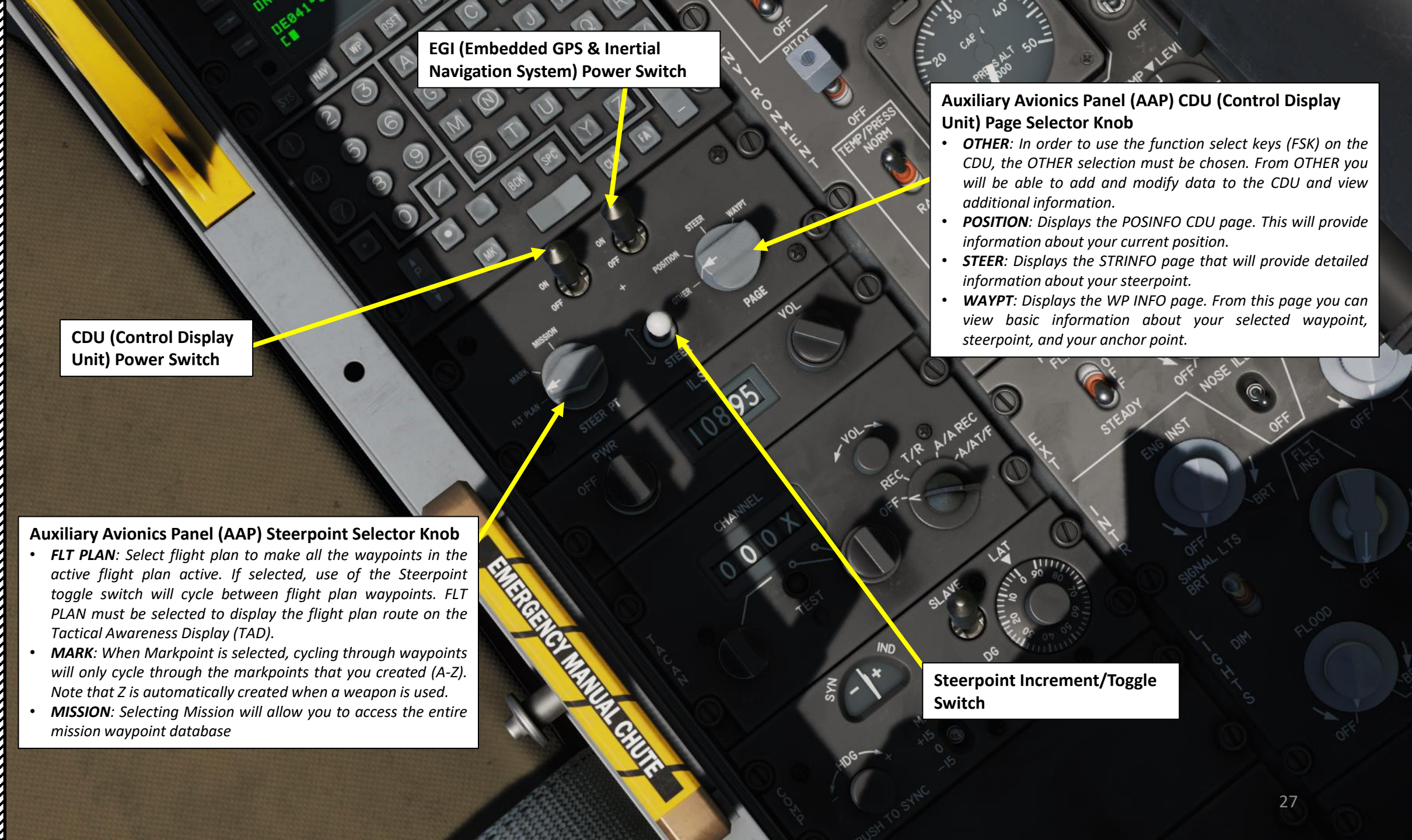

Internal Canopy Disengage Handle
AFT: Disengaged


Oxygen Supply Pressure (PSI)
Oxygen Supply Lever ON/OFF
Oxygen Dilution Lever
Oxygen Flow Indicator
Oxygen Indicator Test Switch
Emergency Oxygen Lever
Oxygen Quantity Indicator (L)
OXYGEN REGULATOR
PRESSURE DEMAND
EMERGENCY
NORMAL
TEST
MASK
FLOW
100 % OXYGEN
NORMAL OXYGEN
SUPPLY
ON
OFF
NVG
OXYGEN SUPPLY PRESSURE
PSI
OXY IND TEST
LIQUID OXYGEN LITERS
EMER FLOOD
INVERTER STBY
BATTERY PWR
APU GEN PWR
AC GEN PWR
OFF/RESET
TEST
EXTEND BOARDING LADDER
CLEAR VISION
CANOPY DEFOG
WINDSHIELD DEFOG/DEICE
PITOT
MAIN AIR SUP
TEMP
LEVEL
LO
HI
MED
CAB AIR COND
OPER
AUTO


HARS (Heading & Attitude Reference System) Mode Switch
• SLAVED: SLAVE mode, also called gyro-magnetic mode, allows the HARS gyro to be fed by the compass signal.
• DG: Directional gyro mode. If Slave mode fails, the DG (Directional Gyro) mode acts as a backup. In DG mode the Gyro is uncoupled from the compass and works autonomously.
Compass LATITUDE Correction Setting Knob
SYNC IND
Shows sync between HARS gyro and magnetic azimuth detector. Used in SLAVED mode.
HDG (Heading) Knob
Heading & Push-to-Sync Control
Magnetic Variation Selector Switch
N-S Switch
Selects which hemisphere (North/South) is in for DG and SLAVED modes.


ILS Frequency
ILS (Instrument Landing System) Volume Control & Frequency Selector
• Mouse Click: Tunes Volume
• Scroll Mousewheel: Tunes Frequency
TACAN Volume Control
TACAN Mode Selector
• OFF
• REC: Receive Only
• T/R: Transmit/Receive
• A/A REC: Air-to-Air TACAN Receive Mode
• A/A T/R: Air-to-Air TACAN Transmit-Receive Mode
ILS (Instrument Landing System) Power Switch & Frequency Selector
• Right Click: Toggles Power
• Scroll Mousewheel: Tunes Frequency
TACAN Channel
TACAN Channel Selector
TACAN Test Button
TACAN Channel Selector
108.95
000X
EMERGENCY MANUAL CHUTE


CDU (Control Display Unit)
The CDU provides the control and information interface between you and the EGI (Embedded GPS INS) navigation system.
AAP (Auxiliary Avionics Panel)
The AAP provides the power for both the CDU and EGI (Embedded GPS/INS) systems.


EGI (Embedded GPS & Inertial Navigation System) Power Switch
CDU (Control Display Unit) Power Switch
Auxiliary Avionics Panel (AAP) CDU (Control Display Unit) Page Selector Knob
• OTHER: In order to use the function select keys (FSK) on the CDU, the OTHER selection must be chosen. From OTHER you will be able to add and modify data to the CDU and view additional information.
• POSITION: Displays the POSINFO CDU page. This will provide information about your current position.
• STEER: Displays the STRINFO page that will provide detailed information about your steerpoint.
• WAYPT: Displays the WP INFO page. From this page you can view basic information about your selected waypoint, steerpoint, and your anchor point.
Auxiliary Avionics Panel (AAP) Steerpoint Selector Knob
• FLT PLAN: Select flight plan to make all the waypoints in the active flight plan active. If selected, use of the Steerpoint toggle switch will cycle between flight plan waypoints. FLT PLAN must be selected to display the flight plan route on the Tactical Awareness Display (TAD).
• MARK: When Markpoint is selected, cycling through waypoints will only cycle through the markpoints that you created (A-Z). Note that Z is automatically created when a weapon is used.
• MISSION: Selecting Mission will allow you to access the entire mission waypoint database
Steerpoint Increment/Toggle Switch
EMERGENCY MANUAL CHUTE

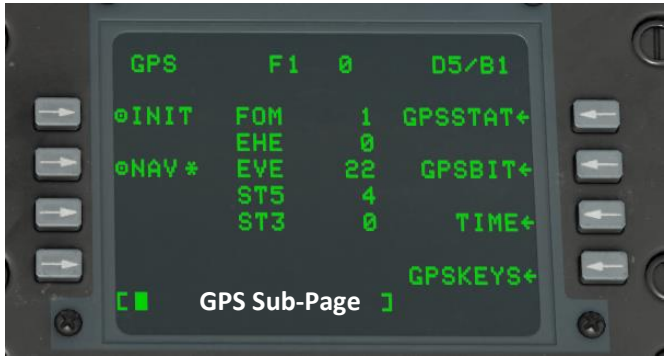
CDU (Control Display Unit) Functions

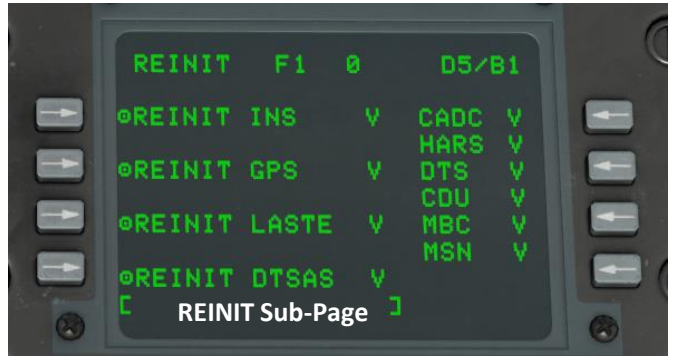
SYS FSK *System Menu*	NAV FSK *Navigation Menu*	WP FSK *Waypoint Menu*	OSET FSK *Offset Point Menu*	FPM FSK *Flight Plan Menu*
EGI: Embedded GPS INS Data	**ALIGN**: Position Alignment	**STEERPOINT**: data on selected steerpoint	**OSET**: Determines offset between two points	**FPM**: Allows you to select a flight plan, create a new one, or edit an existing one
INS: Inertial Navigation System Data	**TIME**: Data & Time, Desired Time On Target	**ANCHOR PT**: Anchor Point / Bullseye Data		
GPS: Global Positioning System Data	**UPDATE**: INS Update page	**WAYPOINT**: Data on selected waypoint		
REINIT: Re-Initialization Page	**DTSUPLOAD**: Data Transfer System Upload Page	**FROM PT**: selects the FROM POINT		
LASTE: Low Altitude Safety and Targeting Enhancement Data	**BLENDED**: Combination of INS and GPS navigation input			
HARS: Heading Attitude Reference System Data	**ATTRIBUTES**: Course Deviation Indicator (CDI) and glide slope indicator sensitivity			
DTSAS: Digital Terrain System Application Software Data	**OPTIONS**: current magnetic heading and magnetic variation			
RESET: Fault Reset	**DIVERT**: 4 closest divert airfields data			
DTS: Data Transfer System				
LRUTEST: Line Replaceable Unit Test Page				
OFPID: Operational Flight Profile Identification Data				
CADC: Central Air Data Computer Data				
CDUTEST: Control Display Unit Test				
MXLOG: Mission Log Data				


SYS (System) Menu (Page 1/2)
SYS F1 0 D5/B1
→EGI LASTE←
→INS HARS←
→GPS DTSAS←
→REINIT RESET←
P1/2
SYS
NAV
WP
OSET
FPM
PREV
DIM
BRT


EGI F1 0 D5/B1
INS V GPS V MSN V
FLIGHT DRIVER
BLENDED
FOM
INS 1 GPS 1 BLD 1
P1/4
EGI Sub-Page


INS F1 0 D5/B1
→ALIGN INSSTAT←
→ALT ALIGN UPDATE←
→POS
MISC
INS Sub-Page

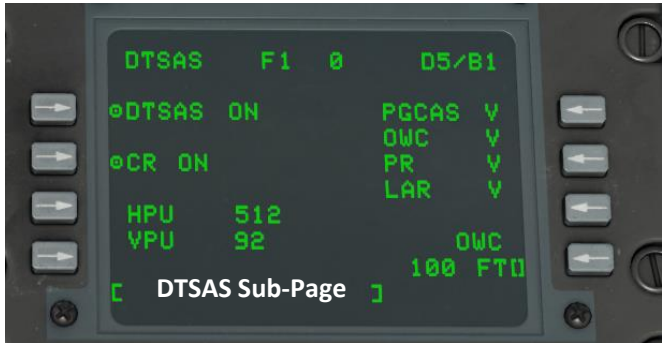

GPS F1 0 D5/B1
INIT FOM 1 GPSSTAT←
EHE 0
NAV * EVE 22 GPSBIT←
ST5 4
ST3 0 TIME←
GPSKEYS←
GPS Sub-Page

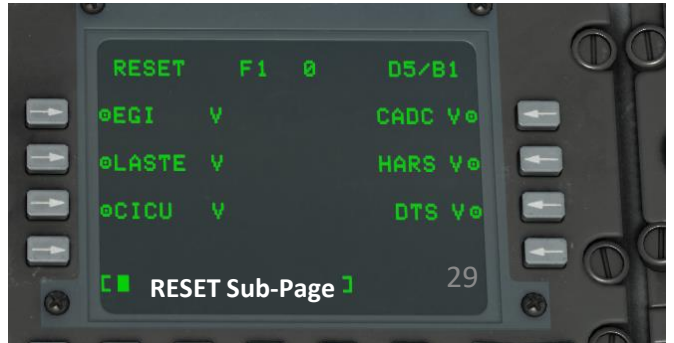

REINIT F1 0 D5/B1
REINIT INS V CADC V
HARS V
REINIT GPS V DTS V
CDU V
REINIT LASTE V MBC V
MSN V
REINIT DTSAS V
REINIT Sub-Page

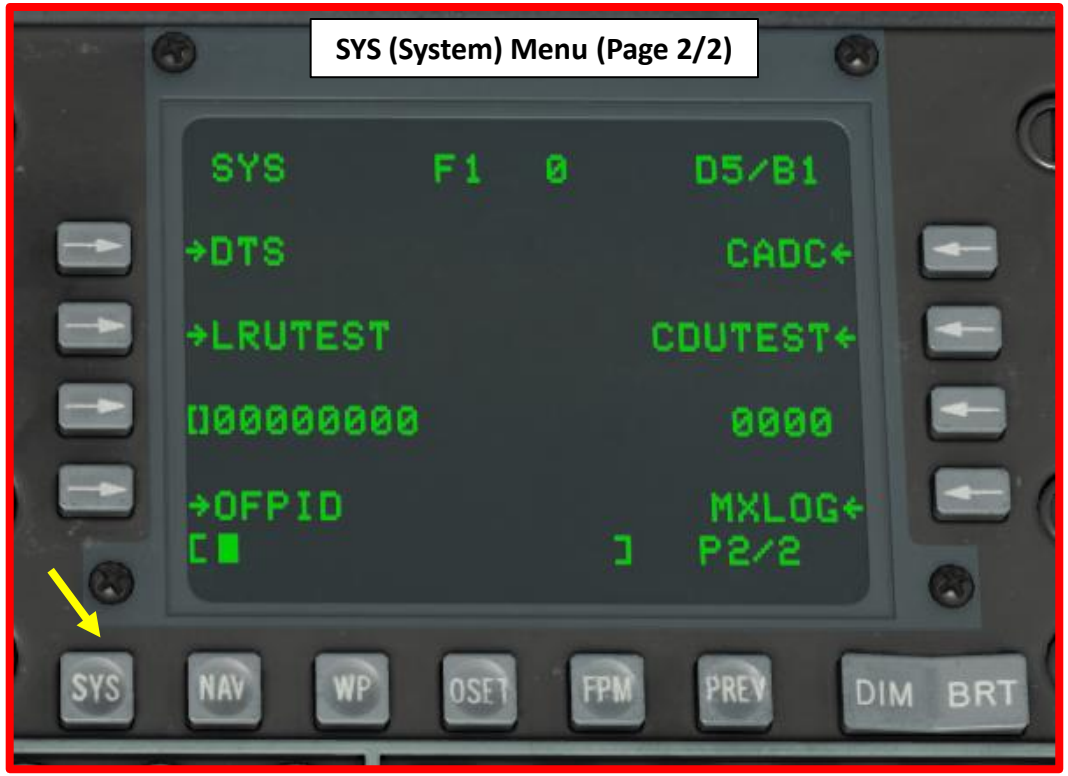

LASTE F1 0 D5/B1
READY YES LASTE V
OFP NOT ATTEMPTED
INIT SUCCESSFUL
SERVICE LOAD PASS
WPN EVENTS 0000
GCAS MSGS 0000 WIND←
LASTE Sub-Page


HARS F1 0 D5/B1
INVALID NO HARS V
ROLL 14.6° V
PITCH 18.8° V
MAG HEAD 290.0° V
HARS Sub-Page


SYS F1 0 D5/B1
→DTS CADC←
→LRUTEST CDUTEST←
00000000 0000
→OFPID MXLOG←
P2/2
SYS Sub-Page

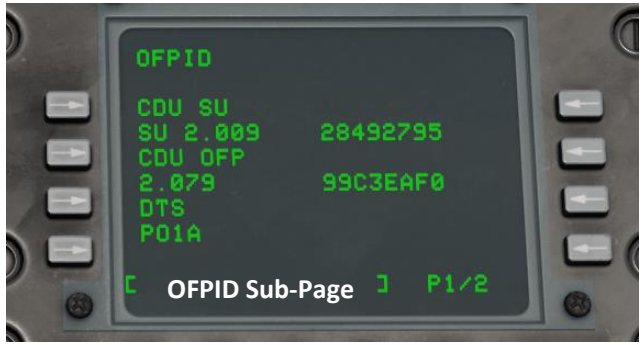

DTSAS F1 0 D5/B1
DTSAS ON PGCAS V
OWC V
CR ON PR V
LAR V
HPU 512
VPU 92 OWC
100 FT
DTSAS Sub-Page


RESET F1 0 D5/B1
EGI V CADC V
LASTE V HARS V
CICU V DTS V
RESET Sub-Page

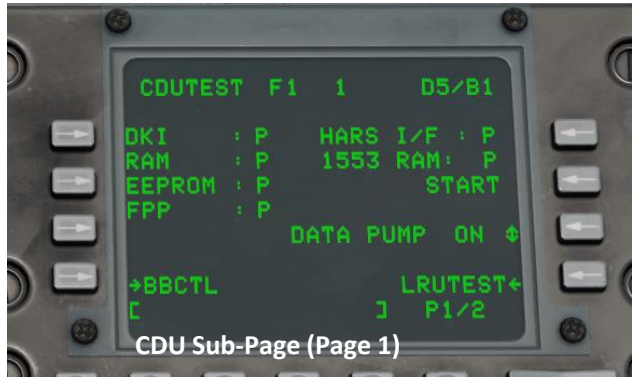

SYS (System) Menu (Page 2/2)
SYS F1 0 D5/B1
→DTS CADC←
→LRUTEST CDUTEST←
[]00000000 0000
→OFPID MXLOG←
[ ] P2/2
SYS
NAV
WP
OSET
FPM
PREV
DIM BRT

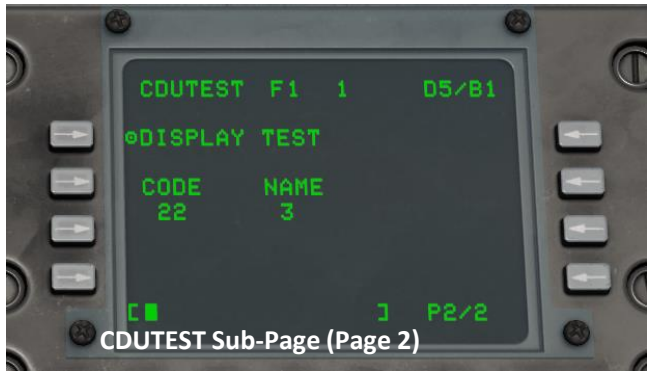

DTS F1 1 D5/B1
DTS V DTSUPLD←
READY YES DTSDNLD←
DTSSTAT←
DTS Sub-Page

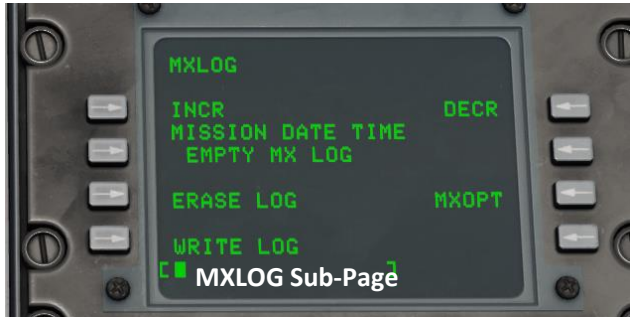

LRUTEST F1 1 D5/B1
→EGITEST DTS UN⊙
CADC UN
CDU UN RECORD⊙
TEST MODE
LRUTEST Sub-Page

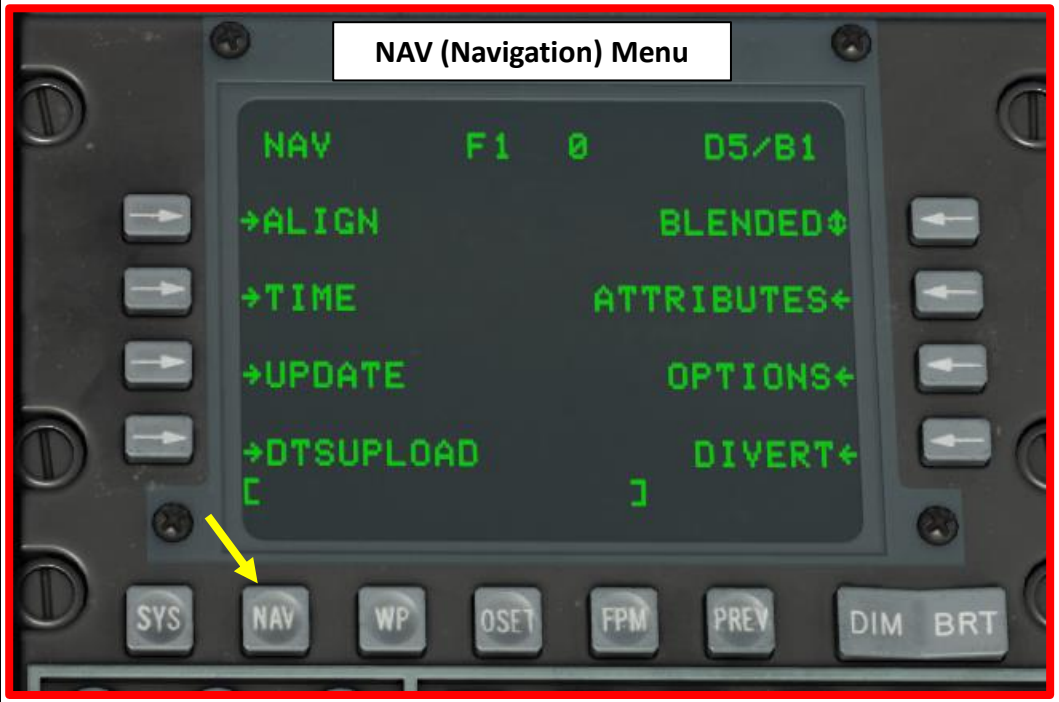

OFPID
CDU SU
SU 2.009 28492795
CDU OFP
2.079 99C3EAF0
DTS
P01A
OFPID Sub-Page P1/2

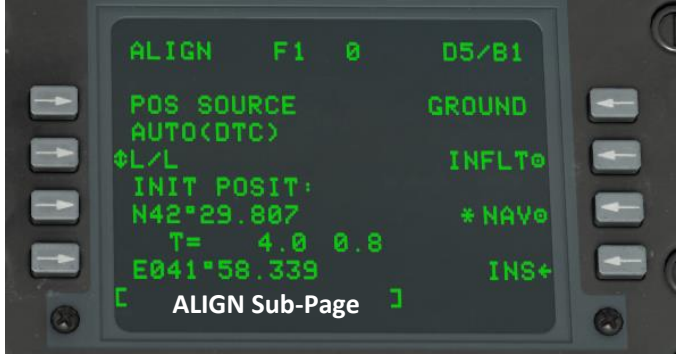

CADC F1 1 D5/B1
FAULT NO CADC V
P ALT 2722.8 V
B ALT 2722.9 V
TAS 265.304 V
MACH 0.4023 V
IAS 252.1847 V
TEMP 14.53 V
CADC Sub-Page


CDUTEST F1 1 D5/B1
DKI : P HARS I/F : P
RAM : P 1553 RAM: P
EEPROM : P START
FPP : P
DATA PUMP ON ⊙
→BBCTL LRUTEST←
P1/2
CDU Sub-Page (Page 1)


CDUTEST F1 1 D5/B1
⊙DISPLAY TEST
CODE NAME
22 3
P2/2
CDUTEST Sub-Page (Page 2)

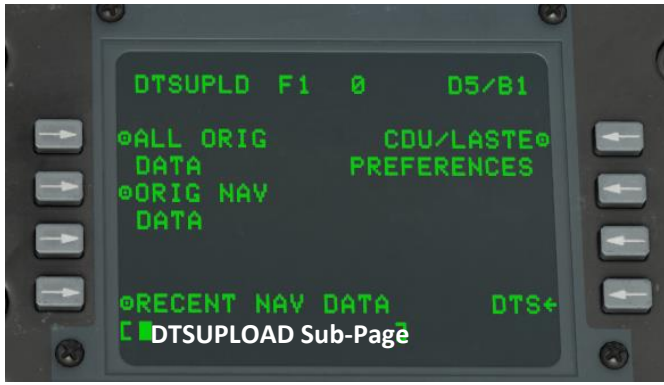

MXLOG
INCR DECR
MISSION DATE TIME
EMPTY MX LOG
ERASE LOG MXOPT
WRITE LOG
MXLOG Sub-Page


NAV (Navigation) Menu
NAV F1 0 D5/B1
→ALIGN BLENDED◊
→TIME ATTRIBUTES←
→UPDATE OPTIONS←
→DTSUPLOAD DIVERT←
SYS
NAV
WP
OSET
FPM
PREV
DIM BRT


ALIGN F1 0 D5/B1
POS SOURCE GROUND
AUTO(DTC)
◊L/L INFLT◊
INIT POSIT:
N42°29.807 *NAV◊
T= 4.0 0.8
E041°58.339 INS←
ALIGN Sub-Page


TIME F1 0 D5/B1
□DTOT ADJUST YEAR 11
+00:00:00
MONTH 6
□LCL ADJUST DAY 1
+00:00
GMT 10:35:06
TIME Sub-Page

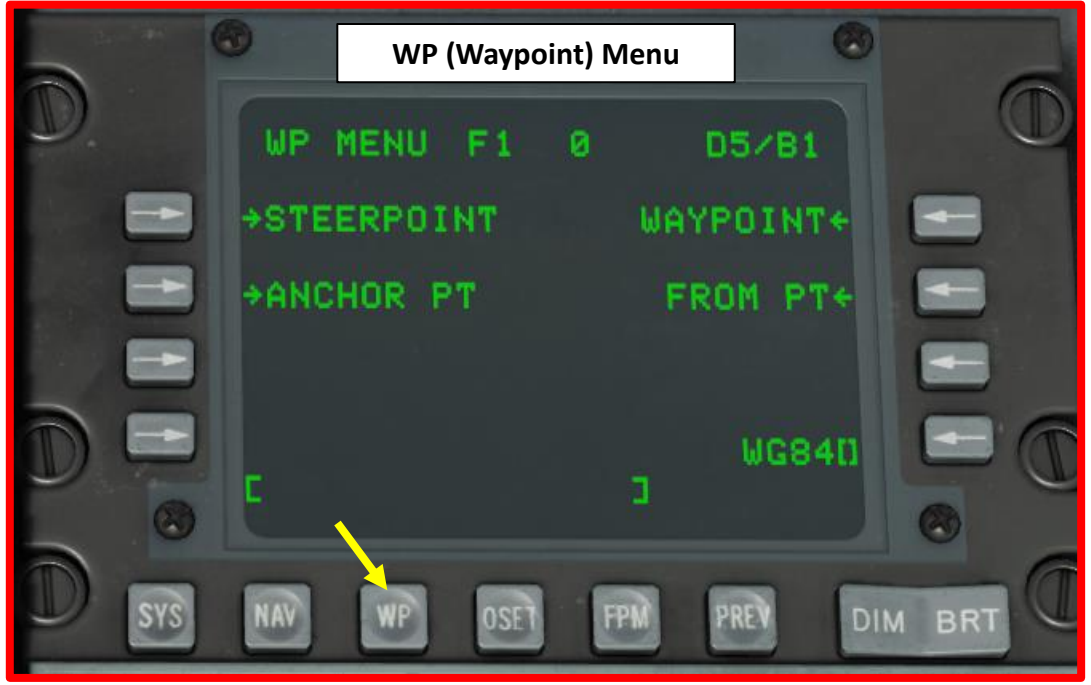

UPDATE F1 0 D5/B1
0 L/L◊
DIS 9.1
INIT POSIT MV E6.3
TTG 00:03:58
N42°29.807 PROCEED◊
E041°58.339 EL 6554
UPDATE Sub-Page

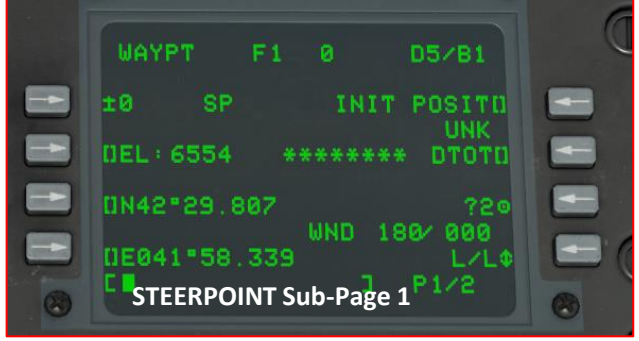

DTSUPLD F1 0 D5/B1
◊ALL ORIG DATA CDU/LASTE◊ PREFERENCES
◊ORIG NAV DATA
◊RECENT NAV DATA DTS←
DTSUPLOAD Sub-Page

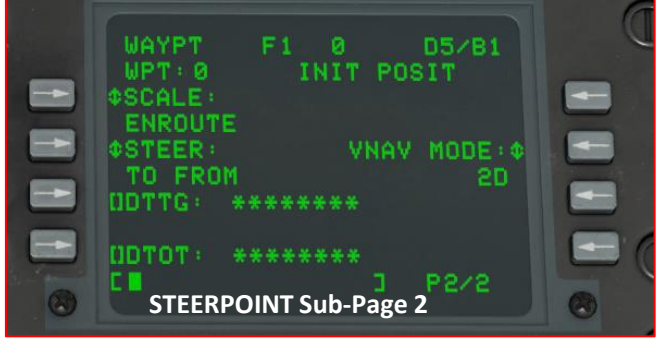

ATTRIB F1 0 D5/B1
DEFAULT ATTRIBUTES 2D◊
◊SCALE:
ENROUTE
◊STEER:
TO FROM HSI SET AT
◊SCS: OFF CRS: 335.5
ATTRIBUTES Sub-Page

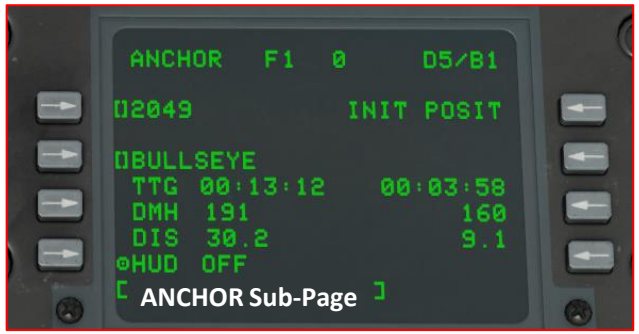

OPTIONS F1 0 D5/B1
◊MAG
MH 290.0
□MV E6.3
OPTIONS Sub-Page


DIVERT F1 0 D5/B1
◊62 SENAKI-KOLKH
157/24.9 TTG: 00:10:53
◊64 KUTAISI
127/37.1 TTG: 00:16:13
◊59 SUKHUMI-BABU
277/38.7 TTG: 00:16:56
◊63 KOBULETI
173/43.4 TTG: 00:18:58
DIVERT Sub-Page


WP (Waypoint) Menu
WP MENU F1 0 D5/B1
→STEERPOINT WAYPOINT←
→ANCHOR PT FROM PT←
WG84
SYS NAV WP OSET FPM PREV DIM BRT

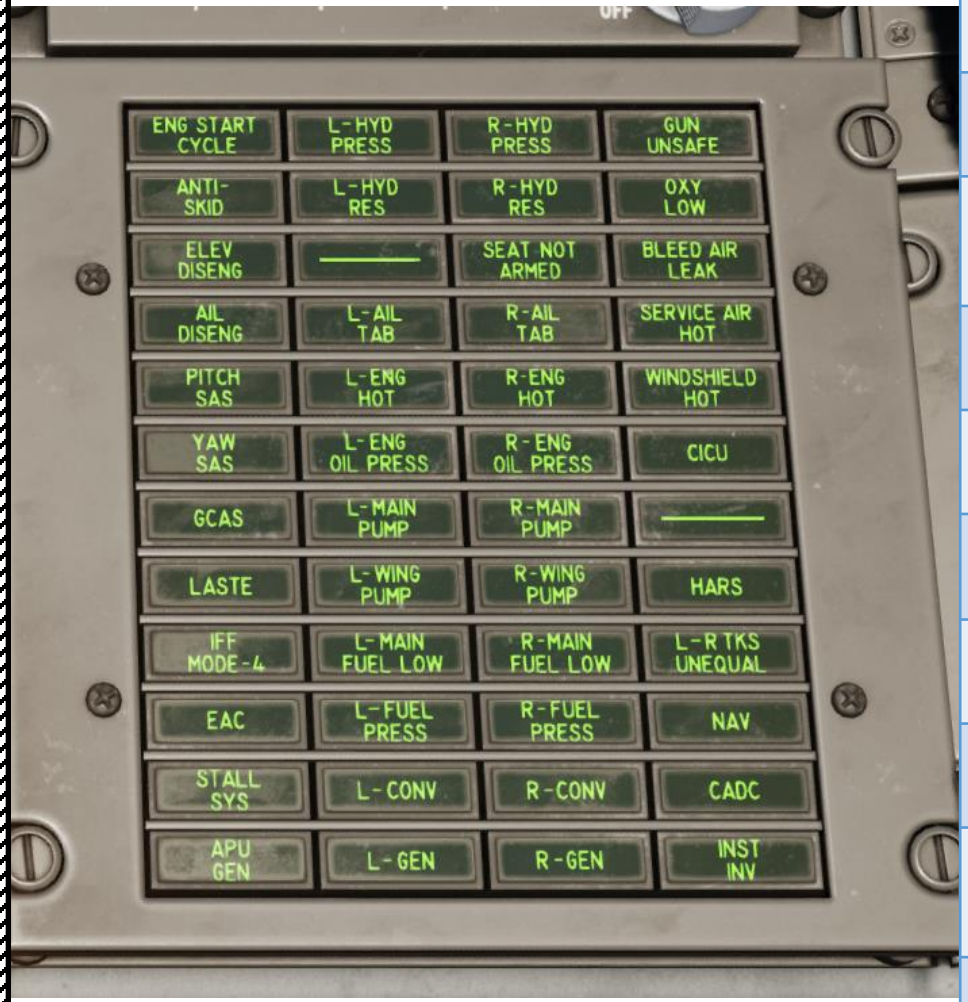

WAYPT F1 0 D5/B1
±0 SP INIT POSIT
UNK
EL: 6554 ******** DTOT
N42°29.807 ?2
WND 180/ 000
E041°58.339 L/L
P1/2
STEERPOINT Sub-Page 1


WAYPT F1 0 D5/B1
WPT: 0 INIT POSIT
SCALE:
ENROUTE
STEER: VNAV MODE:
TO FROM 2D
DTTG: ********
DTOT: ********
P2/2
STEERPOINT Sub-Page 2


ANCHOR F1 0 D5/B1
2049 INIT POSIT
BULLSEYE
TTG 00:13:12 00:03:58
DMH 191 160
DIS 30.2 9.1
HUD OFF
ANCHOR Sub-Page

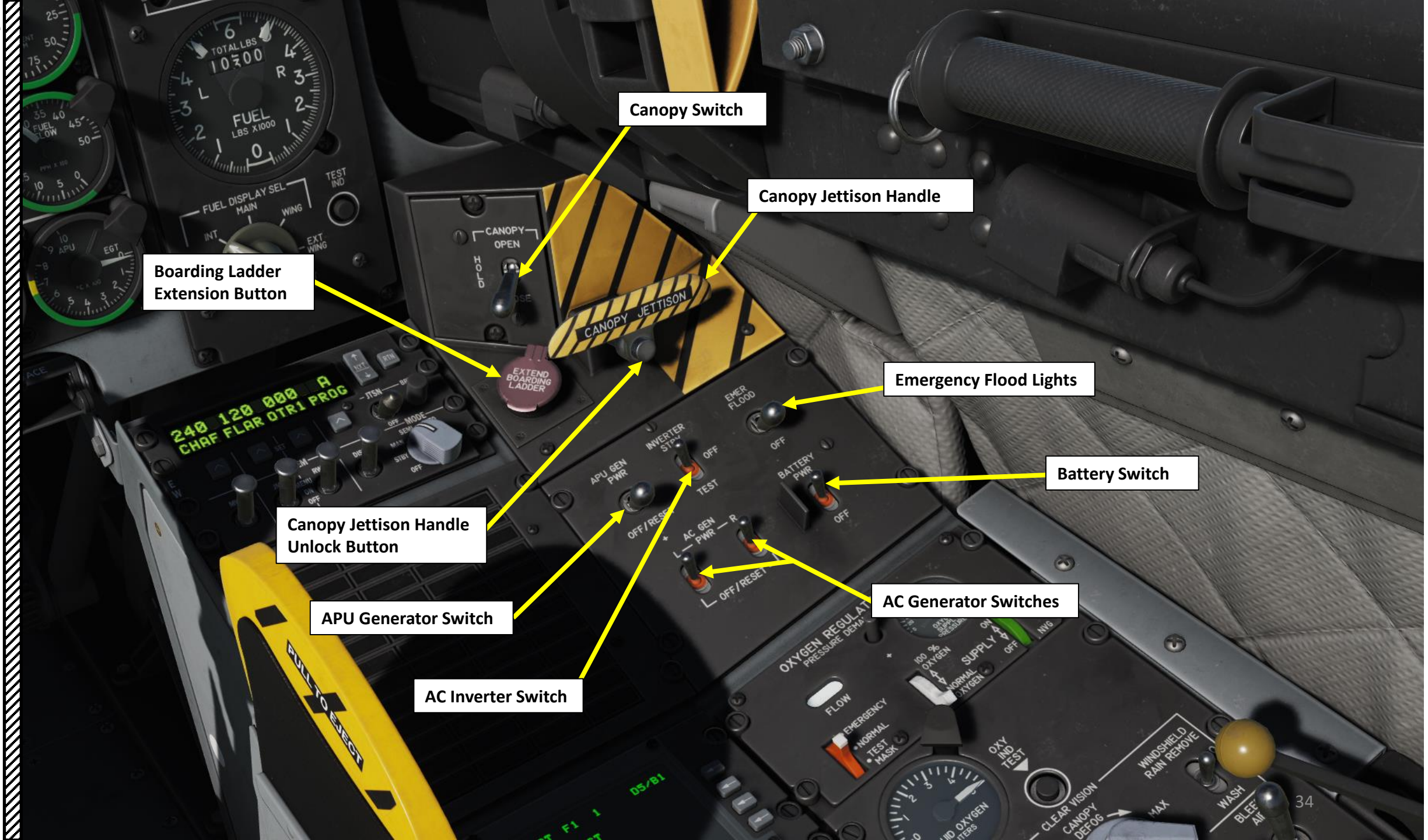

OSET (Offset) Menu
OFFSET F1 0 D5/B1
±0 L/L
INIT POSIT MH/DIS:
354/0.0
N42°29.807 ?2
E041°58.339 0
SYS NAV WP OSET FPM PREV DIM BRT


FPMENU (Flight Plan) Menu
FPMENU F1 0 D5/B1
FPBUILD
01 AUTO MSN * ←
02 (NEW FP)
P1/1
SYS NAV WP OSET FPM PREV DIM BRT



CAUTION LIGHT PANEL

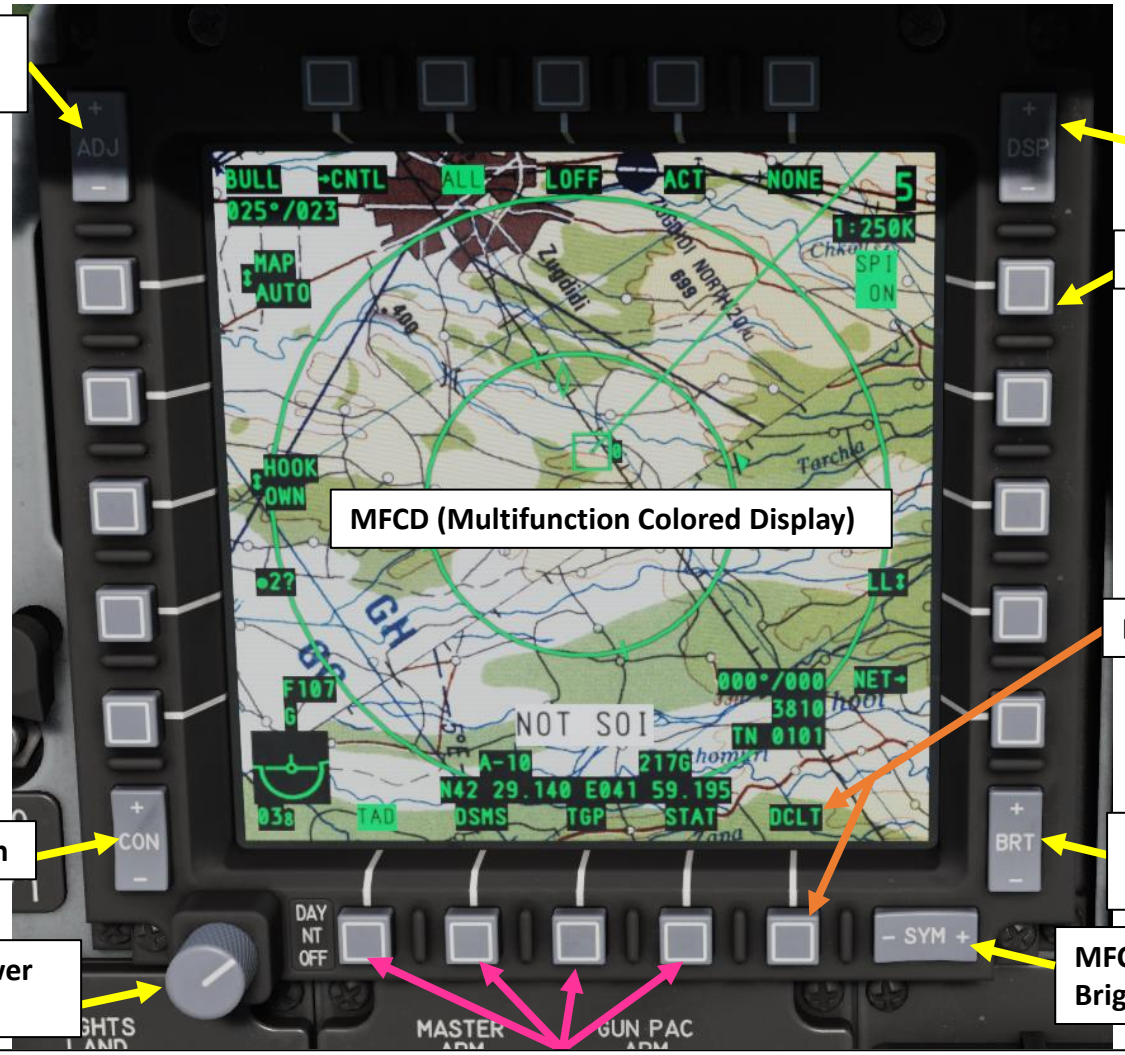
ENG START CYCLE Engine start cycle is in progress	**L-HYD PRESS** Left hydraulic system pressure below 1000 psi	**R-HYD PRESS** Right hydraulic system pressure below 1000 psi	**GUN UNSAFE** Gun safety is off and can be fired
ANTI-SKID Landing gear is down and anti-skid is disengaged	**L-HYD RES** Left hydraulic fluid reservoir is low	**R-HYD RES** Right hydraulic fluid reservoir is low	**OXY LOW** Oxygen gauge indicates 0.5 liters or less (low quantity)
ELEV DISENG At least one elevator is disengaged	----------	**SEAT NOT ARMED** Ground safety lever is in SAFE position (seat is not armed)	**BLEED AIR LEAK** Bleed air is 400 deg F or more
AIL DISENG At least one aileron is disengaged	**L-AIL TAB** Left aileron is not at normal position due to MRFCS (Manual Reversion Flight Control System)	**R-AIL TAB** Right aileron is not at normal position due to MRFCS (Manual Reversion Flight Control System)	**SERVICE AIR HOT** Air temperature exceeds allowable ECS (Environmental Control System) range
PITCH SAS At least one pitch SAS (Stability Augmentation System) channel is disabled	**L-ENG HOT** Left engine ITT exceeds 880 deg C	**R-ENG HOT** Right engine ITT exceeds 880 deg C	**WINDSHIELD HOT** Windshield temperature exceeds 150 deg F
YAW SAS At least one yaw SAS (Stability Augmentation System) channel is disabled	**L-ENG OIL PRESS** Left engine oil pressure is below 27.5 psi	**R-ENG OIL PRESS** Right engine oil pressure is below 27.5 psi	**CICU** Central Interface Control Unit failure
GCAS LASTE failure detected affects GCAS (Ground Collision Avoidance System)	**L-MAIN PUMP** Left Main Fuel Tank Booster Pump Low Pressure Detected	**R-MAIN PUMP** Right Main Fuel Tank Booster Pump Low Pressure Detected	----------
LASTE Fault detected in LASTE (Low Altitude Safety and Targeting Enhancement) computer	**L-WING PUMP** Left Wing Fuel Tank Booster Pump Low Pressure Detected	**R-WING PUMP** Right Wing Fuel Tank Booster Pump Low Pressure Detected	**HARS** HARS system Heading or Attitude is invalid
IFF MODE-4 Inoperative Identify-Friend-or-Foe Mode 4 capability is detected.	**L-MAIN FUEL LOW** Left Main fuel tank has 500 lbs of fuel or less	**R-MAIN FUEL LOW** Right Main fuel tank has 500 lbs of fuel or less	**L-R TKS UNEQUAL** There is a 750-lbs difference between two main fuel tanks
EAC EAC (Enhanced Attitude Control) system is turned off	**L-FUEL PRESS** Low fuel pressure is detected in left engine fuel feed lines	**R-FUEL PRESS** Low fuel pressure is detected in right engine fuel feed lines	**NAV** Control Display Unit failure while in navigation system alignment mode
STALL SYS AFC (Automatic Flight Controls) malfunction or deselected	**L-CONV** Left electrical converter failure detected	**R-CONV** Right electrical converter failure detected	**CADC** Central Air Data Computer failure
	L-GEN Left engine generator has shut down or AC power is out of limits	**R-GEN** Right engine generator has shut down or AC power is out of limits	**INST INV** AC powered systems are not receiving power from inverter


Canopy Switch
Canopy Jettison Handle
Boarding Ladder Extension Button
Emergency Flood Lights
Battery Switch
Canopy Jettison Handle Unlock Button
APU Generator Switch
AC Generator Switches
AC Inverter Switch
CANOPY OPEN
CANOPY JETTISON
EXTEND BOARDING LADDER
FUEL DISPLAY SEL
TOTAL LBS
FUEL LBS X1000
EMER FLOOD
INVERTER
APU GEN PWR
BATTERY PWR
AC GEN PWR
OFF/RESET
OXYGEN REGULATOR
PULL TO EJECT

PART 3 – COCKPIT & GAUGES


Manual Canopy Opening Assist Handle
Canopy Breaker Tool (used to shatter canopy glass)
Flood Light
FIRE < R ENG > PULL
MANUAL CANOPY OPENING ASSIST
CANOPY JETTISON

PART 3 – COCKPIT & GAUGES



Moving Map Scale Adjustment Rocker Switch

MFCD Backlight Brightness Rocker Switch

OSB (Option Select Button)

MFCD (Multifunction Colored Display)

DCLT *is used to declutter*

MFCD Contrast Rocker Switch

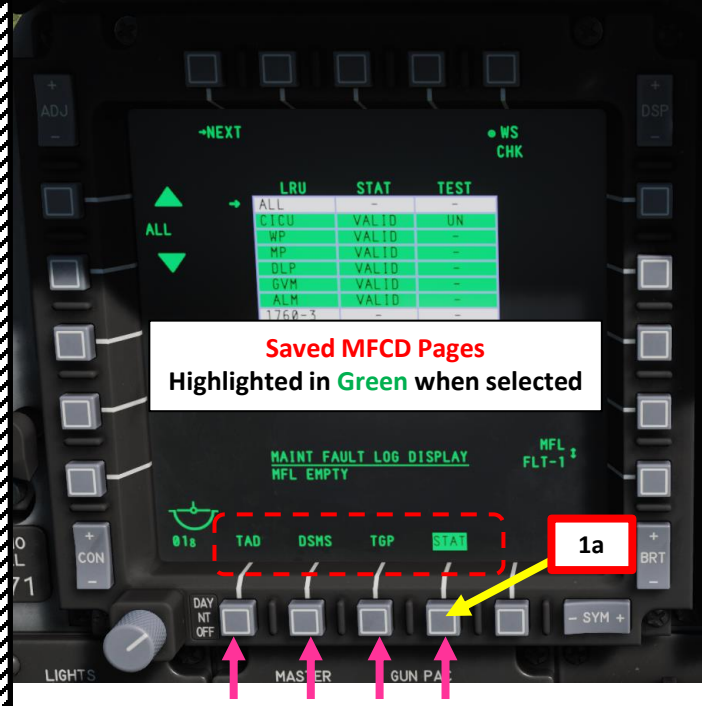
MFCD Brightness Rocker Switch

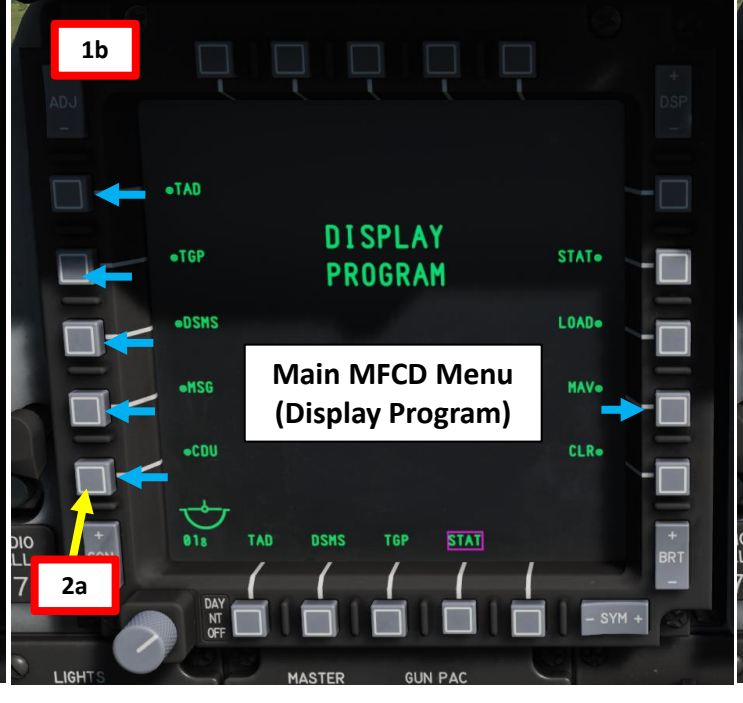
MFCD Day/Night/Off Power Mode Knob

MFCD Symbology Brightness Rocker Switch

Note 1:

*The four lower OSBs are Direct Access (DA) buttons (in **pink**) and provide direct access to the saved MFCD displays according to master mode. Up to four pages for each MFCD may be assigned to the DA buttons for each master mode. These pages are toggled by pressing the corresponding direct access OSB button or they can be cycled even faster with the HOTAS buttons: Coolie Hat Short right for the right MFCD and Coolie Hat Short left for the left MFCD.*



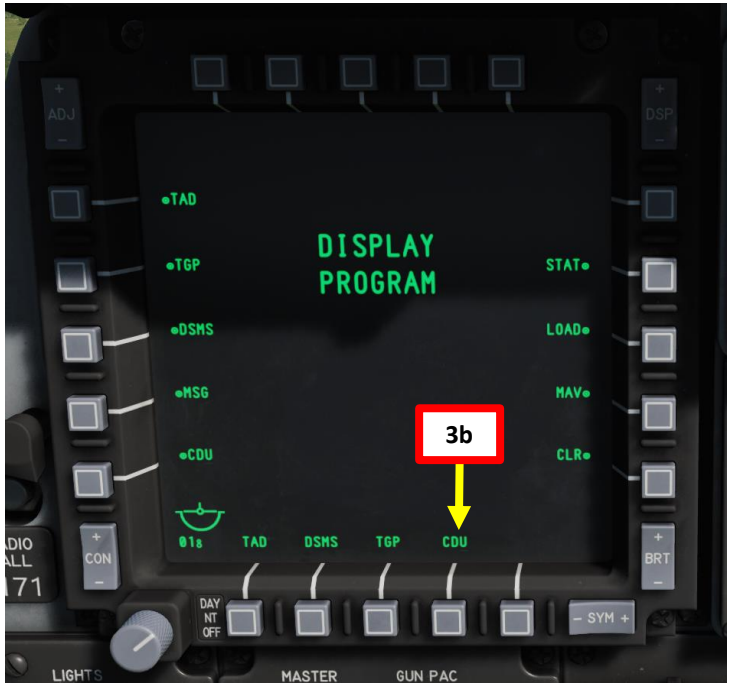


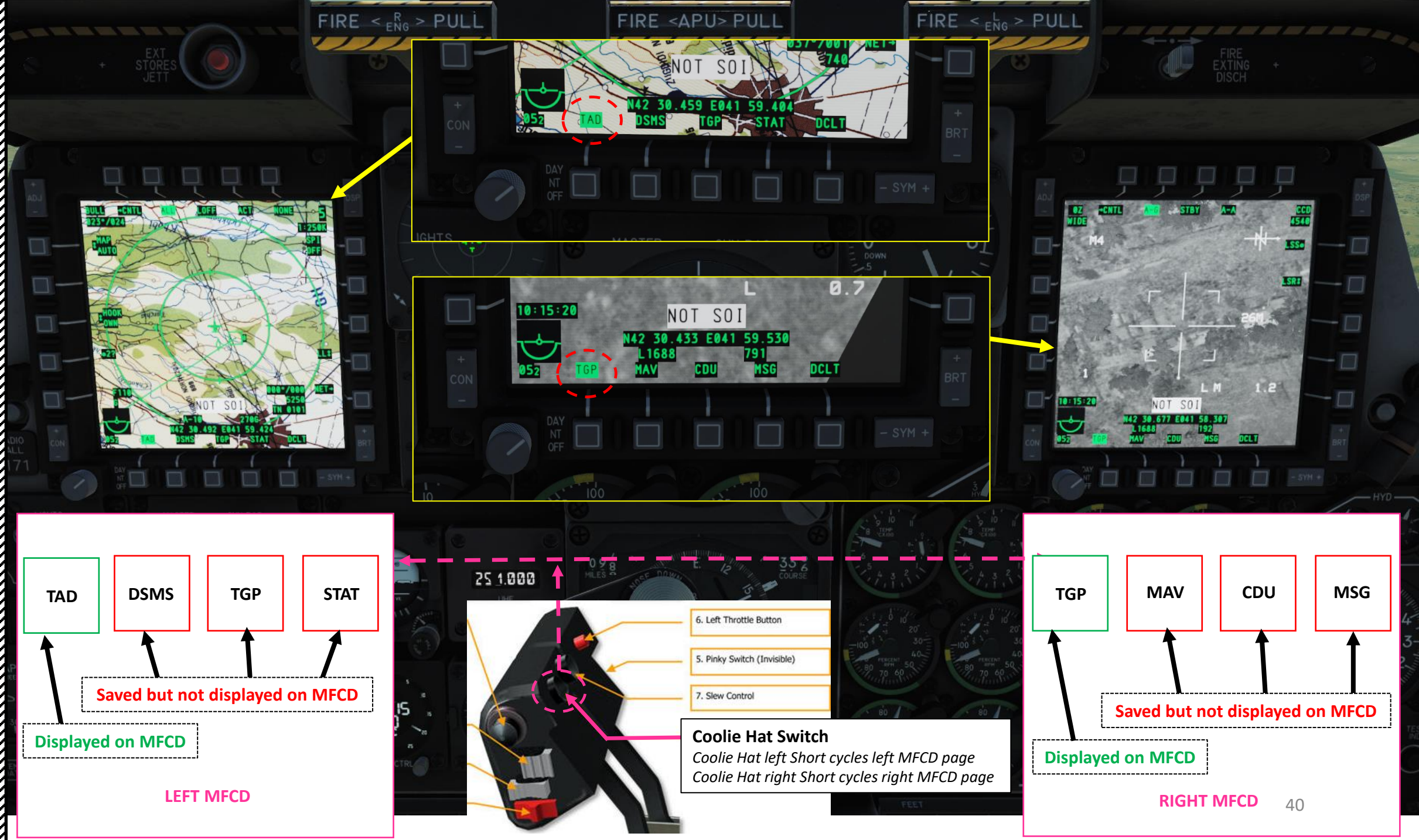
Note 2:

In this example, we will change the STAT (Status) saved page to the CDU (Control Display Unit) page. Then, we will display the CDU page.

To access a specific MFCD page:

1. *Press and hold for approx. 2 seconds on one of the four **DA OSBs (Direct Access Option Select Button)**. The DISPLAY PROGRAM page will appear.*
2. *Select desired page with its respective OSB (shown in **blue**) from the Display Program page. Once selected, page will be highlighted in green.*
3. *Once desired page is selected, click on the **DA OSB** next to the desired Saved MFCD Page slot. This will assign the Saved Page slot to the page selected in step 2.*
4. *To display the CDU page set in step 3, press on the **DA OSB** next to CDU. The CDU page will then be displayed.*





Coolie Hat Switch

Coolie Hat left Short cycles left MFCD page
Coolie Hat right Short cycles right MFCD page

LEFT MFCD

- **TAD** — Displayed on MFCD
- **DSMS** — Saved but not displayed on MFCD
- **TGP** — Saved but not displayed on MFCD
- **STAT** — Saved but not displayed on MFCD

RIGHT MFCD

- **TGP** — Displayed on MFCD
- **MAV** — Saved but not displayed on MFCD
- **CDU** — Saved but not displayed on MFCD
- **MSG** — Saved but not displayed on MFCD

MFCD (Multifunction Colored Display) Pages

TAD (Tactical Awareness Display): Use the digital, moving map for navigation, targeting, and datalink purposes	**STAT (Status)**: Review status of A-10C sub-systems
TGP (Targeting Pod): LITENING targeting pod page	**DTS (Data Transfer System)**: Load navigation and weapon data from the mission planner into the aircraft. In the real-world, this would be done with a Data Transfer Cartridge that loads data from the Mission Planning Software onto the aircraft
DSMS (Digital Stores Management System): Manage the stores of the aircraft	**DP (Display Program)**: Configure which page-links are to be displayed on the bottom of each MFCD
MSG (Message): Send and receive text messages with other units on SADL datalink network	**MAV (Maverick)**: Employ various models of the AGM-65 Maverick air-to-surface missile
CDU (Control Display Unit): View the CDU screen display on an MFCD	

TAD Page

DSMS Page

STAT Page

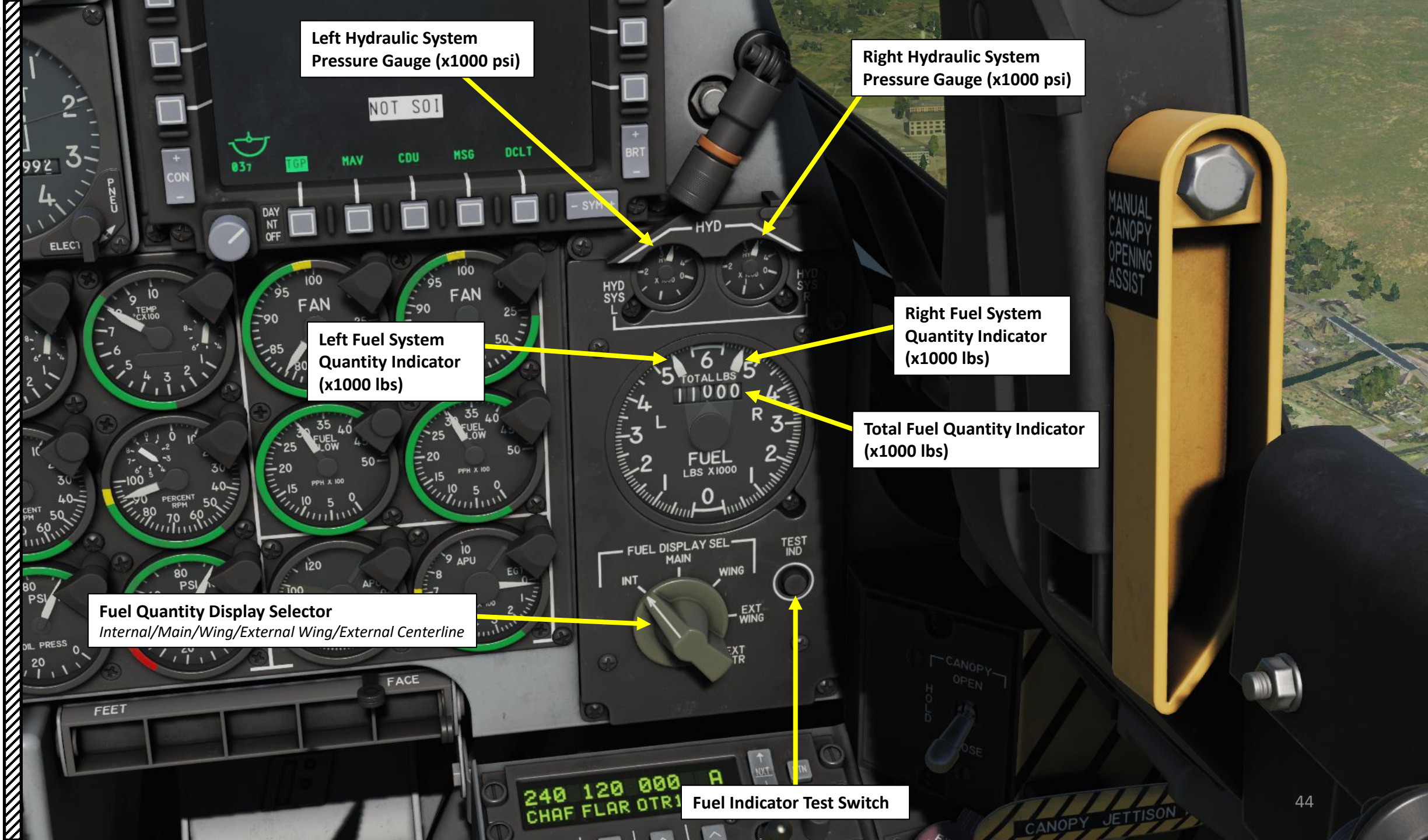
MSG Page

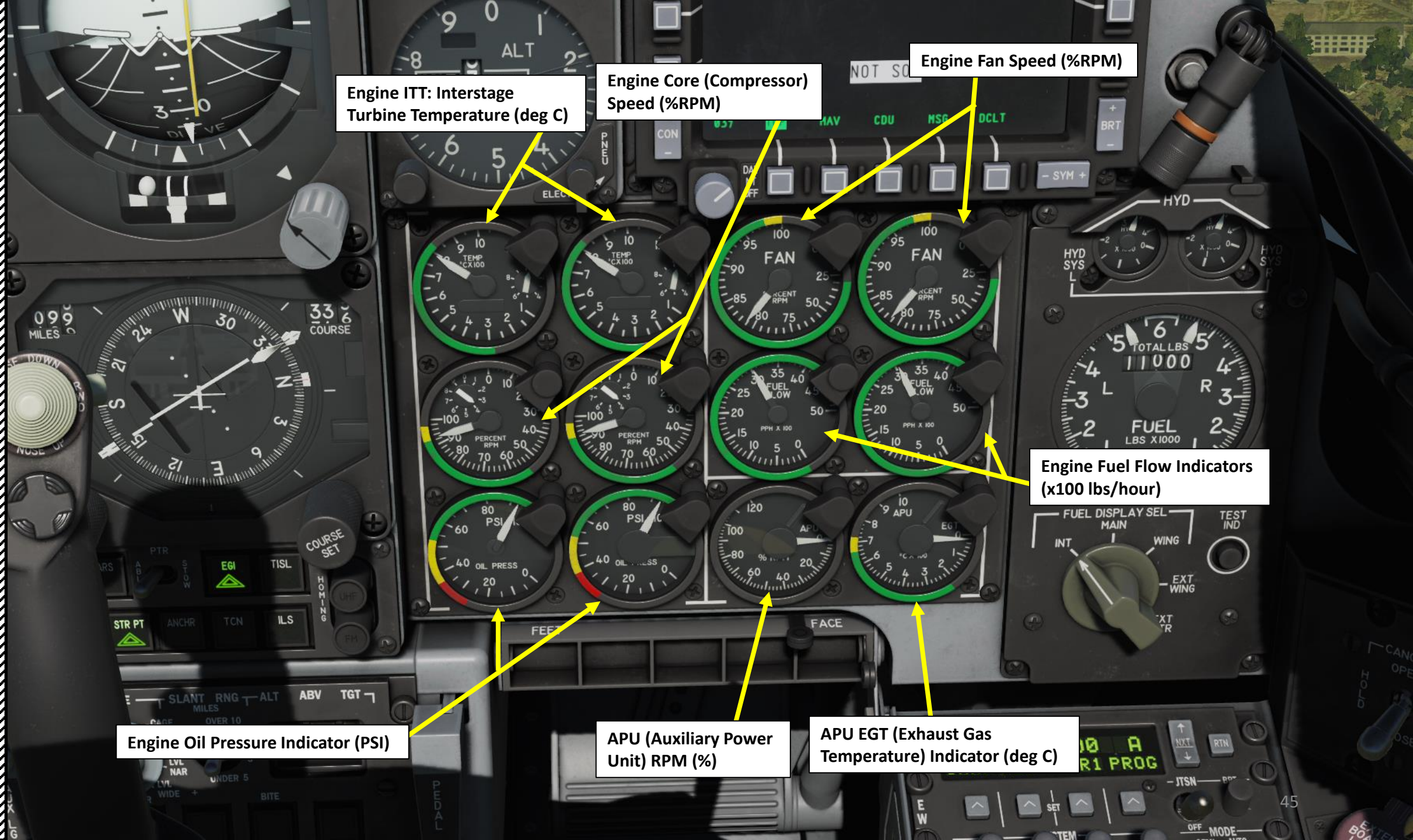
CDU Page

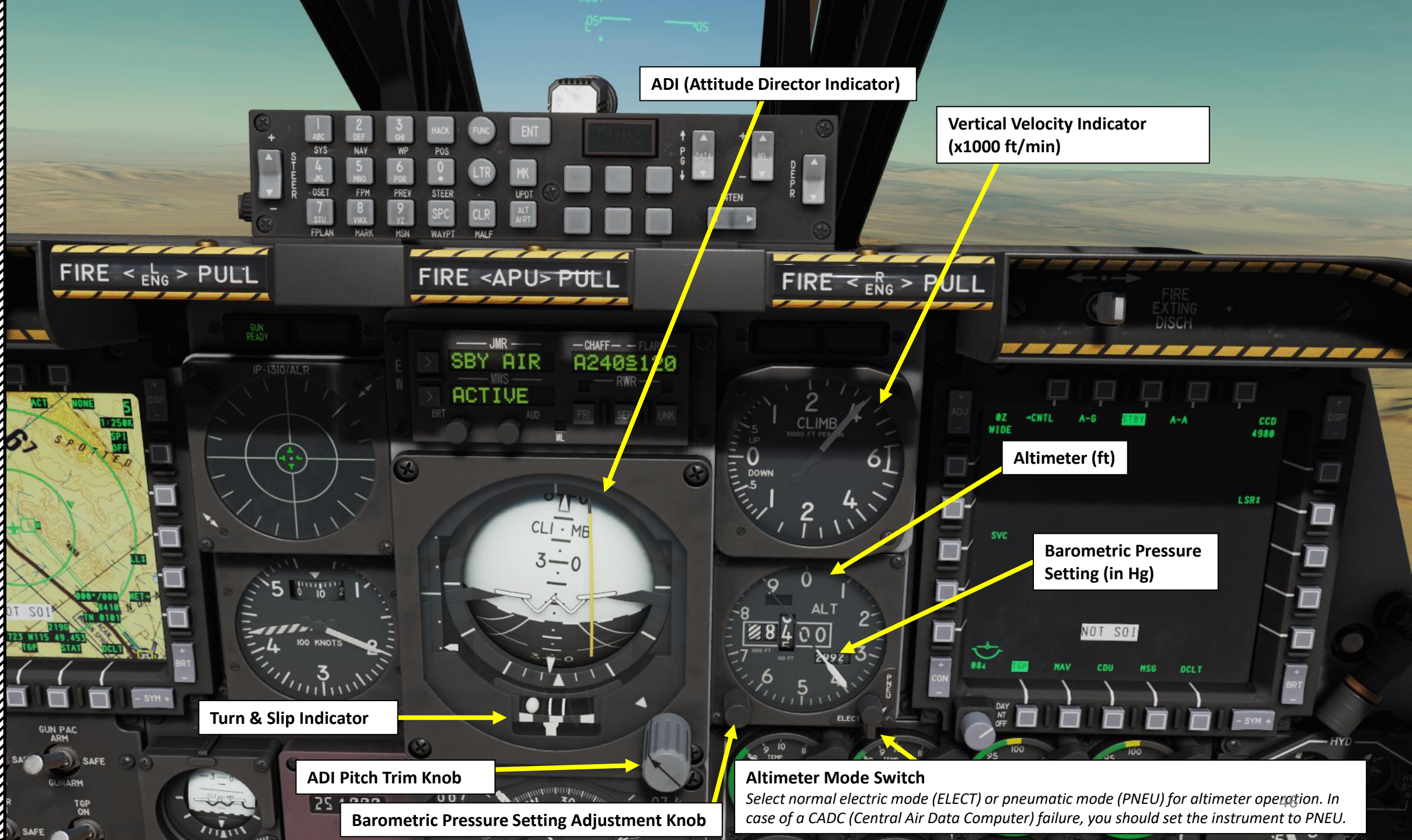
TGP Page

MAV Page

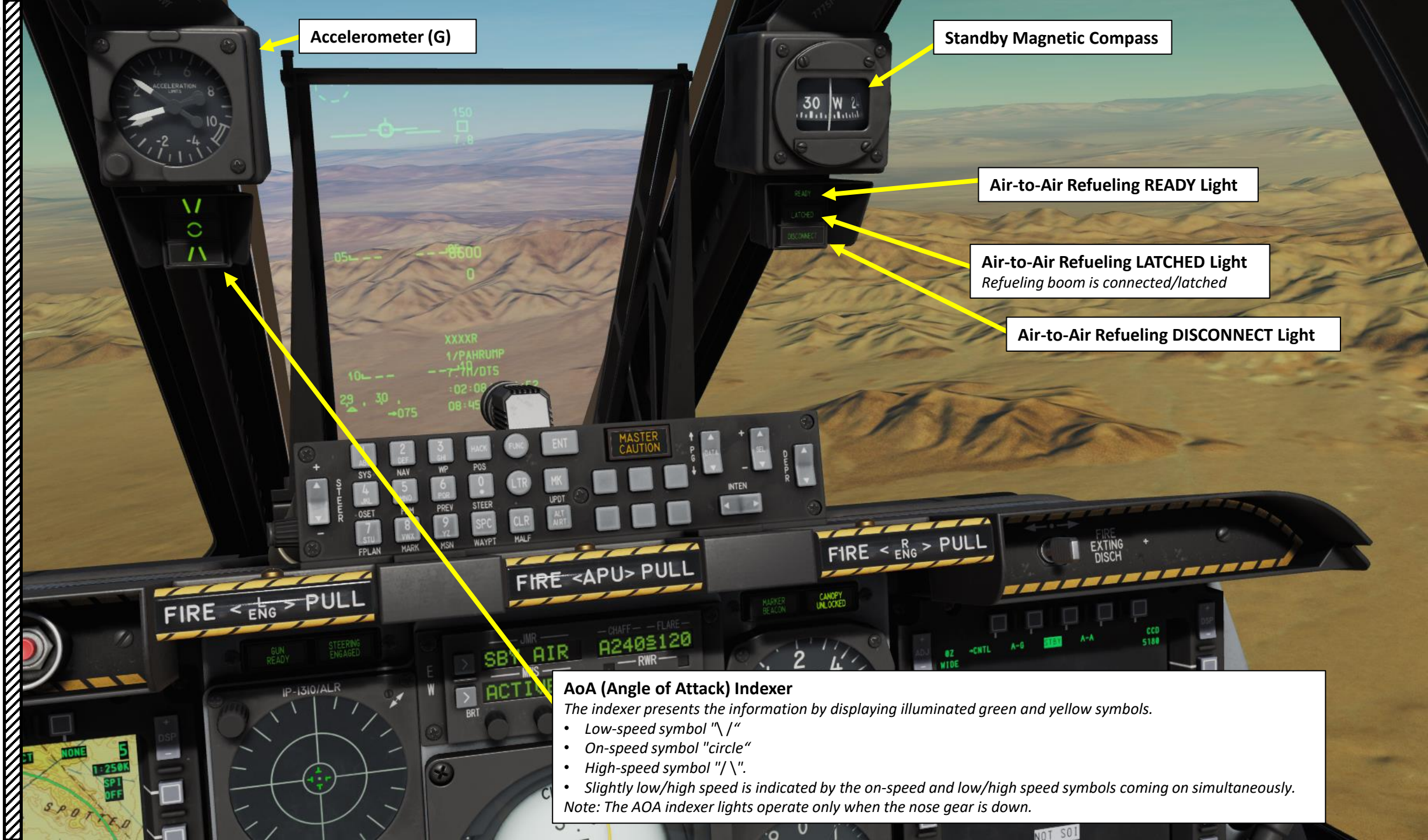
DTS Page


Left Hydraulic System Pressure Gauge (x1000 psi)
Right Hydraulic System Pressure Gauge (x1000 psi)
Left Fuel System Quantity Indicator (x1000 lbs)
Right Fuel System Quantity Indicator (x1000 lbs)
Total Fuel Quantity Indicator (x1000 lbs)
Fuel Quantity Display Selector
Internal/Main/Wing/External Wing/External Centerline
Fuel Indicator Test Switch
HYD
TOTAL LBS
11000
FUEL
LBS X1000
FUEL DISPLAY SEL
MAIN
INT
WING
EXT WING
TEST IND
MANUAL CANOPY OPENING ASSIST
CANOPY JETTISON


Engine ITT: Interstage Turbine Temperature (deg C)
Engine Core (Compressor) Speed (%RPM)
Engine Fan Speed (%RPM)
Engine Fuel Flow Indicators (x100 lbs/hour)
Engine Oil Pressure Indicator (PSI)
APU (Auxiliary Power Unit) RPM (%)
APU EGT (Exhaust Gas Temperature) Indicator (deg C)


ADI (Attitude Director Indicator)
Vertical Velocity Indicator (x1000 ft/min)
Altimeter (ft)
Barometric Pressure Setting (in Hg)
Turn & Slip Indicator
ADI Pitch Trim Knob
Barometric Pressure Setting Adjustment Knob
Altimeter Mode Switch
Select normal electric mode (ELECT) or pneumatic mode (PNEU) for altimeter operation. In case of a CADC (Central Air Data Computer) failure, you should set the instrument to PNEU.


FIRE < L ENG > PULL
FIRE <APU> PULL
FIRE < R ENG > PULL
FIRE EXTING DISCH
SBY AIR
ACTIVE
A240≦120
CLIMB
ALT
NOT SOI
External Stores Jettison Button
Jettisons all external stores except Targeting Pod and ECM pods
Left Engine Fire Detection Light & Fire Extinguisher Handle
APU (Auxiliary Power Unit) Fire Detection Light & Fire Extinguisher Handle
Right Engine Fire Detection Light & Fire Extinguisher Handle
Fire Extinguisher Discharge Switch



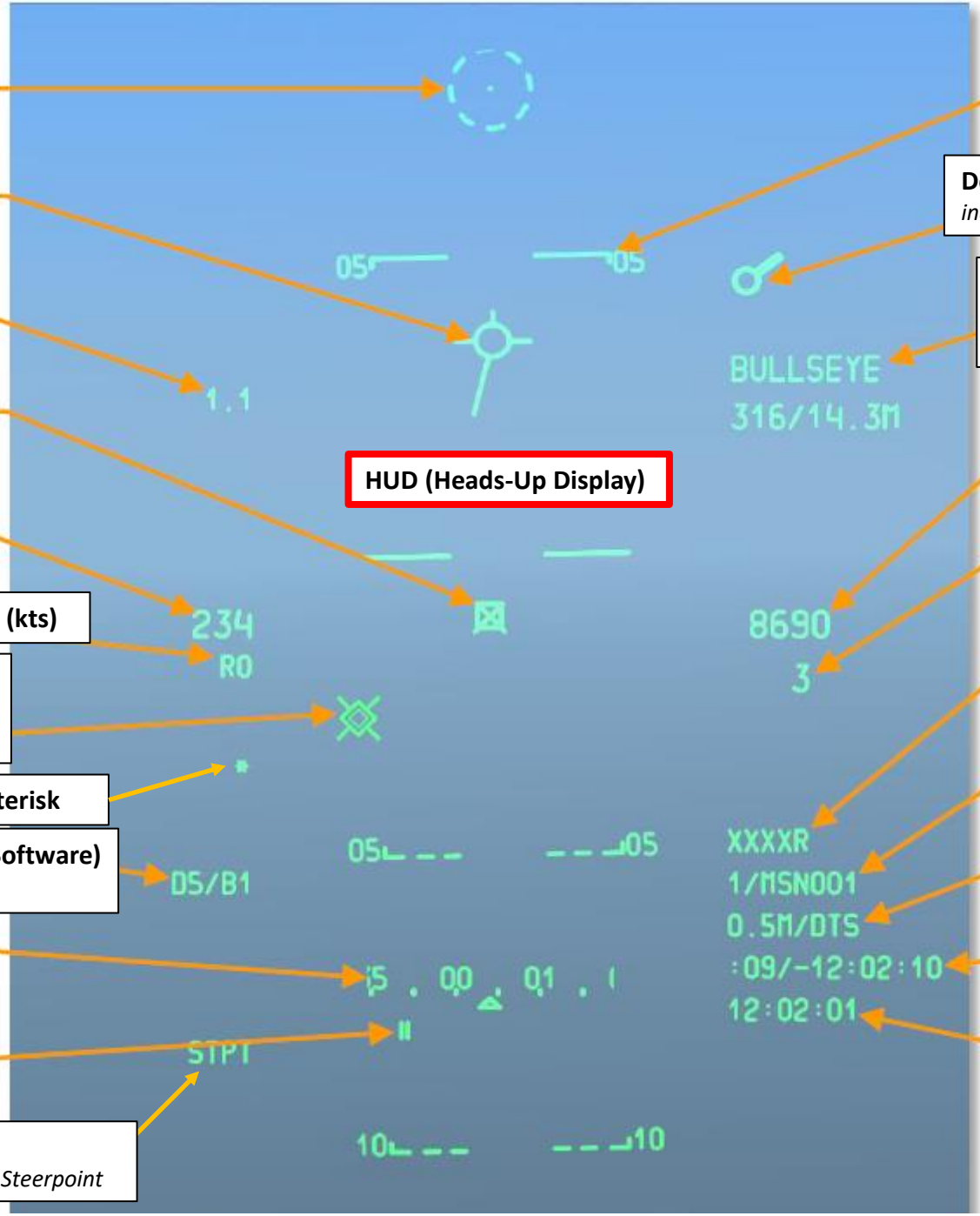
AoA (Angle of Attack) Indexer

The indexer presents the information by displaying illuminated green and yellow symbols.

- *Low-speed symbol "\ /"*
- *On-speed symbol "circle"*
- *High-speed symbol "/ \".*
- *Slightly low/high speed is indicated by the on-speed and low/high speed symbols coming on simultaneously.*

Note: The AOA indexer lights operate only when the nose gear is down.


Mirror
Mirror
Mirror
HUD (Heads-Up Display)
FIRE < ENG > PULL
FIRE < APU > PULL
FIRE < ENG > PULL
SBY AIR
ACTIVE
CLIMB
ALT
RADIO CALL 90171



Depressible Gun Pipper

Pitch Ladder (deg)

TVV (Total Velocity Vector)
(also called Flight Path Marker)

Destination Index (Tadpole)
indicates relative bearing to the selected steerpoint

G-Meter

Anchor Point Display (Bullseye)
Magnetic Heading from Anchor Point to Aircraft / Distance from aircraft to Anchor Point (nm)

TDC (Target Designation Cursor)

Barometric Altitude (ft)

HUD (Heads-Up Display)

Airspeed (kts)
G: Ground Speed
T: True Airspeed
No letter: Indicated Airspeed

Flight Path Angle (deg)

Required Airspeed to meet Time-On-Target (kts)

Radar Altitude (ft)
XXXX: Radar Altitude is invalid or above 5000 ft AGL

Pave Penny Cue Index
*Provide a method for acquiring the TISL (*Target Identification Set Laser*) Spider*

Selected Steerpoint Number / Name

HUD SOI (Sensor of Interest) Asterisk

DTSAS (Digital Terrain System Application Software) Mode and FOM (Figure of Merit) Message

Distance to Steerpoint (nm) / Target Elevation at the location of the CCRP Reticle (ft)
Shown: 0.5 nm to Steerpoint

Heading Tape / Scratchpad Data Display

Time to Go (TTG) and Time on Target Delta (TOT)

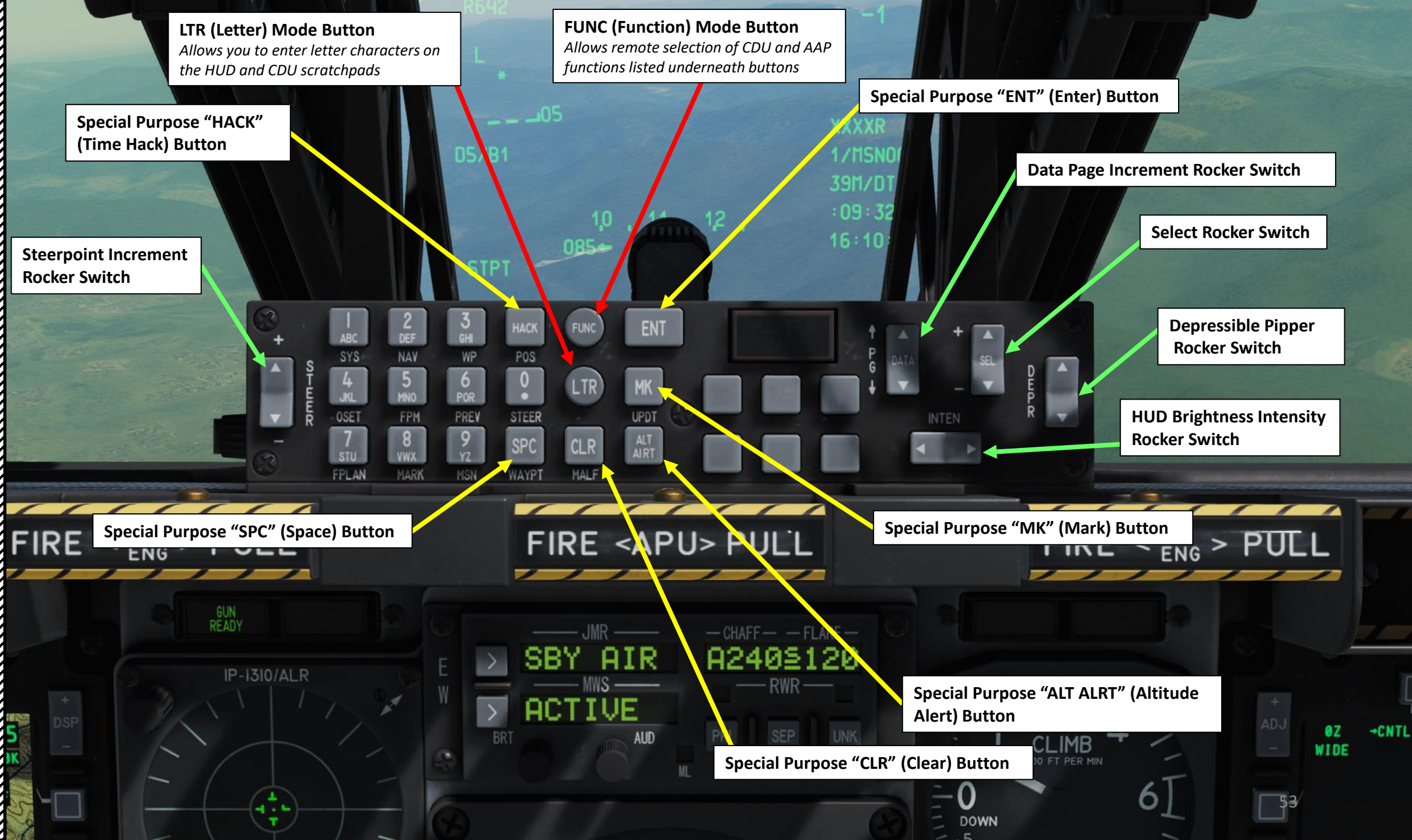
Desired Magnetic Heading to Selected Steerpoint

Current Time

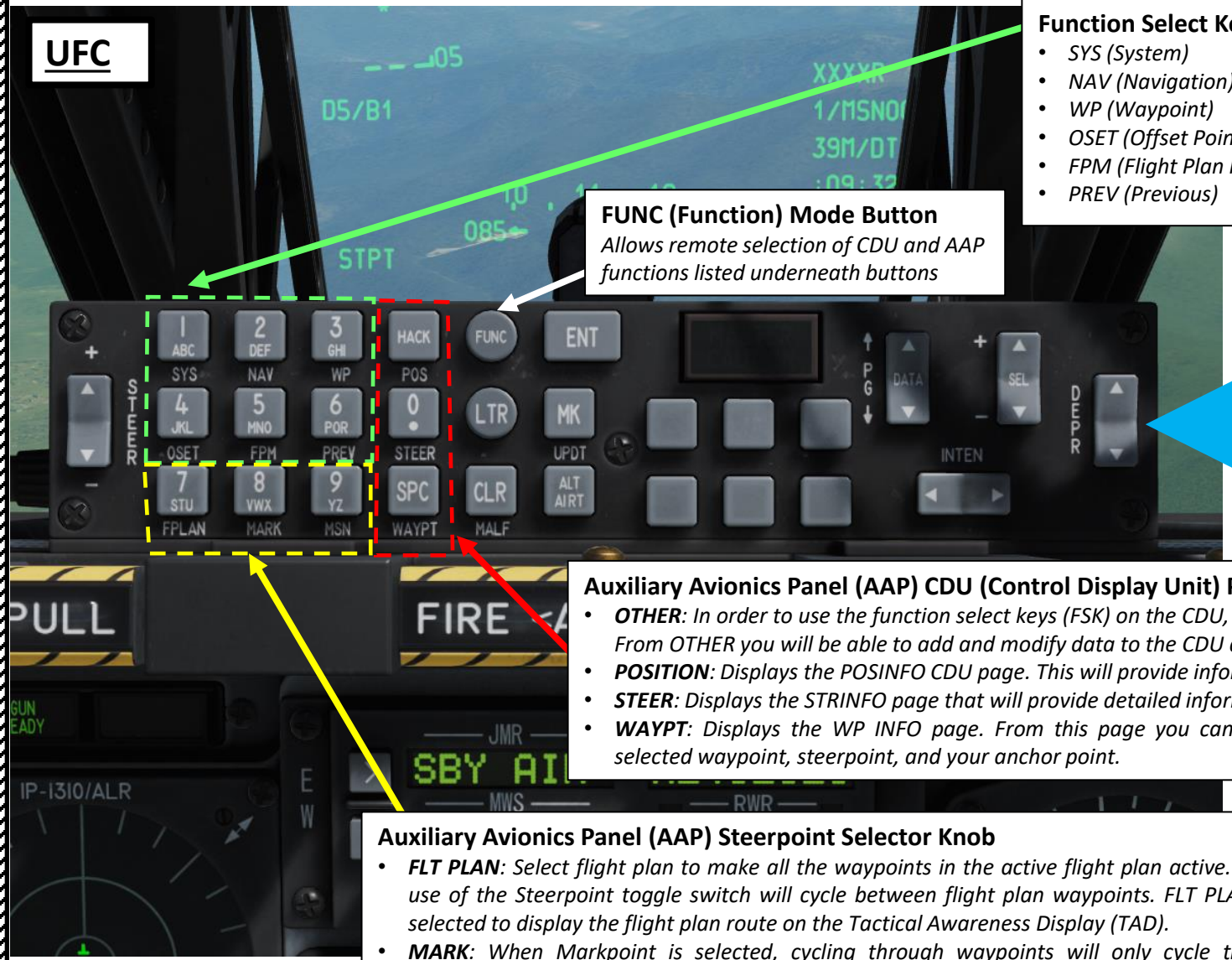
SPI Sensor Indicator
STPT: Current Sensor Point of Interest (SPI) is from Steerpoint


FIRE <ENG> PULL
FIRE <APU> PULL
FIRE <R ENG> PULL
MANUAL CANOPY OPENING ASSIST
STBY
W


Master Caution
UFC (Up Front Controller)
Gun READY Indicator
Nosewheel Steering ENGAGED Indicator
CMSC (Countermeasures Set Control)
Marker Beacon Indicator
Canopy Unlocked Indicator
MASTER CAUTION
FIRE <L ENG> PULL
FIRE <APU> PULL
FIRE <R ENG> PULL
SBY AIR
ACTIVE
A240≦120

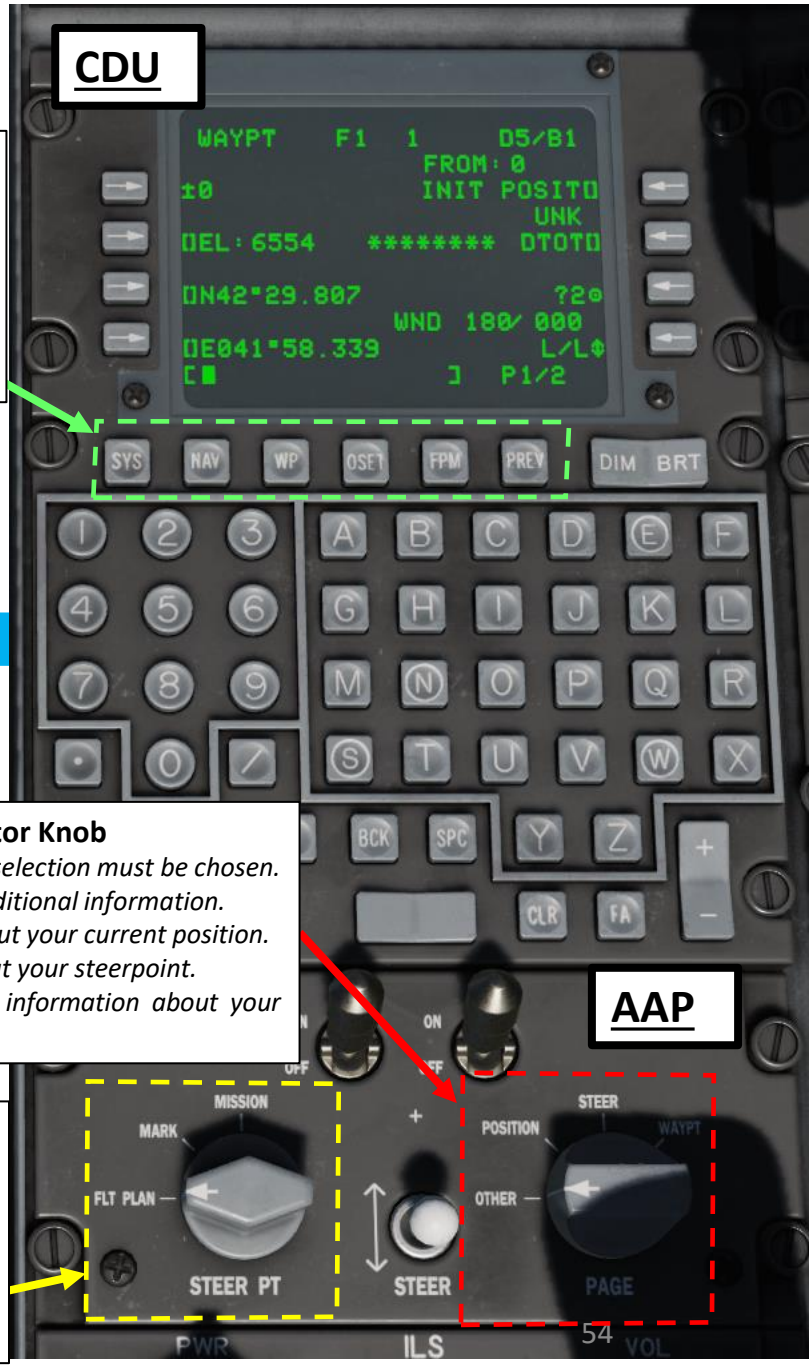

LTR (Letter) Mode Button
Allows you to enter letter characters on the HUD and CDU scratchpads
FUNC (Function) Mode Button
Allows remote selection of CDU and AAP functions listed underneath buttons
Special Purpose "ENT" (Enter) Button
Special Purpose "HACK" (Time Hack) Button
Data Page Increment Rocker Switch
Select Rocker Switch
Steerpoint Increment Rocker Switch
Depressible Pipper Rocker Switch
HUD Brightness Intensity Rocker Switch
Special Purpose "SPC" (Space) Button
Special Purpose "MK" (Mark) Button
Special Purpose "ALT ALRT" (Altitude Alert) Button
Special Purpose "CLR" (Clear) Button
HACK
FUNC
ENT
LTR
MK
SPC
CLR
ALT ALRT
DATA
SEL
INTEN
STEER
DEPR
FIRE <APU> PULL
SBY AIR
ACTIVE
A240S120
GUN READY
IP-1310/ALR
CLIMB

Correspondence between UFC (Up-Front Control) Panel Buttons and CDU (Control Display Unit)/AAP (Auxiliary Avionics Panel) Functions



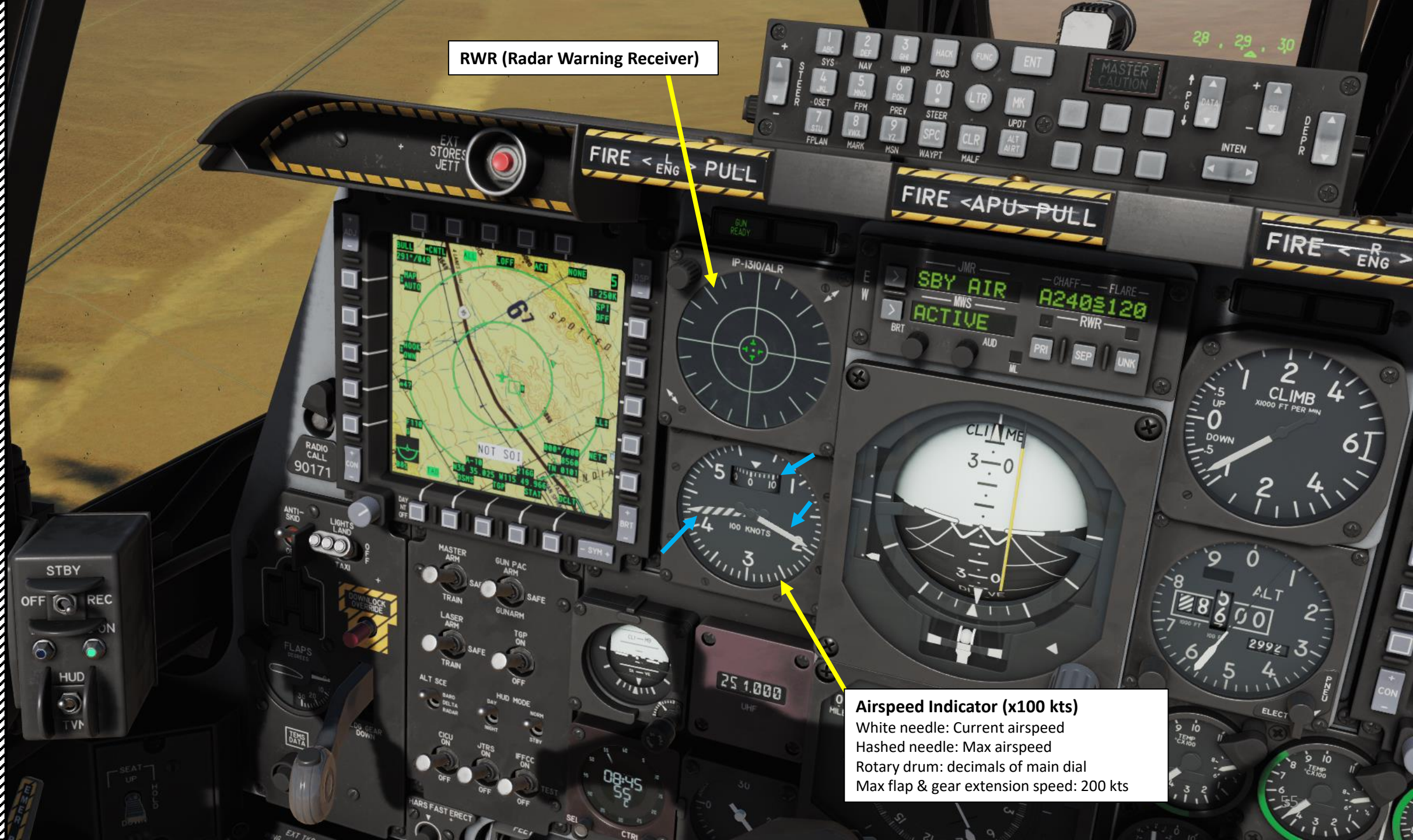
Function Select Keys (FSK)
- *SYS (System)*
- *NAV (Navigation)*
- *WP (Waypoint)*
- *OSET (Offset Point)*
- *FPM (Flight Plan Menu)*
- *PREV (Previous)*

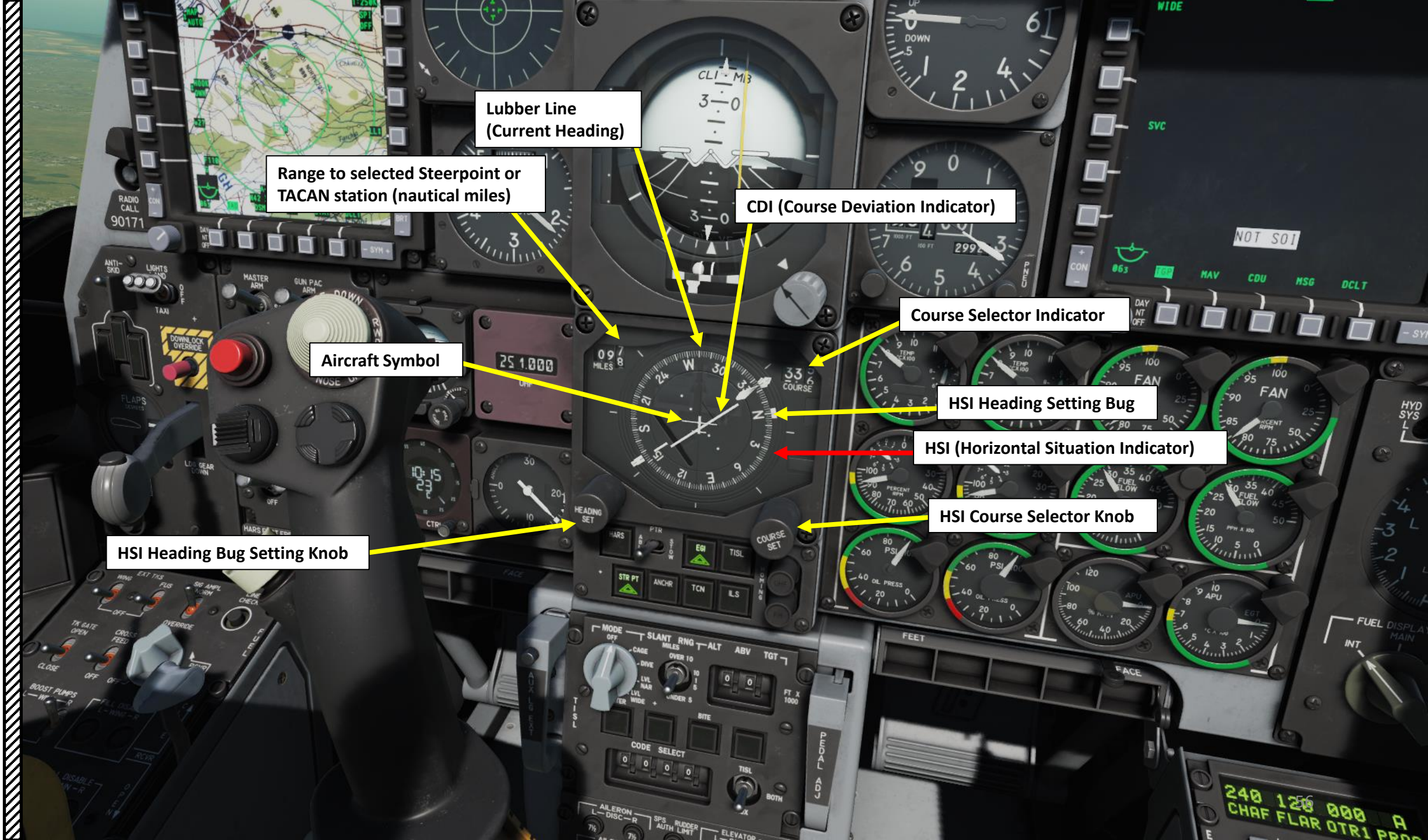
FUNC (Function) Mode Button
Allows remote selection of CDU and AAP functions listed underneath buttons

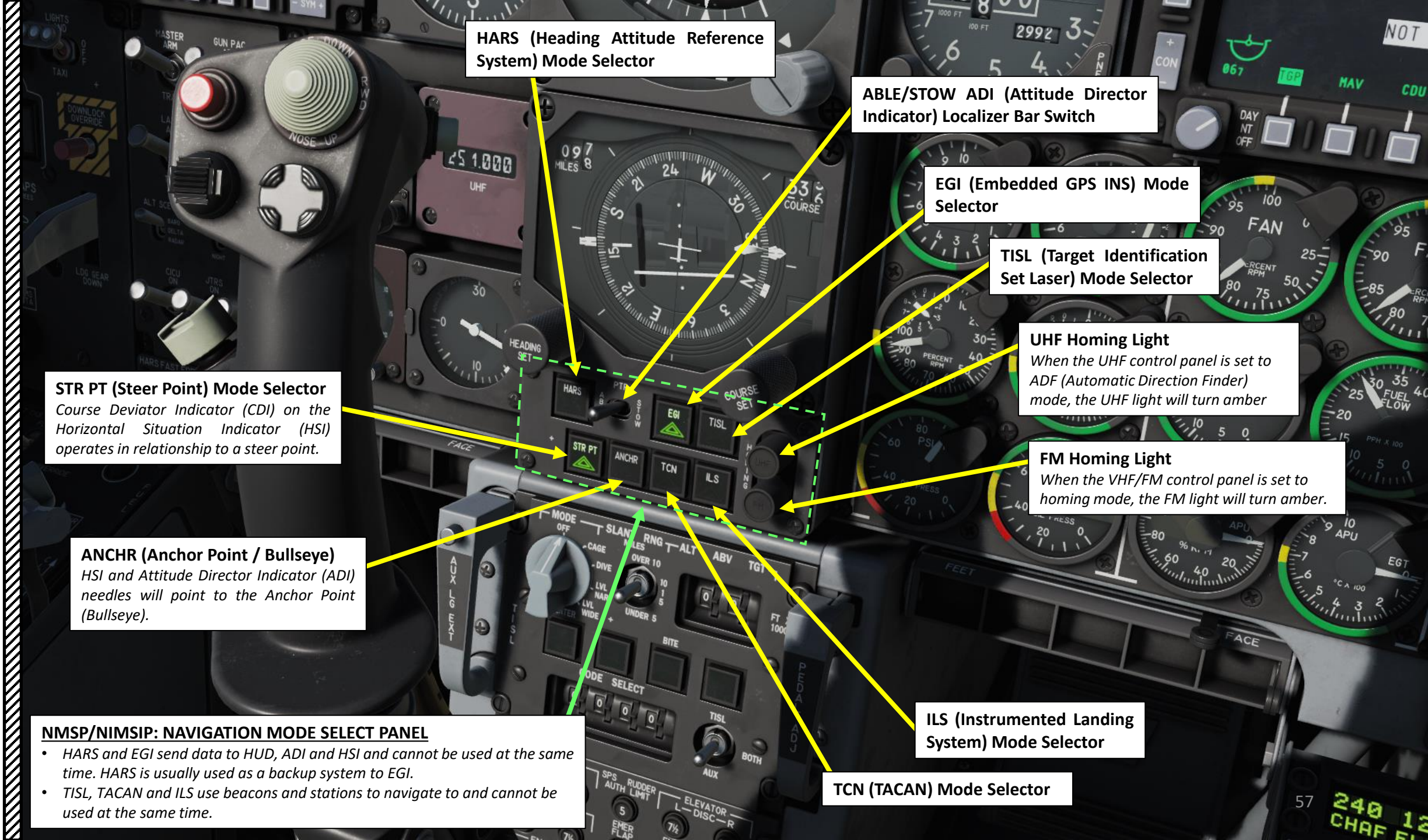


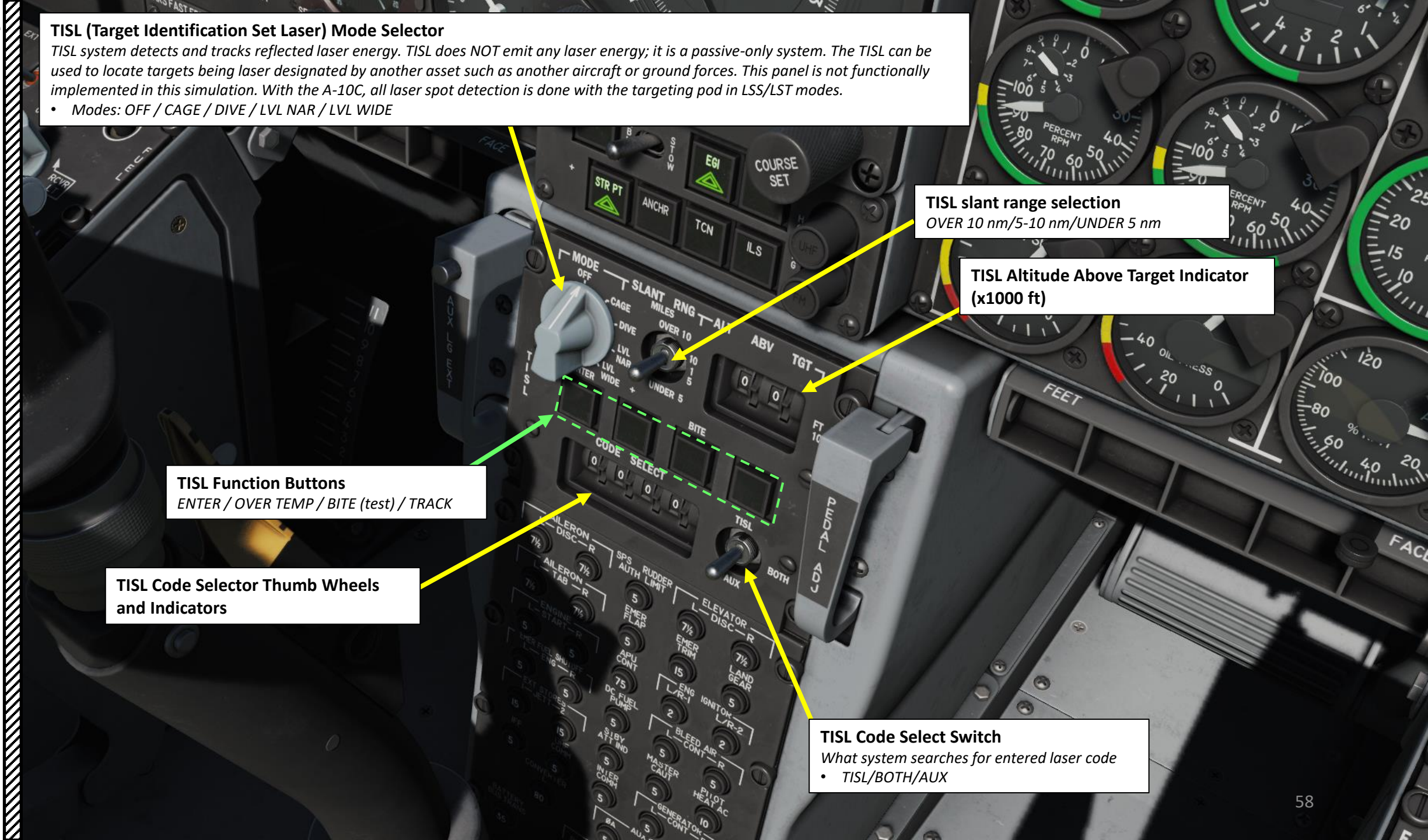
Auxiliary Avionics Panel (AAP) CDU (Control Display Unit) Page Selector Knob
- ***OTHER****: In order to use the function select keys (FSK) on the CDU, the OTHER selection must be chosen. From OTHER you will be able to add and modify data to the CDU and view additional information.*
- ***POSITION****: Displays the POSINFO CDU page. This will provide information about your current position.*
- ***STEER****: Displays the STRINFO page that will provide detailed information about your steerpoint.*
- ***WAYPT****: Displays the WP INFO page. From this page you can view basic information about your selected waypoint, steerpoint, and your anchor point.*

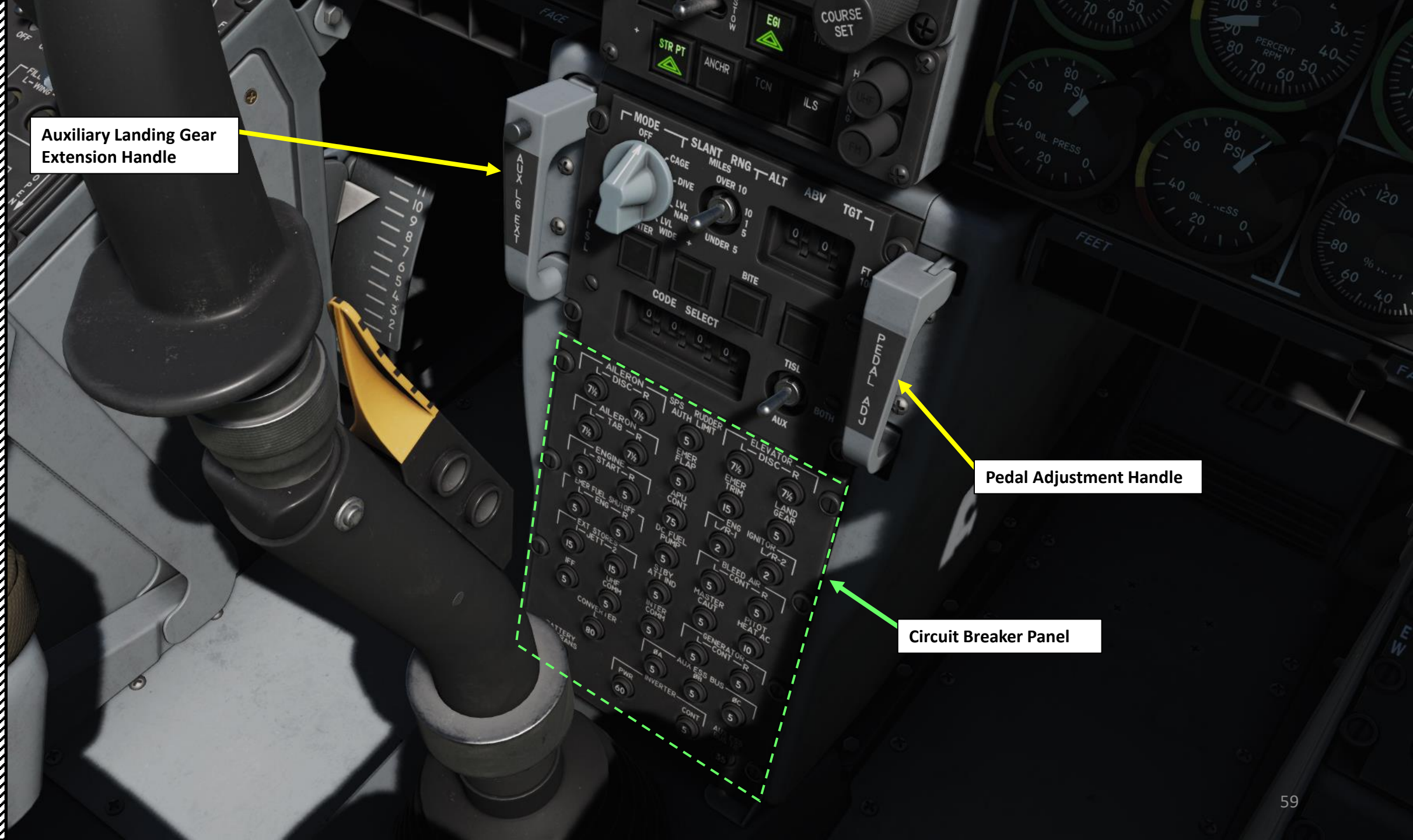
Auxiliary Avionics Panel (AAP) Steerpoint Selector Knob
- ***FLT PLAN****: Select flight plan to make all the waypoints in the active flight plan active. If selected, use of the Steerpoint toggle switch will cycle between flight plan waypoints. FLT PLAN must be selected to display the flight plan route on the Tactical Awareness Display (TAD).*
- ***MARK****: When Markpoint is selected, cycling through waypoints will only cycle through the markpoints that you created (A-Z). Note that Z is automatically created when a weapon is used.*
- ***MISSION****: Selecting Mission will allow you to access the entire mission waypoint database*

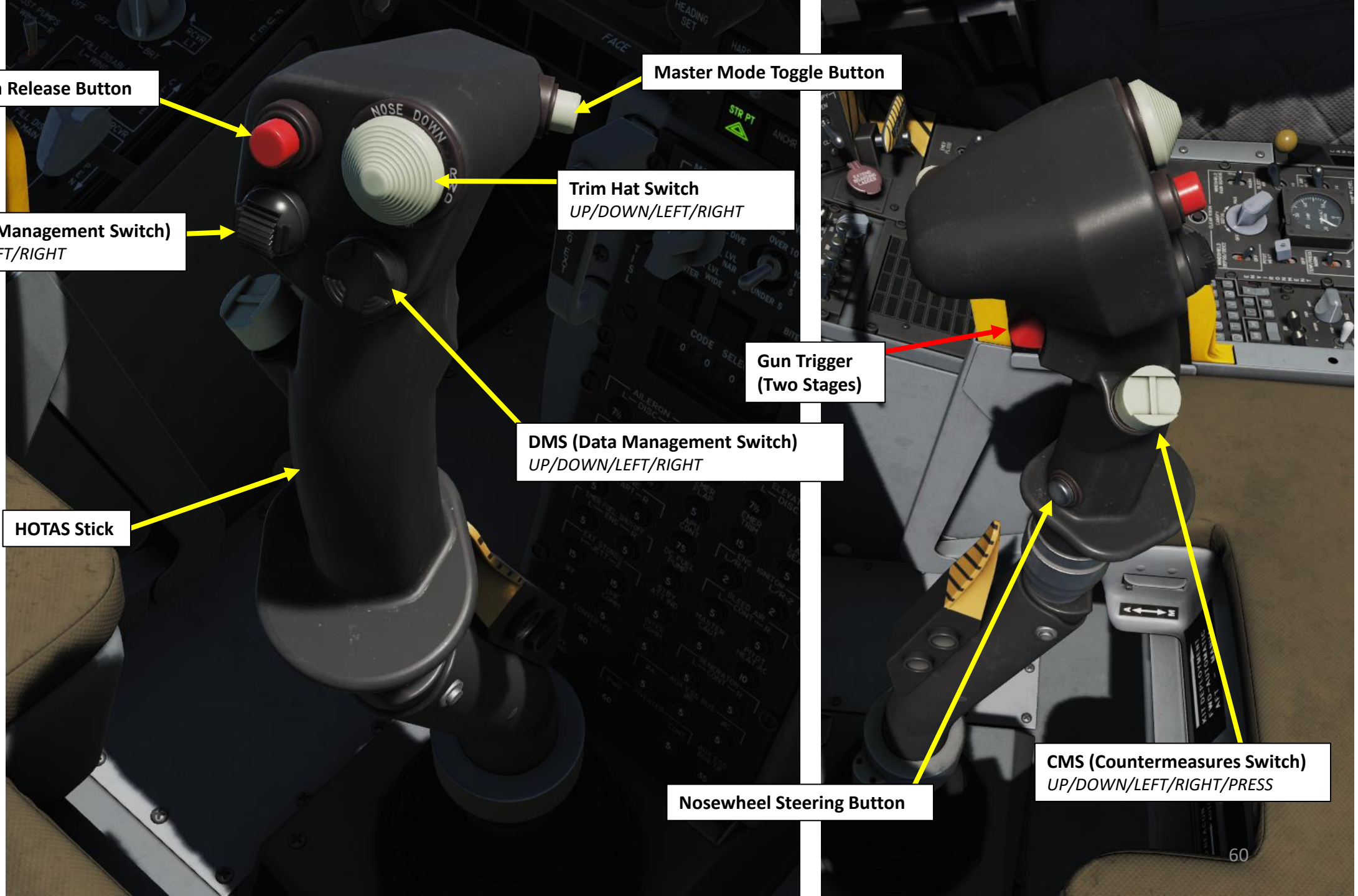

RWR (Radar Warning Receiver)
Airspeed Indicator (x100 kts)
White needle: Current airspeed
Hashed needle: Max airspeed
Rotary drum: decimals of main dial
Max flap & gear extension speed: 200 kts


Lubber Line (Current Heading)
Range to selected Steerpoint or TACAN station (nautical miles)
CDI (Course Deviation Indicator)
Course Selector Indicator
Aircraft Symbol
HSI Heading Setting Bug
HSI (Horizontal Situation Indicator)
HSI Course Selector Knob
HSI Heading Bug Setting Knob


HARS (Heading Attitude Reference System) Mode Selector
ABLE/STOW ADI (Attitude Director Indicator) Localizer Bar Switch
EGI (Embedded GPS INS) Mode Selector
TISL (Target Identification Set Laser) Mode Selector
UHF Homing Light
When the UHF control panel is set to ADF (Automatic Direction Finder) mode, the UHF light will turn amber
FM Homing Light
When the VHF/FM control panel is set to homing mode, the FM light will turn amber.
STR PT (Steer Point) Mode Selector
Course Deviator Indicator (CDI) on the Horizontal Situation Indicator (HSI) operates in relationship to a steer point.
ANCHR (Anchor Point / Bullseye)
HSI and Attitude Director Indicator (ADI) needles will point to the Anchor Point (Bullseye).
ILS (Instrumented Landing System) Mode Selector
TCN (TACAN) Mode Selector
NMSP/NIMSIP: NAVIGATION MODE SELECT PANEL
HARS and EGI send data to HUD, ADI and HSI and cannot be used at the same time. HARS is usually used as a backup system to EGI.
TISL, TACAN and ILS use beacons and stations to navigate to and cannot be used at the same time.


TISL (Target Identification Set Laser) Mode Selector
TISL system detects and tracks reflected laser energy. TISL does NOT emit any laser energy; it is a passive-only system. The TISL can be used to locate targets being laser designated by another asset such as another aircraft or ground forces. This panel is not functionally implemented in this simulation. With the A-10C, all laser spot detection is done with the targeting pod in LSS/LST modes.
• Modes: OFF / CAGE / DIVE / LVL NAR / LVL WIDE
TISL slant range selection
OVER 10 nm/5-10 nm/UNDER 5 nm
TISL Altitude Above Target Indicator (x1000 ft)
TISL Function Buttons
ENTER / OVER TEMP / BITE (test) / TRACK
TISL Code Selector Thumb Wheels and Indicators
TISL Code Select Switch
What system searches for entered laser code
• TISL/BOTH/AUX
MODE
OFF
CAGE
DIVE
LVL NAR
LVL WIDE
SLANT RNG
MILES
OVER 10
UNDER 5
ABV
TGT
FEET
BITE
CODE SELECT
TISL
AUX
BOTH
PEDAL ADJ
STR PT
ANCHR
TCN
ILS
EGI
COURSE SET


Auxiliary Landing Gear Extension Handle
Pedal Adjustment Handle
Circuit Breaker Panel

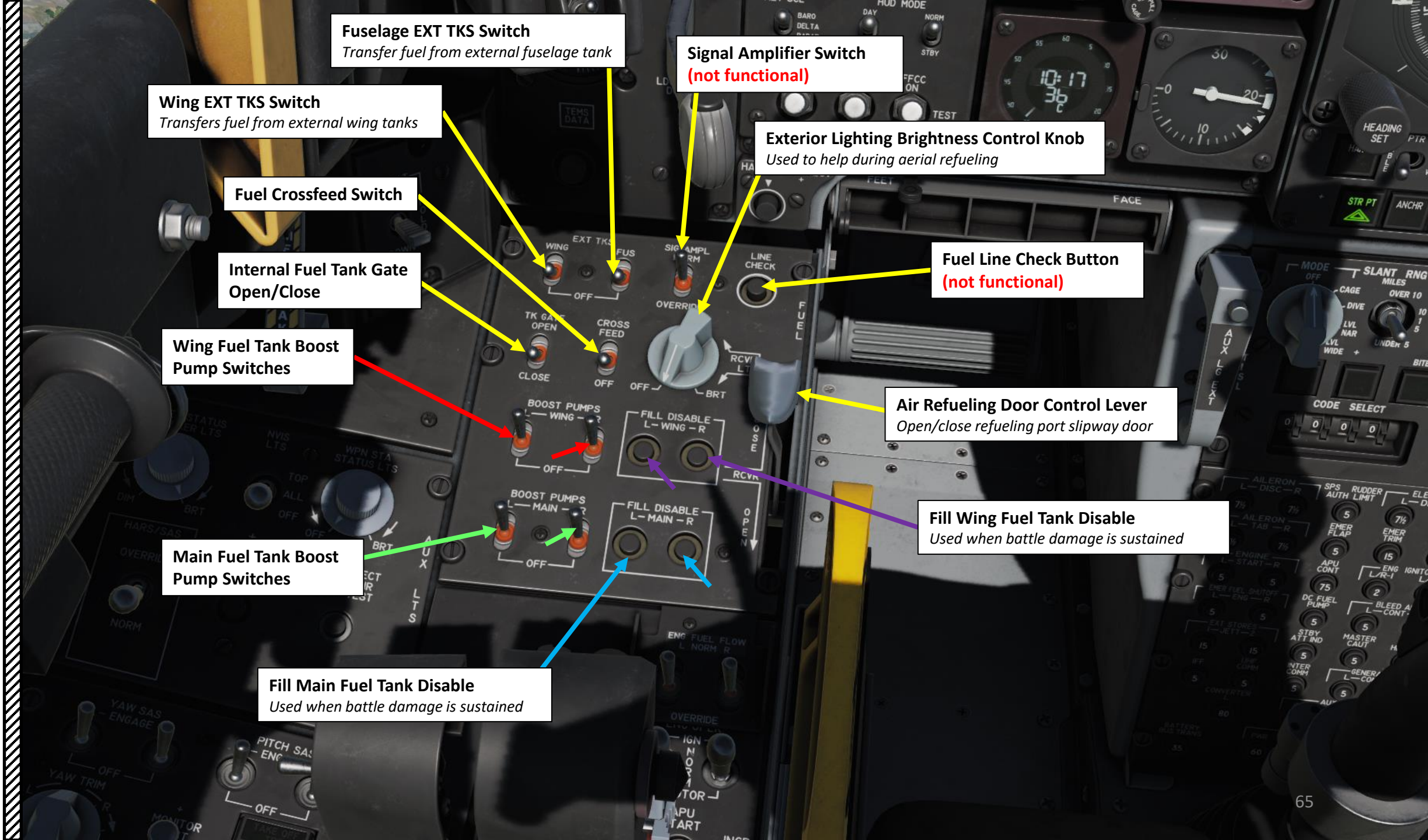

Weapon Release Button
Master Mode Toggle Button
Trim Hat Switch
UP/DOWN/LEFT/RIGHT
TMS (Target Management Switch)
UP/DOWN/LEFT/RIGHT
Gun Trigger
(Two Stages)
DMS (Data Management Switch)
UP/DOWN/LEFT/RIGHT
HOTAS Stick
Nosewheel Steering Button
CMS (Countermeasures Switch)
UP/DOWN/LEFT/RIGHT/PRESS

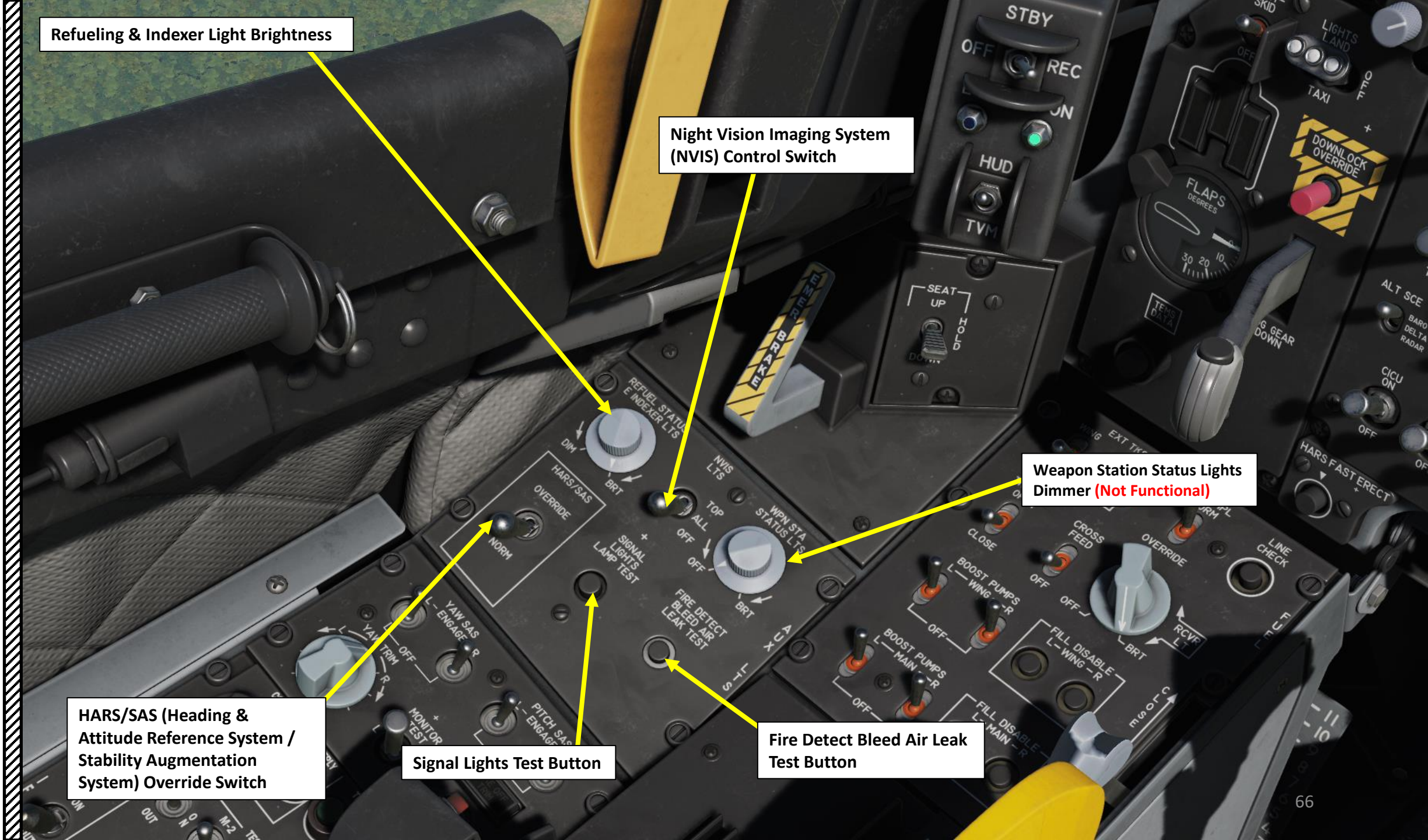

SAI (Standby Attitude Indicator)
SAI (Standby Attitude Indicator) Caging Knob
UHF Radio Frequency Repeater
Clock
AOA (Angle of Attack) Indicator (units of AoA)
RADIO CALL 90171
MASTER ARM
GUN PAC ARM
LASER ARM
TGP ON
ALT SCE
HUD MODE
CICU ON
JTRS ON
IFFCC ON
ANTI-SKID
LIGHTS
DOWNLOCK OVERRIDE
FLAPS
TVM
HUD
TEMS DATA
HARS FAST ERECT
EXT TKS
SIG AMPL
LINE CHECK
251.000
UHF
HEADING SET
COURSE SET
EGI
TISL
STR PT
ANCHR
TCN
ILS
MODE
SLANT RNG
ALT
ABV
TGT


Laser Arming Switch
ARM/SAFE/TRAINING
Master Arm Switch
ARM/SAFE/TRAINING
GUN/PAC (Precision Attitude Correction) Arming Switch
• ARM: Gun Armed, PAC enabled
• SAFE: Gun Not Armed, PAC disabled
• GUNARM, Gun Armed, PAC disabled
TGP (Targeting Pod) Power Switch
AHCP (Armament HUD Control Panel)
HUD Modes Selector
Normal/Standby
HUD modes Selector
Day/Night
IFFCC (Integrated Flight & Fire Control Computer) Power Switch
JTRS (Joint Tactical Radio System) Power Switch
CICU (Central Interface Control Unit) Power Switch
ALT SCE (Altitude Source) Selector
• BARO: Altitude derived from Barometric Pressure
• DELTA: Altitude derived from difference between barometric and radar altimeter
• RADAR: Altitude derived from Radar Altimeter
HARS (Heading & Attitude Reference System) Fast Erect Button
Corrects HARS errors
MASTER ARM
GUN PAC ARM
SAFE
TRAIN
GUNARM
LASER ARM
TGP ON
OFF
ALT SCE
BARO
DELTA
RADAR
HUD MODE
DAY
NIGHT
NORM
STBY
CICU ON
JTRS ON
IFFCC ON
TEST
HARS FAST ERECT
STBY
OFF
HUD
TVM
LIGHTS
TAXI
DOWNLOCK OVERRIDE
UHF
LINE CHECK


Landing Gear Position Indicator Light
• LSAFE/NSAFE: Down and Locked
• Extinguished: Up and Locked
Anti-Skid Switch
UP: ON
Landing/Taxi Lights Switch
Landing Gear Downlock Solenoid Override Button
Flaps Position Indicator (deg)
TEMS (Turbine Engine Monitoring System) Switch
Provides engine diagnostic data for maintenance support.
Landing Gear Control Lever
STBY
OFF
REC
HUD
TVM
ANTI-SKID
LIGHTS
TAXI
DOWNLOCK OVERRIDE
FLAPS
DEGREES
TEMS DATA
MASTER ARM
GUN PAC ARM
SAFE
TRAIN
GUNARM
LASER ARM
TGP ON
ALT SCE
BARO
DELTA
RADAR
HUD MODE
DAY
NIGHT
NORM
STBY
CICU ON
JTRS ON
IFFCC ON
TEST
HARS FAST ERECT
SEAT
UP
DOWN
HOLD
EMER BRAKE
RADIO CALL
90171
UHF
CTRL
HEADING SET
STR PT


Manual Canopy Opening Assist Handle
MANUAL CANOPY OPENING ASSIST
TV Function (Not functional)
STBY
OFF
REC
HUD
TVM
Video Selector TV/HUD (Not Functional)
SEAT UP
HOLD
DOWN
Seat Height Adjustment Switch
EMER BRAKE
Emergency Brake Handle

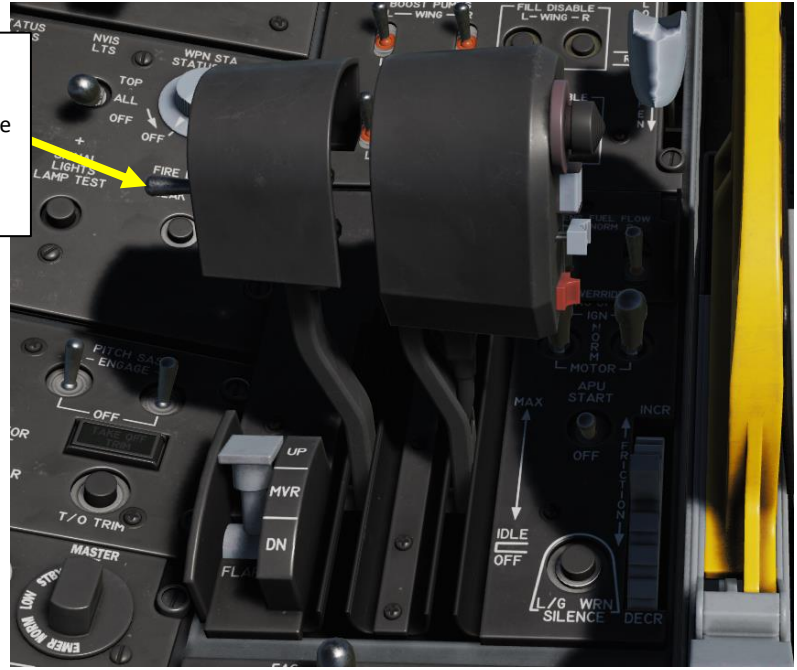

Fuselage EXT TKS Switch
Transfer fuel from external fuselage tank
Signal Amplifier Switch
(not functional)
Wing EXT TKS Switch
Transfers fuel from external wing tanks
Exterior Lighting Brightness Control Knob
Used to help during aerial refueling
Fuel Crossfeed Switch
Internal Fuel Tank Gate Open/Close
Fuel Line Check Button
(not functional)
Wing Fuel Tank Boost Pump Switches
Air Refueling Door Control Lever
Open/close refueling port slipway door
Fill Wing Fuel Tank Disable
Used when battle damage is sustained
Main Fuel Tank Boost Pump Switches
Fill Main Fuel Tank Disable
Used when battle damage is sustained

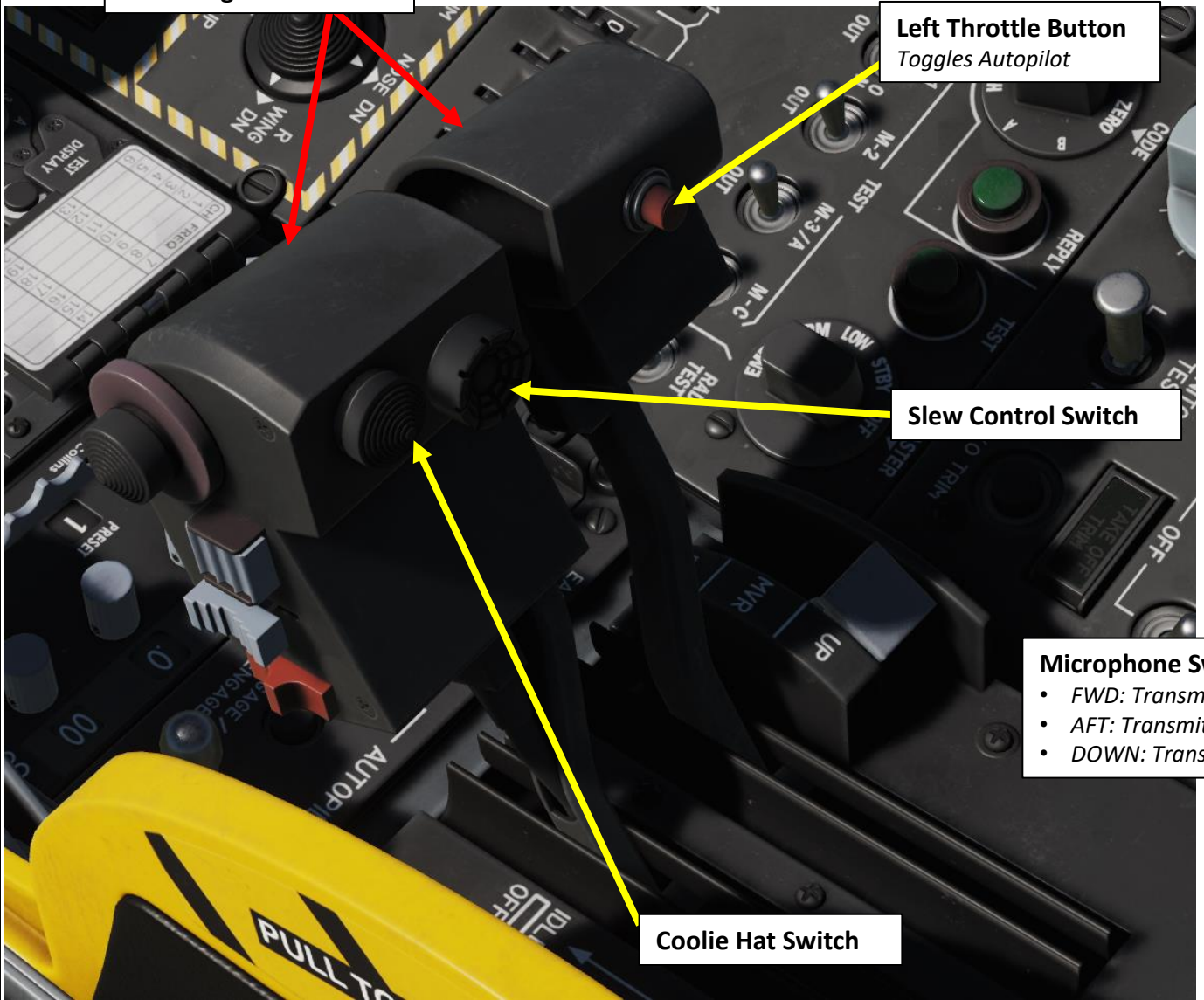

Refueling & Indexer Light Brightness
Night Vision Imaging System (NVIS) Control Switch
Weapon Station Status Lights Dimmer (Not Functional)
HARS/SAS (Heading & Attitude Reference System / Stability Augmentation System) Override Switch
Signal Lights Test Button
Fire Detect Bleed Air Leak Test Button

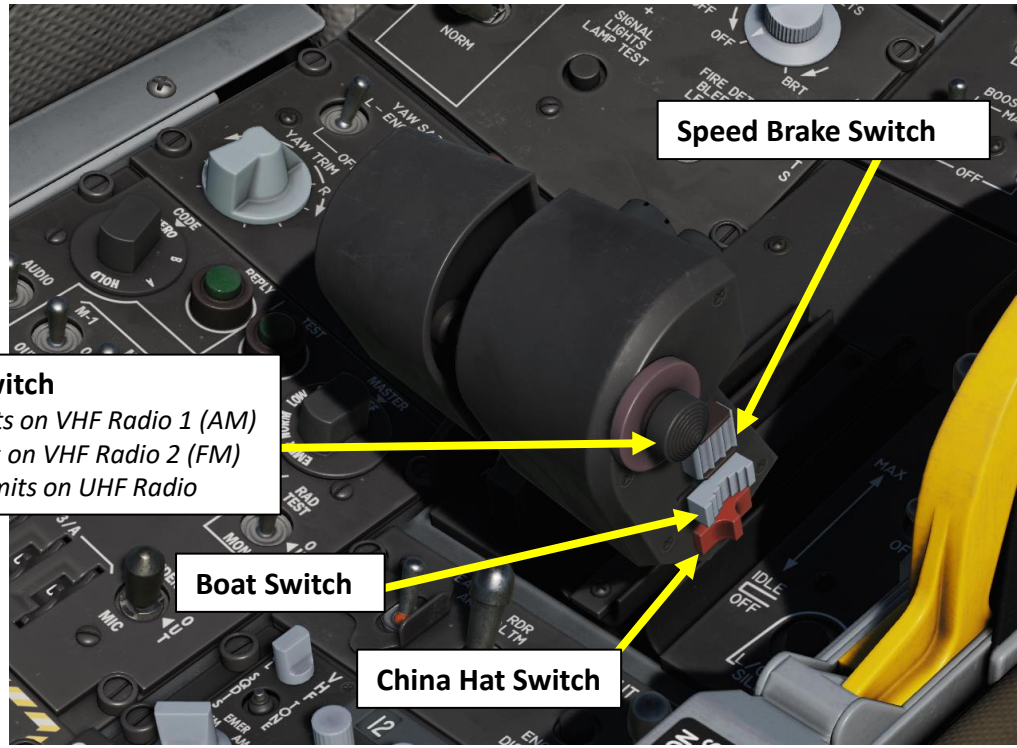
External Lights "Pinky" Switch

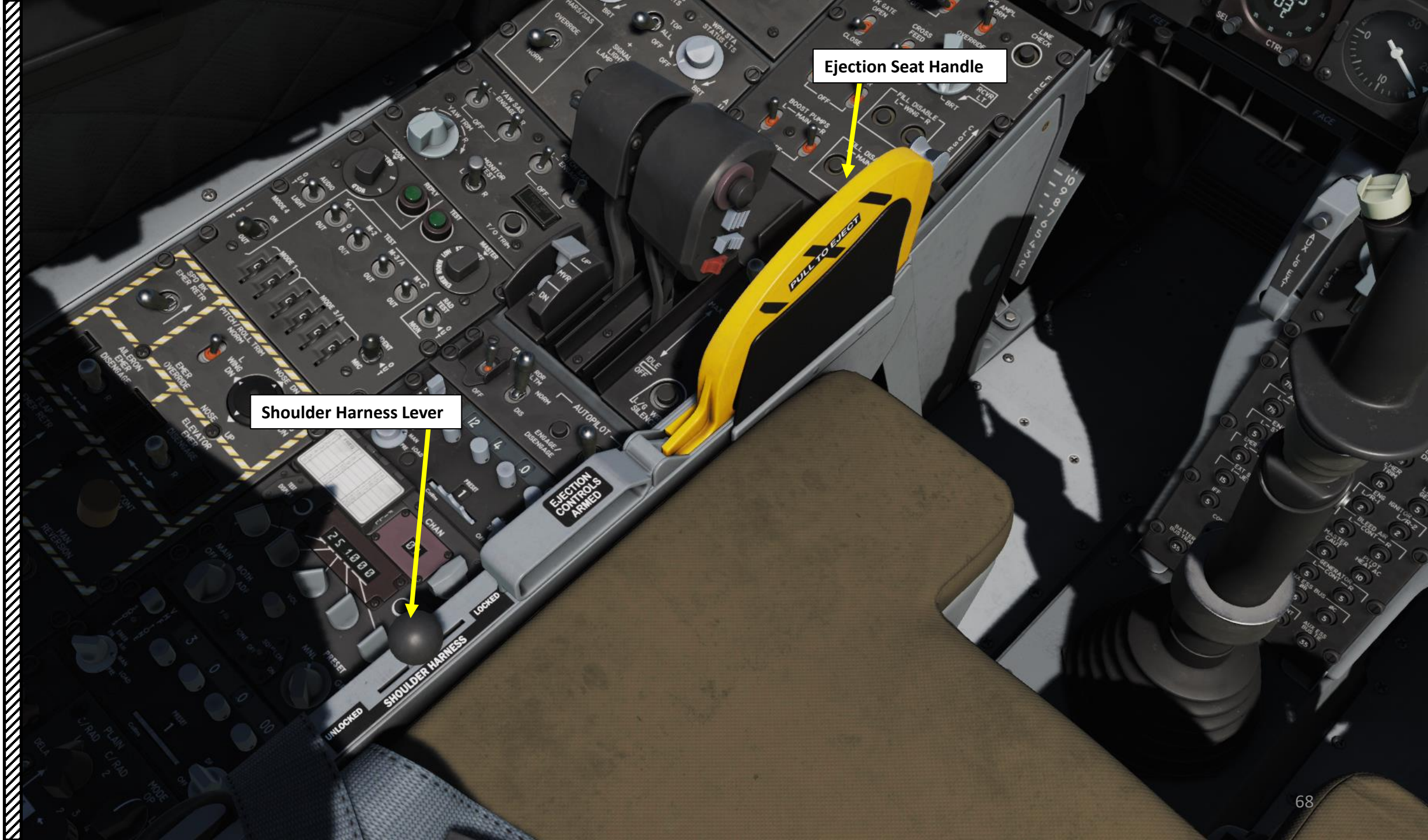
This switch can be seen as a "Master Lights" switch.

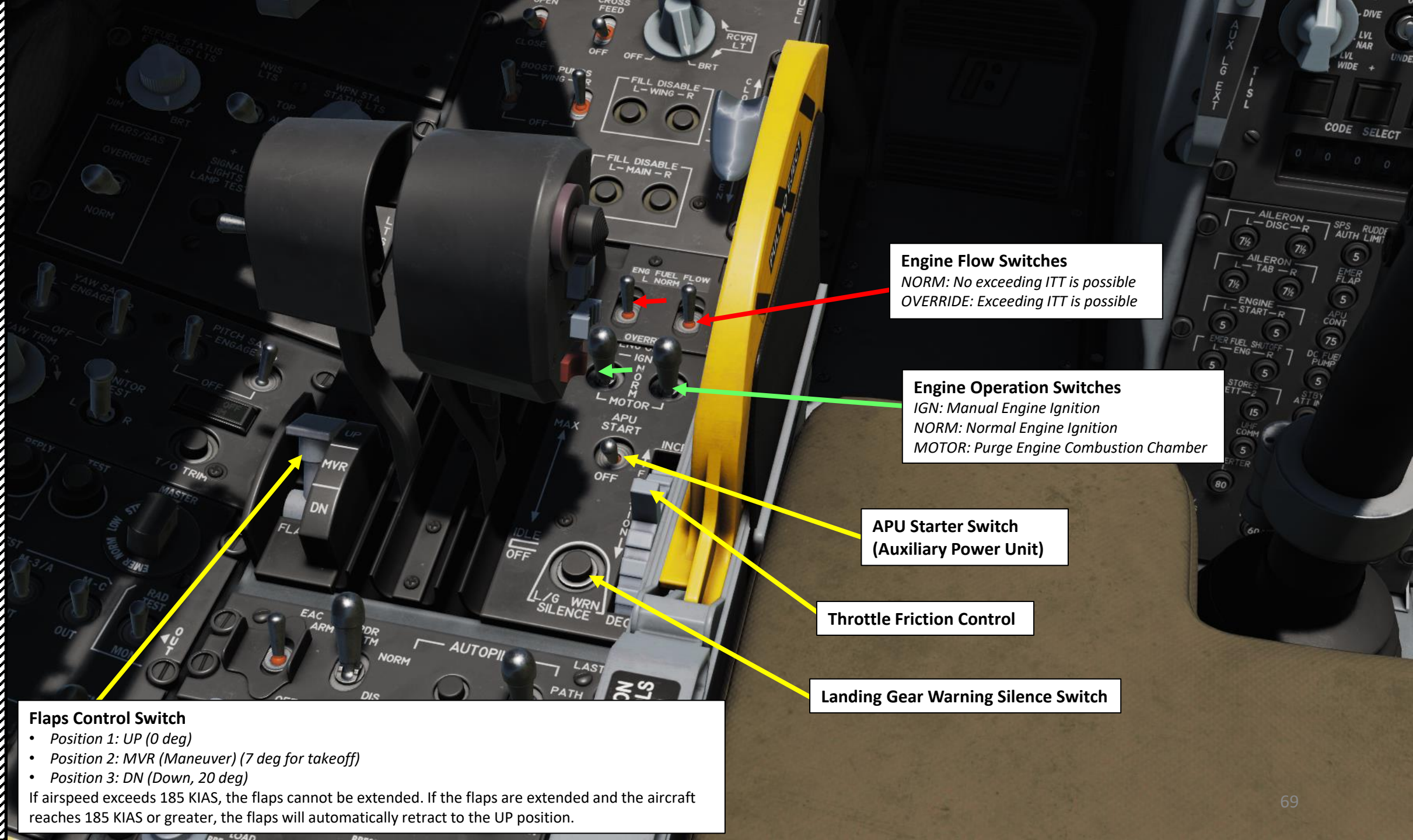
- FWD: Retains set illumination levels for formation lights, nose floodlights and nacelle floodlights. Sets position lights to STEADY and disables anti-collision lights.
- MIDDLE: Turns off all external lights
- AFT: Lights are set according to lighting control panel settings.








Ejection Seat Handle
Shoulder Harness Lever
PULL TO EJECT
EJECTION CONTROLS ARMED
SHOULDER HARNESS
UNLOCKED
LOCKED



Engine Flow Switches
NORM: No exceeding ITT is possible
OVERRIDE: Exceeding ITT is possible

Engine Operation Switches
IGN: Manual Engine Ignition
NORM: Normal Engine Ignition
MOTOR: Purge Engine Combustion Chamber

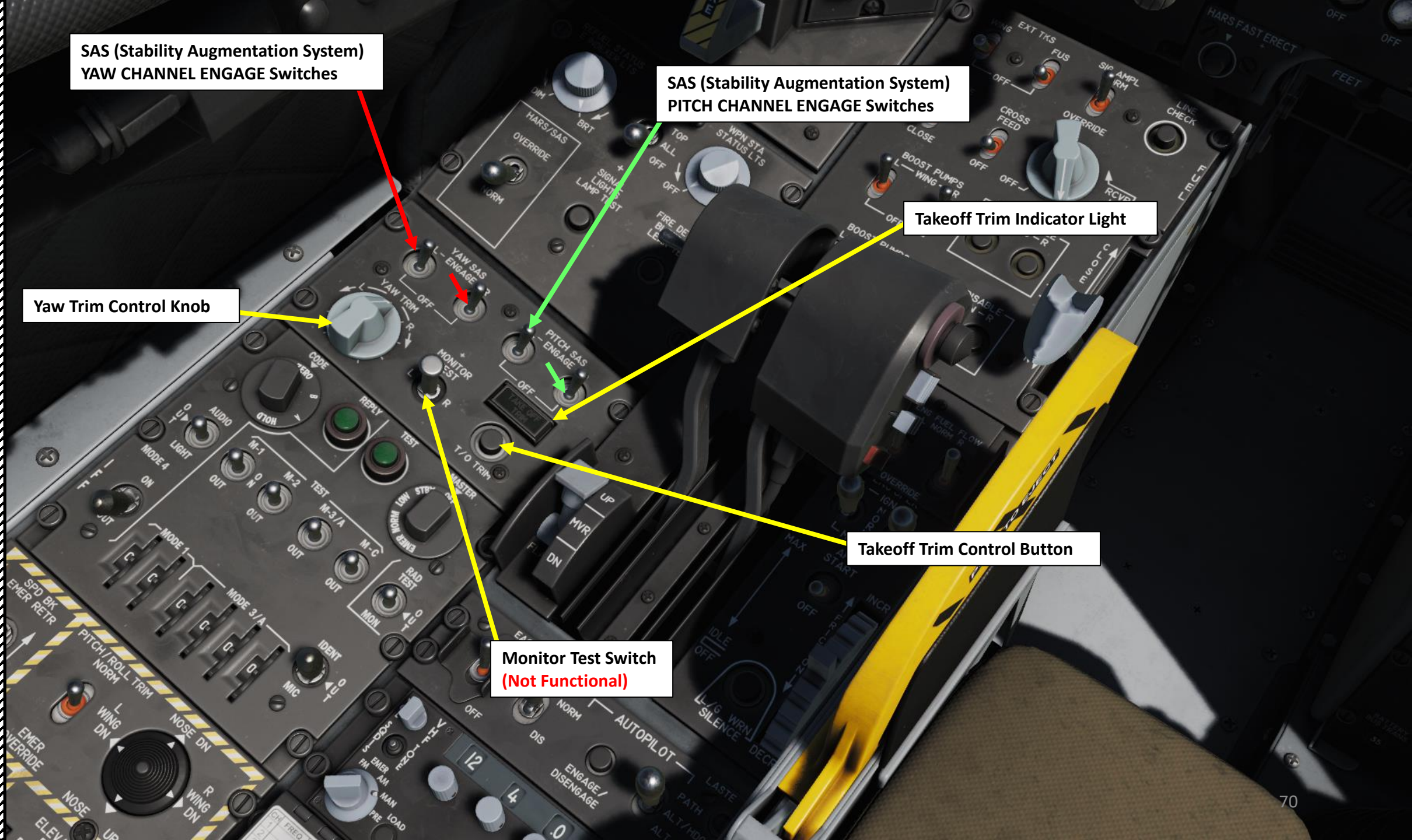
APU Starter Switch (Auxiliary Power Unit)

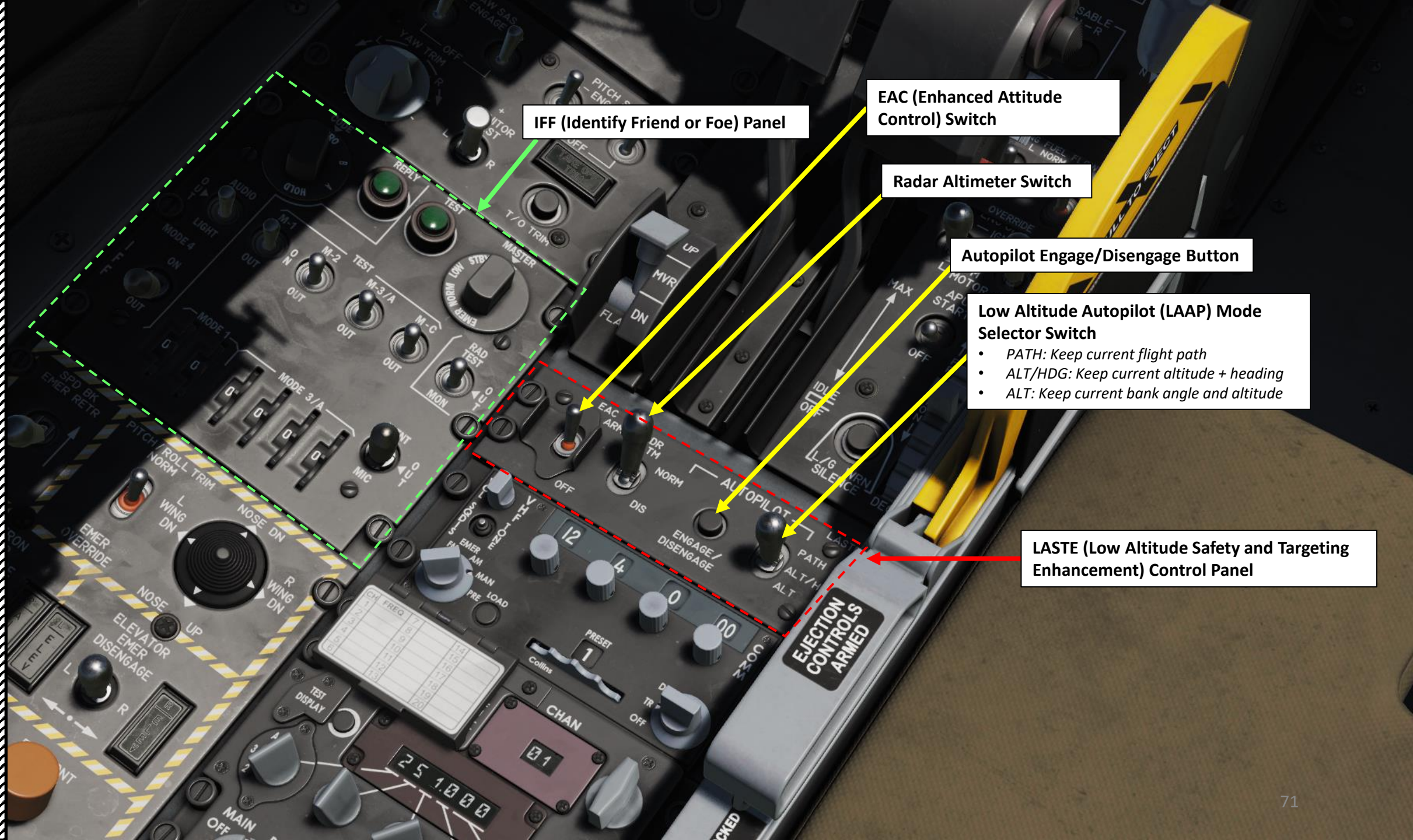
Throttle Friction Control

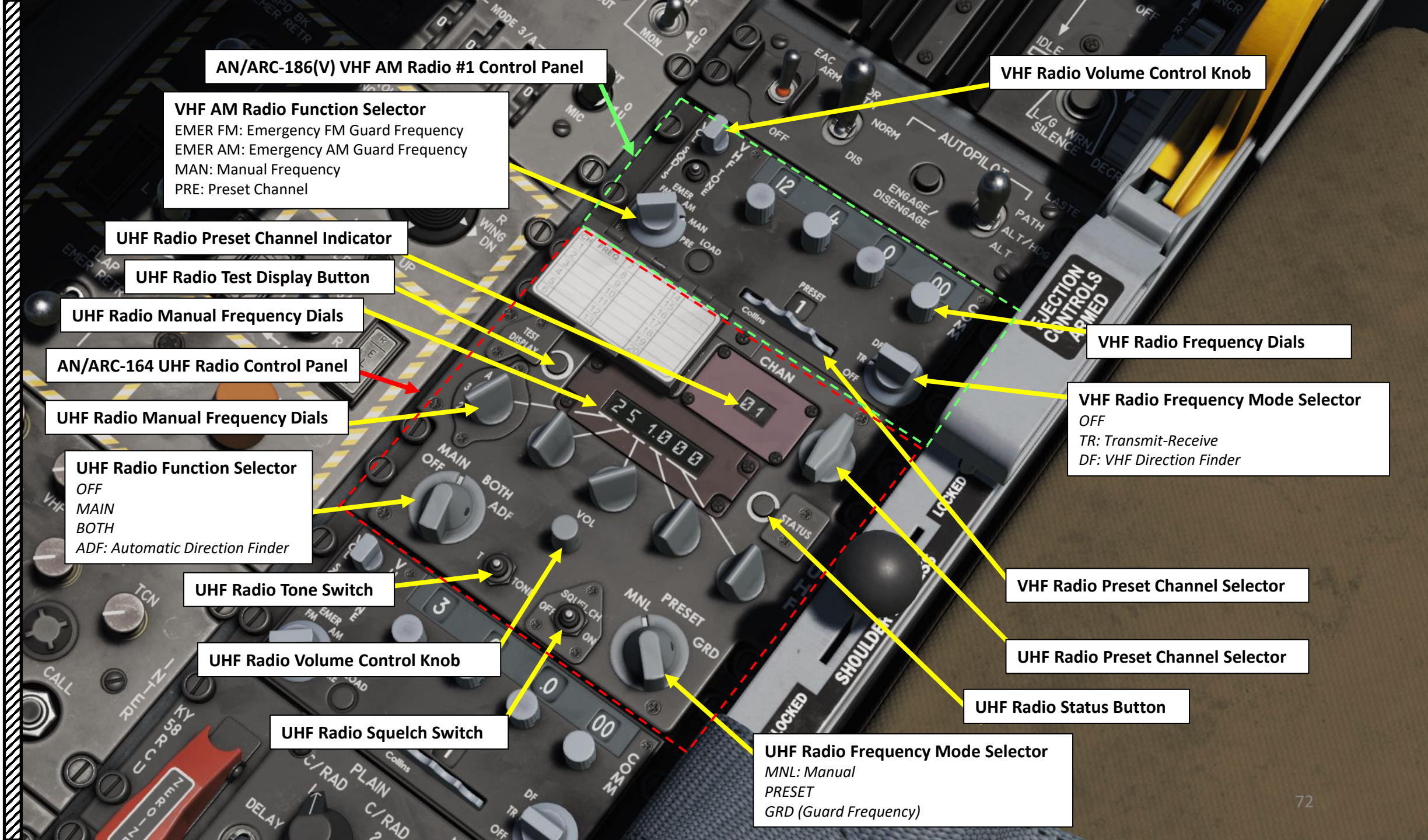
Landing Gear Warning Silence Switch

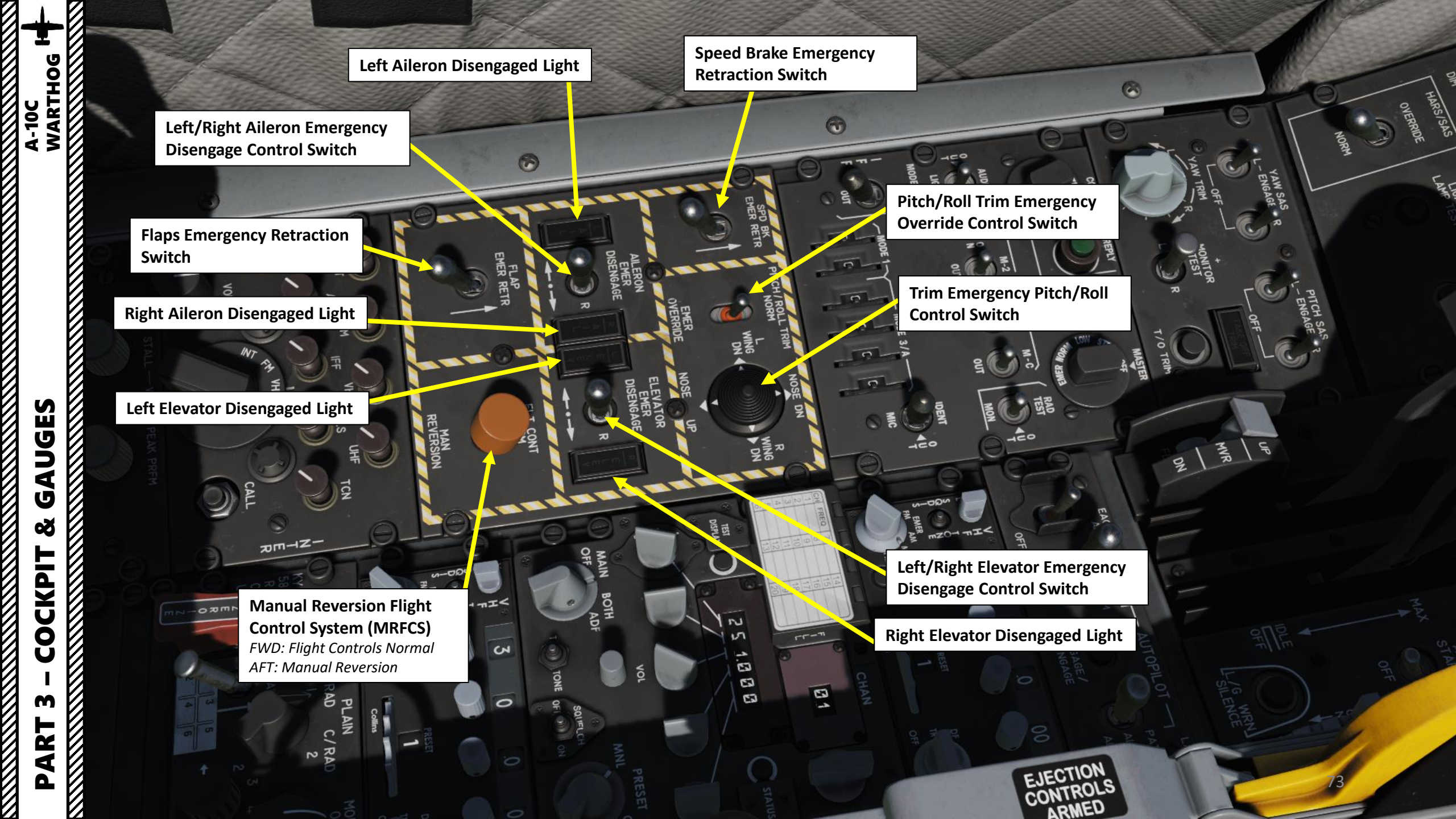
Flaps Control Switch
- *Position 1: UP (0 deg)*
- *Position 2: MVR (Maneuver) (7 deg for takeoff)*
- *Position 3: DN (Down, 20 deg)*

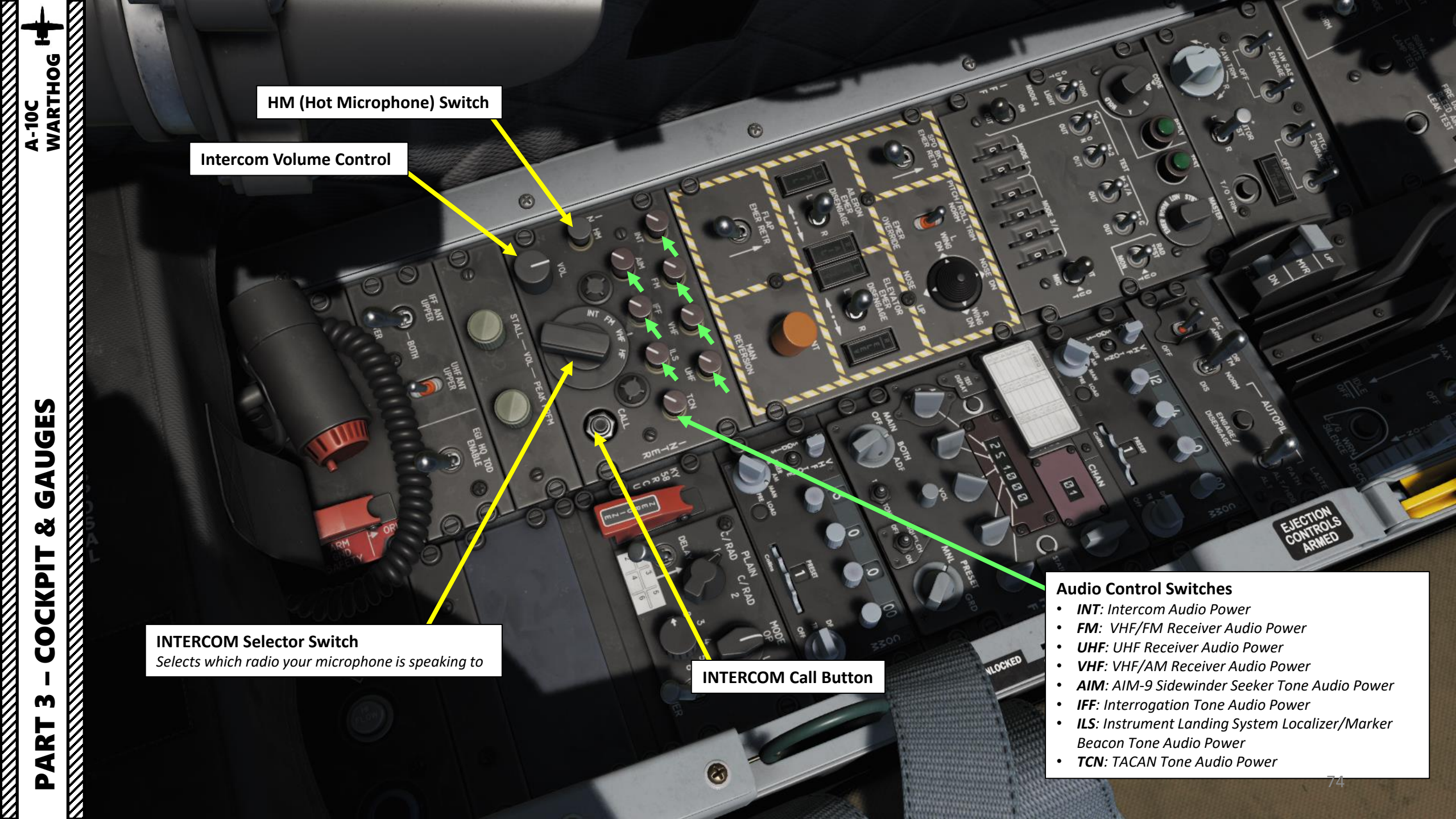
If airspeed exceeds 185 KIAS, the flaps cannot be extended. If the flaps are extended and the aircraft reaches 185 KIAS or greater, the flaps will automatically retract to the UP position.

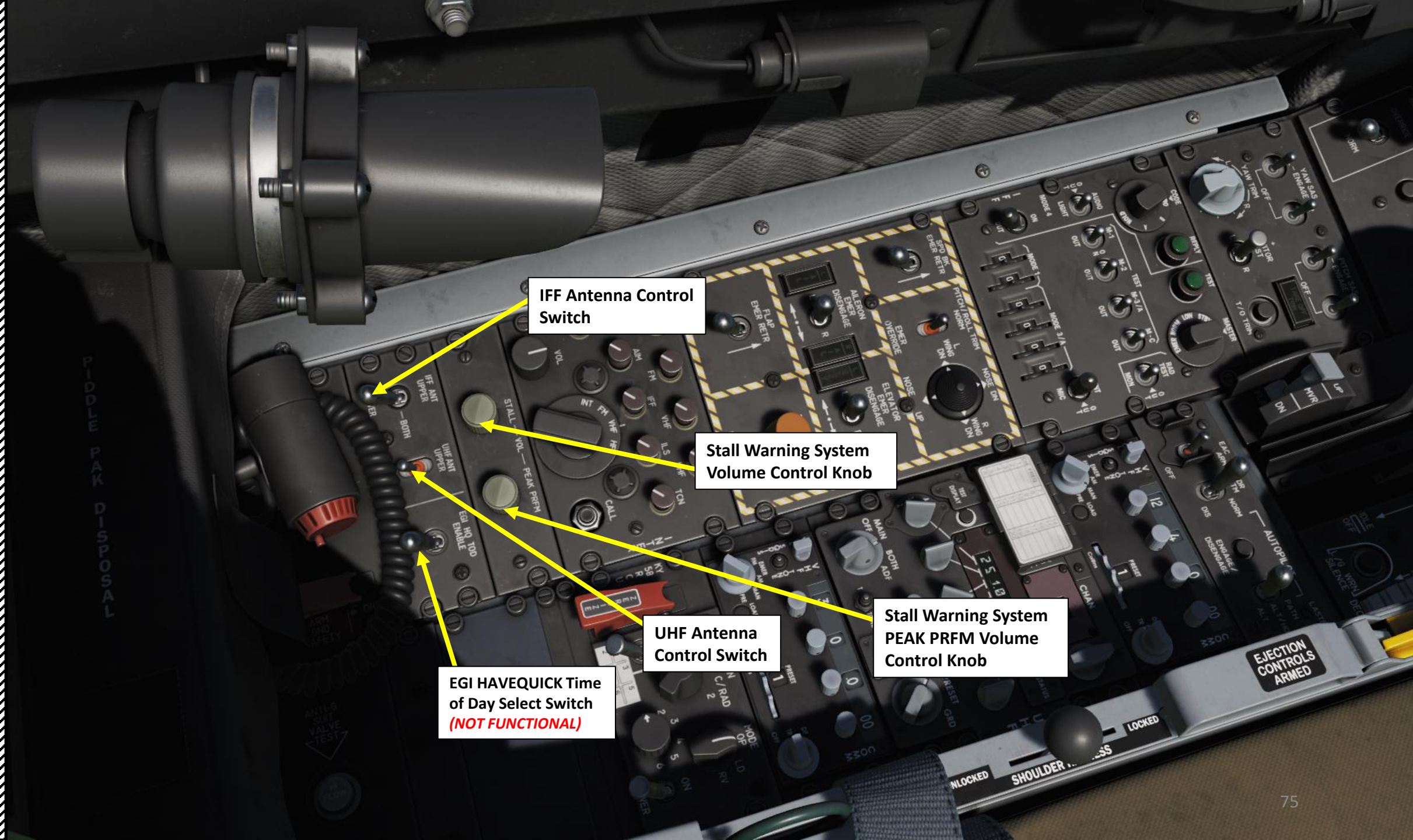

SAS (Stability Augmentation System)
YAW CHANNEL ENGAGE Switches
SAS (Stability Augmentation System)
PITCH CHANNEL ENGAGE Switches
Takeoff Trim Indicator Light
Yaw Trim Control Knob
Takeoff Trim Control Button
Monitor Test Switch
(Not Functional)

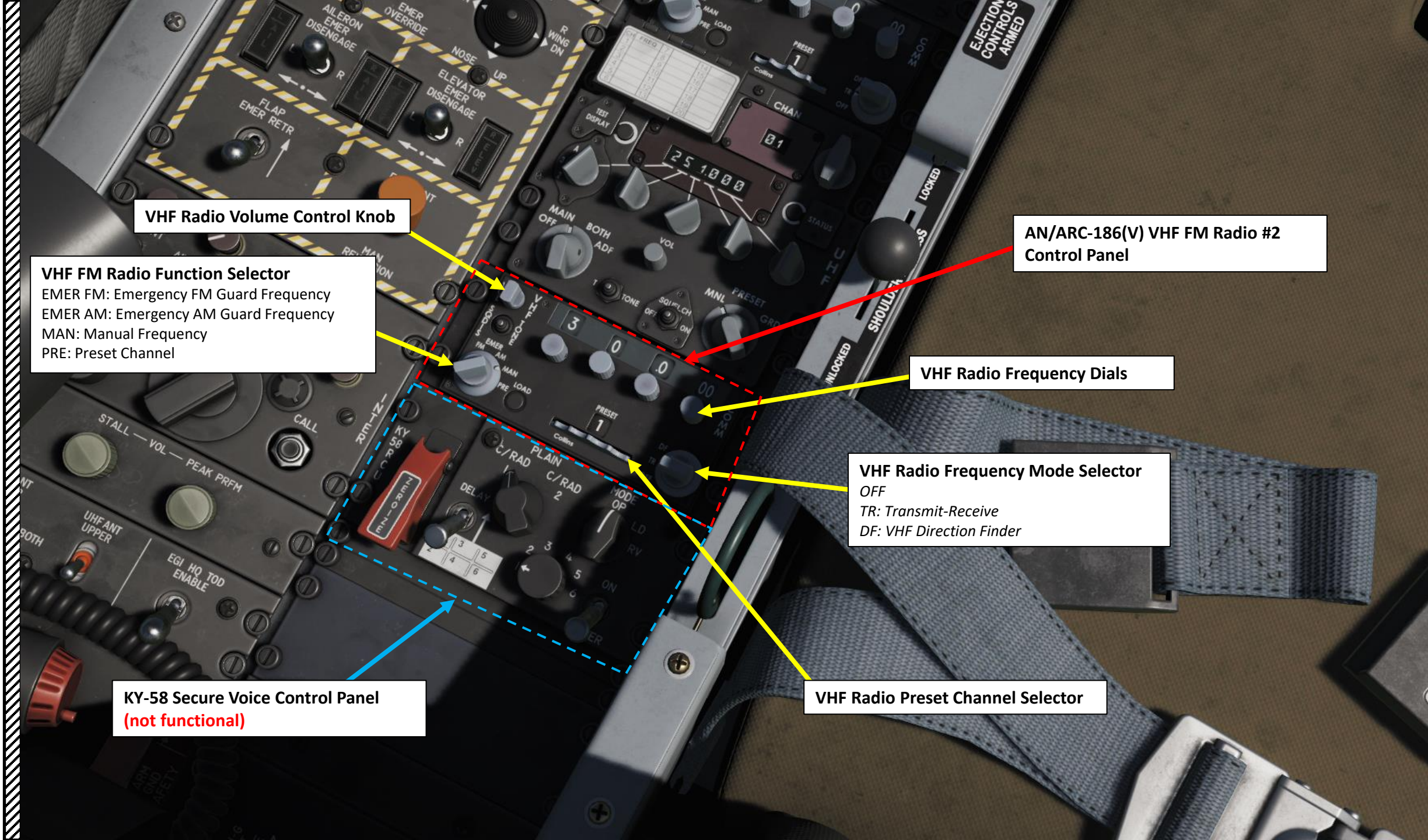

IFF (Identify Friend or Foe) Panel
EAC (Enhanced Attitude Control) Switch
Radar Altimeter Switch
Autopilot Engage/Disengage Button
Low Altitude Autopilot (LAAP) Mode Selector Switch
• PATH: Keep current flight path
• ALT/HDG: Keep current altitude + heading
• ALT: Keep current bank angle and altitude
LASTE (Low Altitude Safety and Targeting Enhancement) Control Panel
EJECTION CONTROLS ARMED

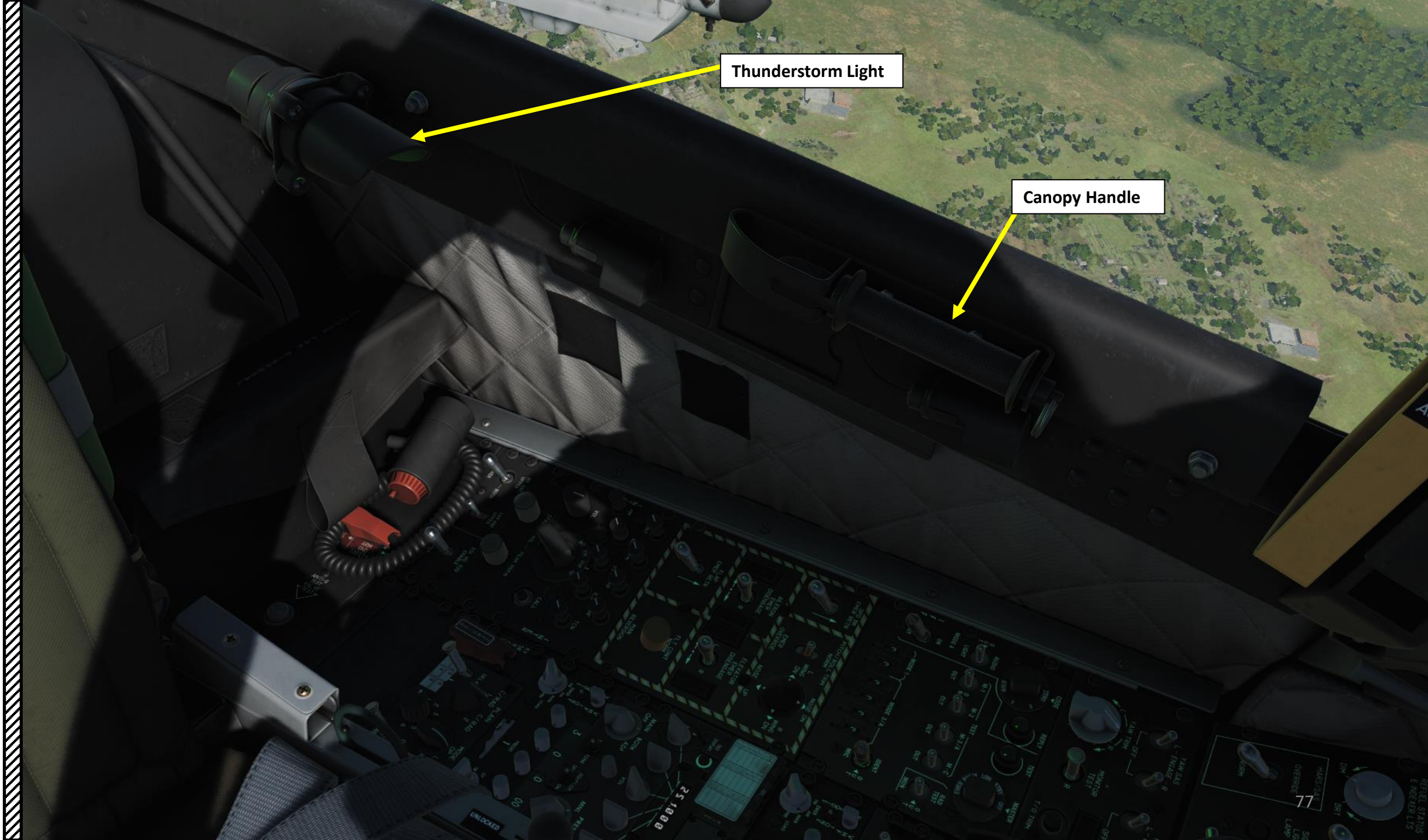

AN/ARC-186(V) VHF AM Radio #1 Control Panel
VHF AM Radio Function Selector
EMER FM: Emergency FM Guard Frequency
EMER AM: Emergency AM Guard Frequency
MAN: Manual Frequency
PRE: Preset Channel
VHF Radio Volume Control Knob
UHF Radio Preset Channel Indicator
UHF Radio Test Display Button
UHF Radio Manual Frequency Dials
AN/ARC-164 UHF Radio Control Panel
VHF Radio Frequency Dials
VHF Radio Frequency Mode Selector
OFF
TR: Transmit-Receive
DF: VHF Direction Finder
UHF Radio Manual Frequency Dials
UHF Radio Function Selector
OFF
MAIN
BOTH
ADF: Automatic Direction Finder
VHF Radio Preset Channel Selector
UHF Radio Tone Switch
UHF Radio Volume Control Knob
UHF Radio Preset Channel Selector
UHF Radio Status Button
UHF Radio Squelch Switch
UHF Radio Frequency Mode Selector
MNL: Manual
PRESET
GRD (Guard Frequency)

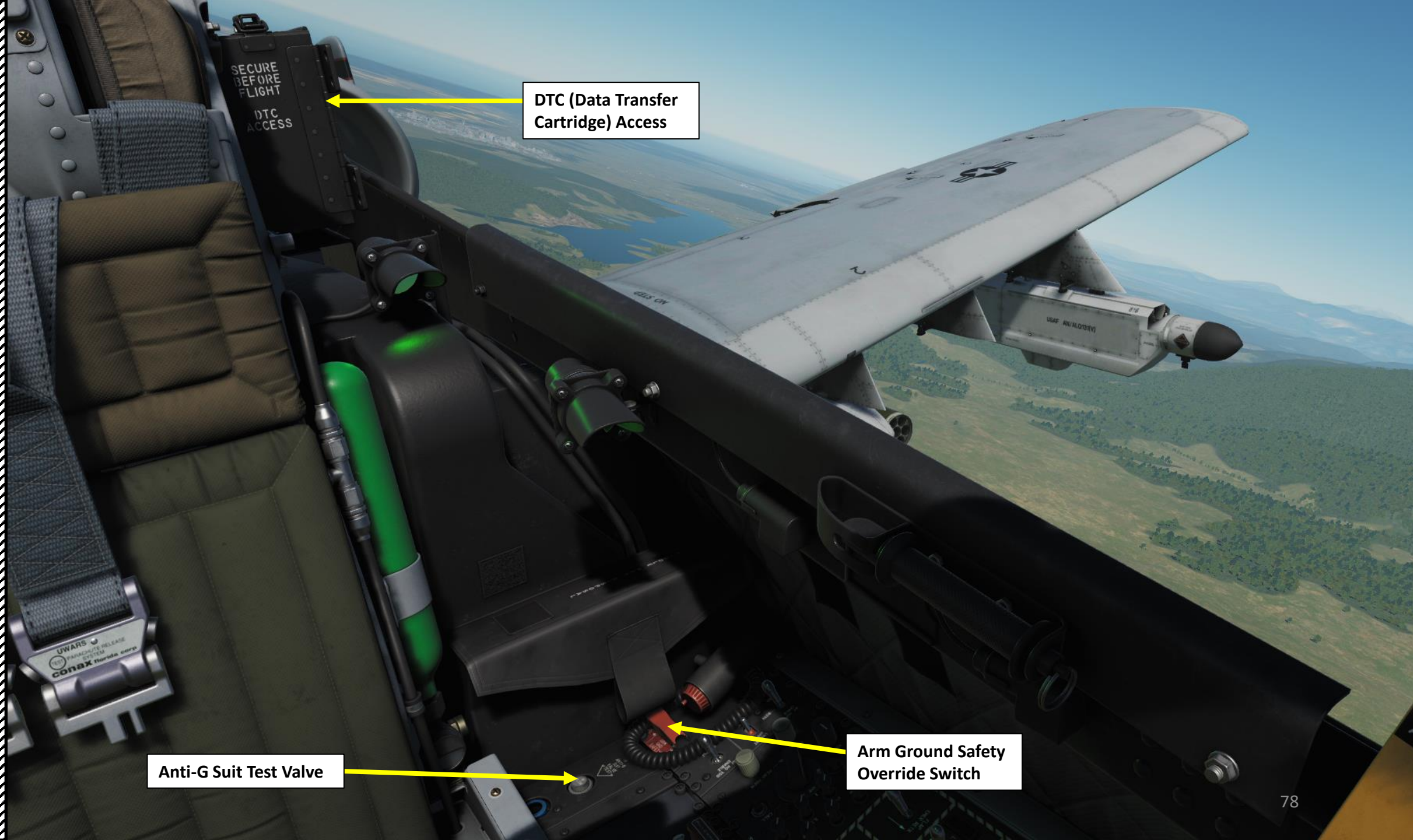

Left Aileron Disengaged Light
Speed Brake Emergency Retraction Switch
Left/Right Aileron Emergency Disengage Control Switch
Flaps Emergency Retraction Switch
Pitch/Roll Trim Emergency Override Control Switch
Right Aileron Disengaged Light
Trim Emergency Pitch/Roll Control Switch
Left Elevator Disengaged Light
Left/Right Elevator Emergency Disengage Control Switch
Manual Reversion Flight Control System (MRFCS)
FWD: Flight Controls Normal
AFT: Manual Reversion
Right Elevator Disengaged Light
EJECTION CONTROLS ARMED


HM (Hot Microphone) Switch
Intercom Volume Control
INTERCOM Selector Switch
Selects which radio your microphone is speaking to
INTERCOM Call Button
Audio Control Switches
• INT: Intercom Audio Power
• FM: VHF/FM Receiver Audio Power
• UHF: UHF Receiver Audio Power
• VHF: VHF/AM Receiver Audio Power
• AIM: AIM-9 Sidewinder Seeker Tone Audio Power
• IFF: Interrogation Tone Audio Power
• ILS: Instrument Landing System Localizer/Marker Beacon Tone Audio Power
• TCN: TACAN Tone Audio Power


IFF Antenna Control Switch
Stall Warning System Volume Control Knob
Stall Warning System PEAK PRFM Volume Control Knob
UHF Antenna Control Switch
EGI HAVEQUICK Time of Day Select Switch (NOT FUNCTIONAL)
EJECTION CONTROLS ARMED
LOCKED
SHOULDER


VHF Radio Volume Control Knob
VHF FM Radio Function Selector
EMER FM: Emergency FM Guard Frequency
EMER AM: Emergency AM Guard Frequency
MAN: Manual Frequency
PRE: Preset Channel
AN/ARC-186(V) VHF FM Radio #2 Control Panel
VHF Radio Frequency Dials
VHF Radio Frequency Mode Selector
OFF
TR: Transmit-Receive
DF: VHF Direction Finder
VHF Radio Preset Channel Selector
KY-58 Secure Voice Control Panel
(not functional)


Thunderstorm Light
Canopy Handle


SECURE BEFORE FLIGHT
DTC ACCESS
UWARS
conax florida corp
DTC (Data Transfer Cartridge) Access
Anti-G Suit Test Valve
Arm Ground Safety Override Switch

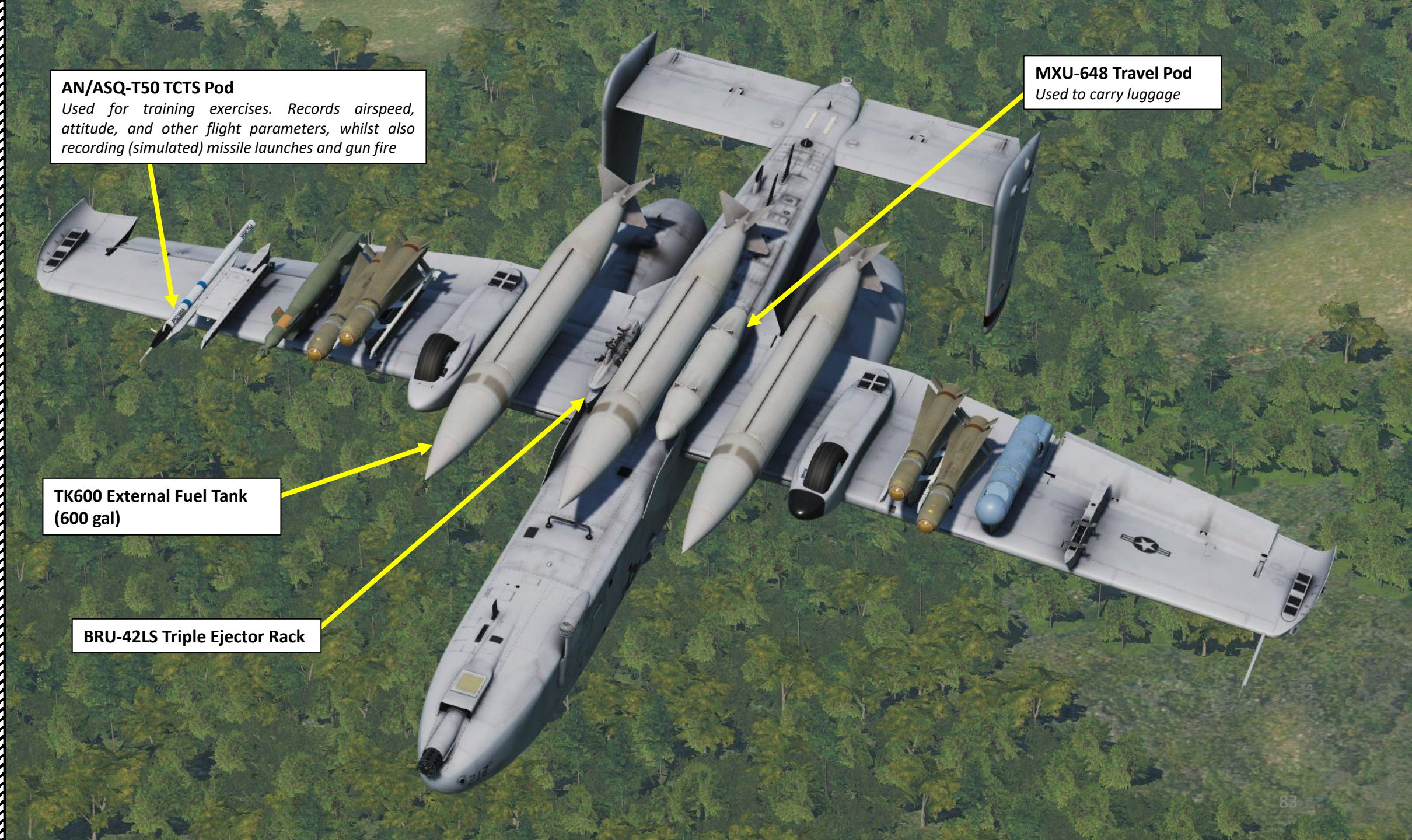
PART 3 – COCKPIT & GAUGES

Environmental Sensor Pitot

In an emergency situation during the pilot escape initiation, the seat moves up the rails leaving the aircraft. Pitot tubes on the top of the seat near the parachute container are exposed to the airstream. Pitot and Static pressure inputs to the environmental sensing unit act on the speed and altitude transducers to establish the safest mode for the pilot involved, based on the speed and altitude environment

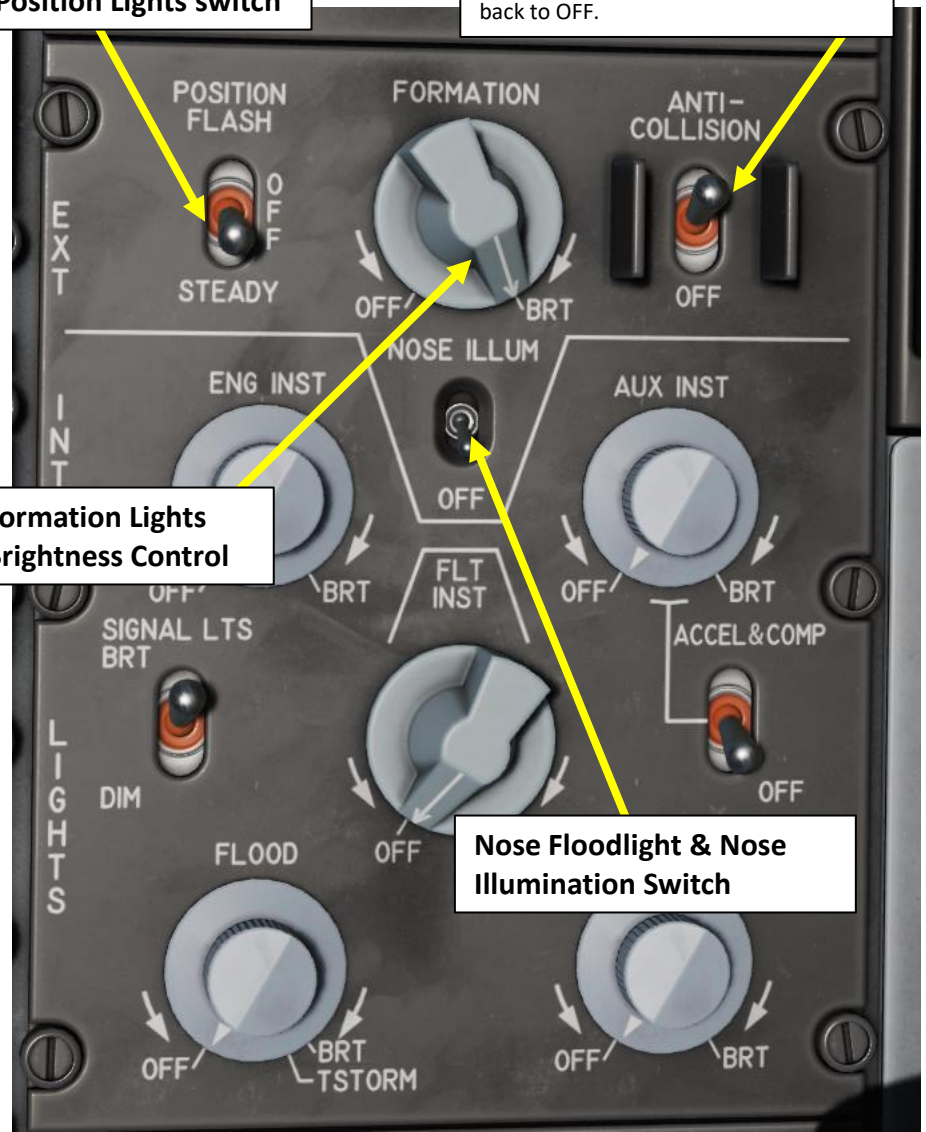

AN/ALQ-131 ECM (Electronic Countermeasure) Pod
AN/AAQ-28 LITENING AT Pod
AAS-35 “Pave Penny” Laser Marked Target Receiver Pod

PART 3 – COCKPIT & GAUGES


AN/ASQ-T50 TCTS Pod
Used for training exercises. Records airspeed, attitude, and other flight parameters, whilst also recording (simulated) missile launches and gun fire
MXU-648 Travel Pod
Used to carry luggage
TK600 External Fuel Tank (600 gal)
BRU-42LS Triple Ejector Rack

Position Lights switch

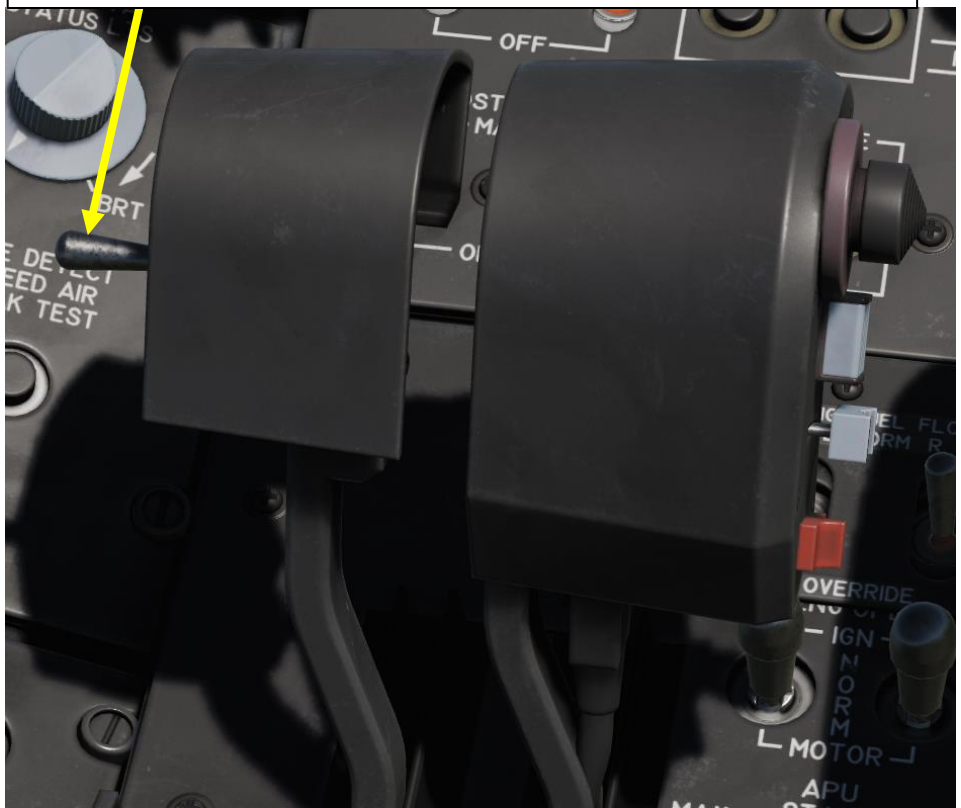
Anti-Collision Lights Switch
If the External Lights Pinky Switch is set Forward (Default Light Settings), the Anti-Collision switch will always spring back to OFF.



Formation Lights Brightness Control

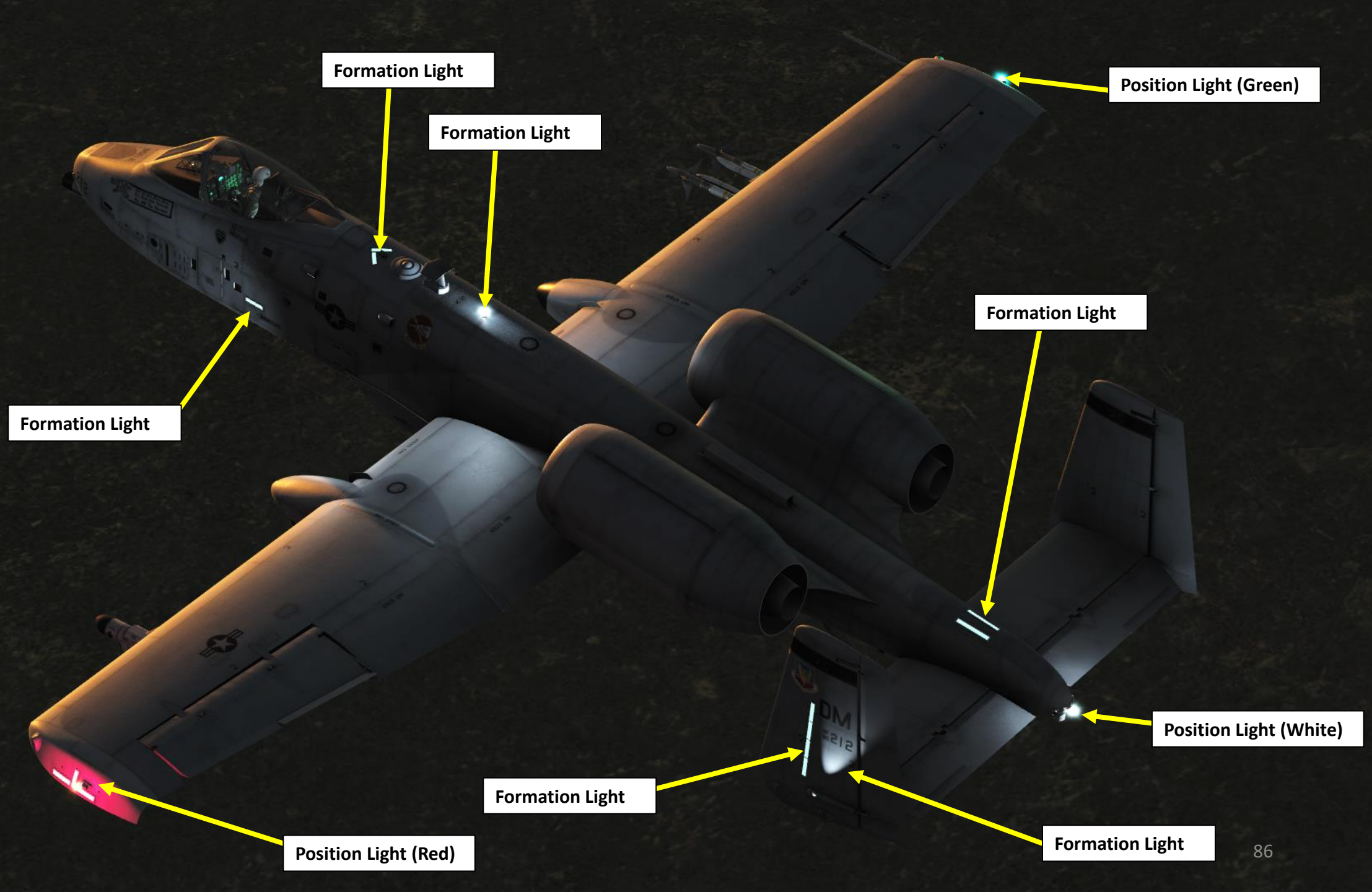
Nose Floodlight & Nose Illumination Switch

External Lights "Pinky" Switch
This switch can be seen as a "Master Lights" switch.
- FWD: Retains set illumination levels for formation lights, nose floodlights and nacelle floodlights. Sets position lights to STEADY and disables anti-collision lights.
- MIDDLE: Turns off all external lights
- AFT: Lights are set according to lighting control panel settings.

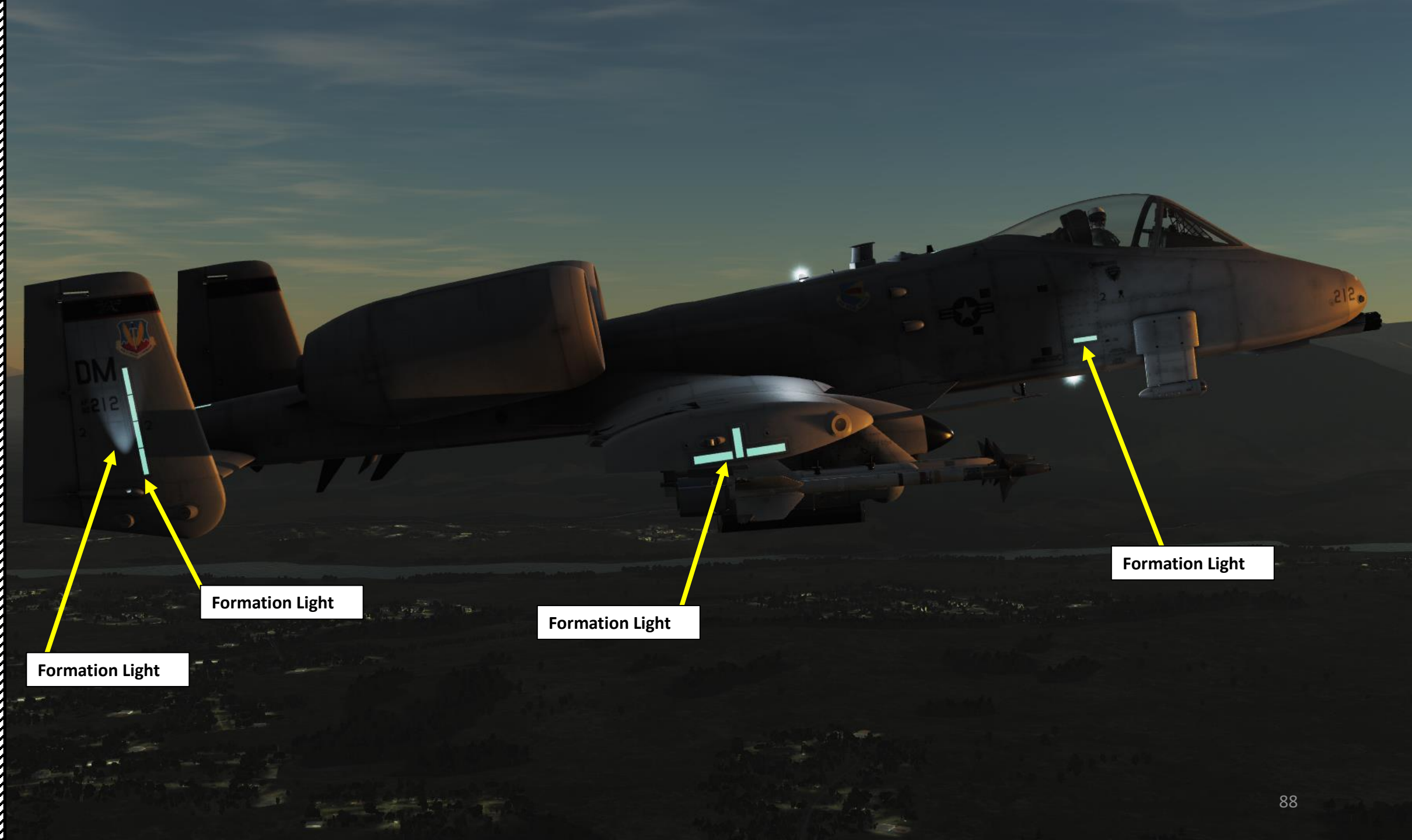


Taxi/Landing Light Switch


Landing Light
Taxi Light


Formation Light
Formation Light
Position Light (Green)
Formation Light
Formation Light
Position Light (White)
Formation Light
Position Light (Red)
Formation Light


Formation Light
Formation Light


Formation Light
Formation Light
Formation Light
Formation Light

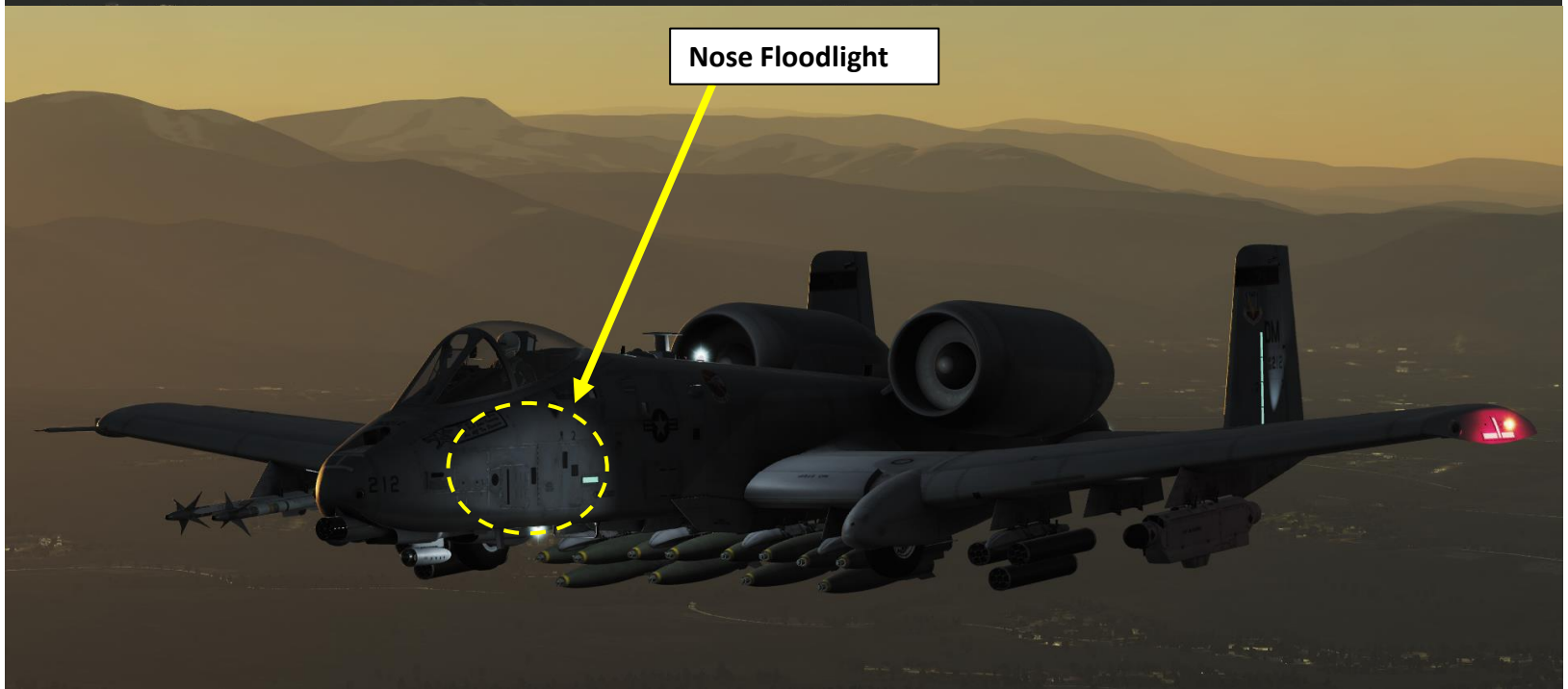

Anti-Collision Light (Blinking)
Anti-Collision Light (Blinking)
Anti-Collision Light (Blinking)

Exterior Lighting Brightness Control Knob
Used to help during aerial refueling

Air Refueling Door Control Lever
Open/close refueling port slipway door

Refueling Port Door
Open & Illuminated

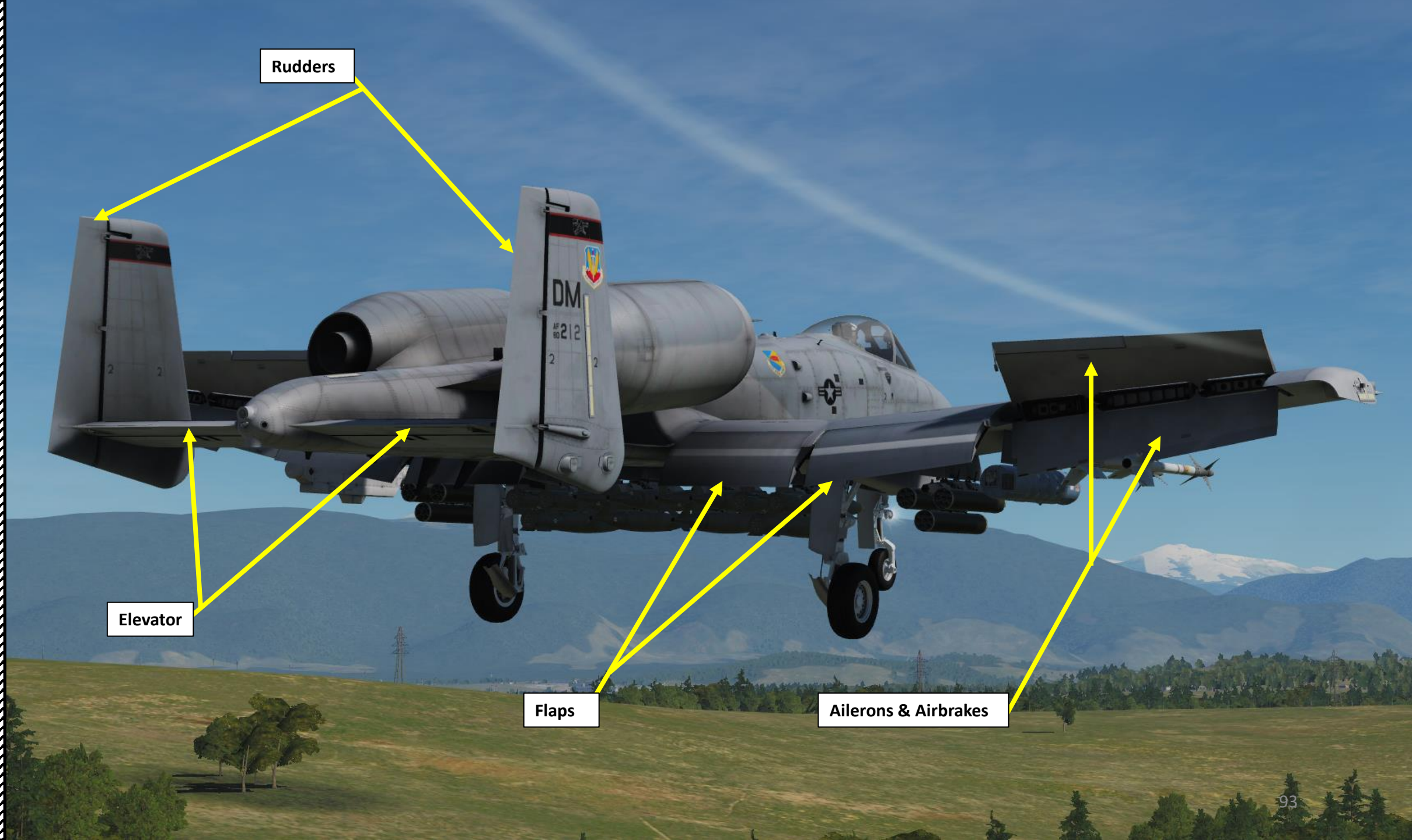

212
Nose Floodlight


Nose Floodlight
212

HUD Night Mode

HUD Day Mode

HUD modes Selector Switch
Day/Night


Rudders
Elevator
Flaps
Ailerons & Airbrakes

NIGHT VISION GOGGLES
ON/OFF: RSHIFT + H
BRIGHTNESS + : RCTRL + RSHIFT + H
BRIGHTNESS - : RALT + RSHIFT + H


NO STEP
NO STEP
212
212
21206

PART 3 – COCKPIT & GAUGES

A-10C II Tank Killer Expansion Only

A-10C II Tank Killer Expansion Only

A-10C II Tank Killer Expansion Only

A-10C II Tank Killer Expansion Only

A-10C II Tank Killer Expansion Only

A-10C II Tank Killer Expansion Only

A-10C II Tank Killer Expansion Only

Scorpion HMCS (Helmet-Mounted Cueing System) Power Switch

- *ON (FWD): Power to the HMCS through the aircraft electrical power supply system*
- *OFF (MIDDLE): Power removed from the HMCS.*
- *BAT (AFT): Power to the HMCS using a battery stored in the panel. This allows it to be tested without need of aircraft electrical power.*

A-10C II Tank Killer Expansion Only

PART 3 – COCKPIT & GAUGES

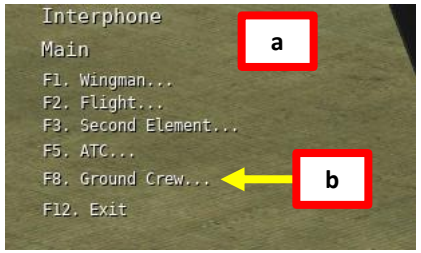
ARC-210 V/UHF Radio Panel – Not Yet Available

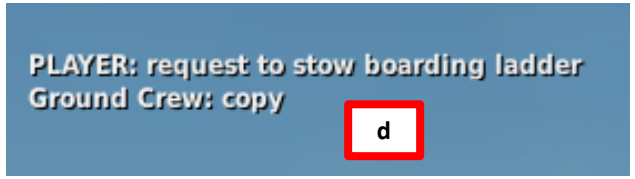
A-10C II Tank Killer Expansion Only

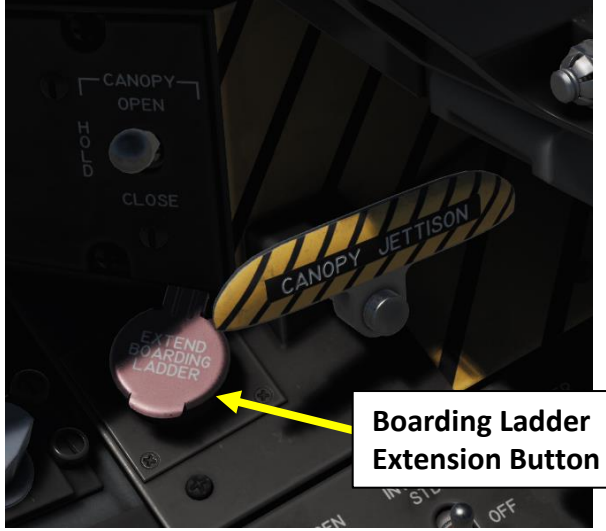
PART 4 – START-UP PROCEDURE

PRE-START

- You can request the ground crew to retract the boarding ladder by calling the ground crew with the interphone.
  - a) Press "\" (Communication Menu)
  - b) Select Ground Crew by pressing "F8"
  - c) Select "Stow boarding ladder" by pressing "F4"

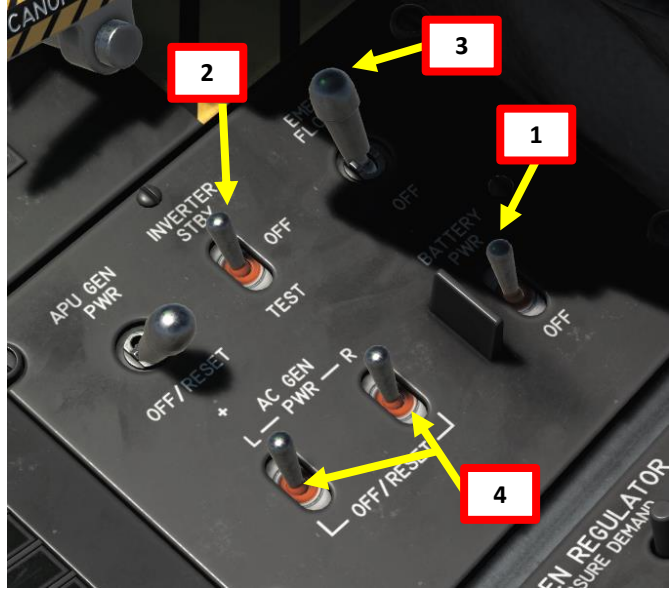


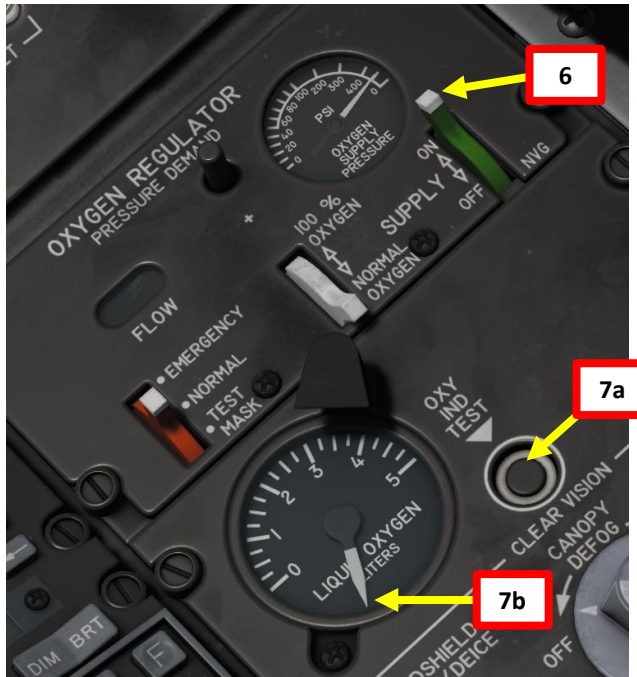


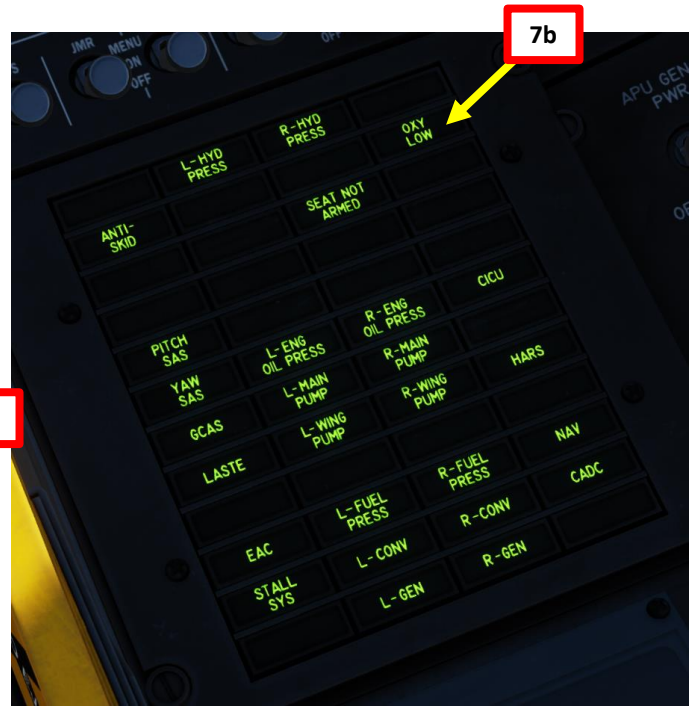


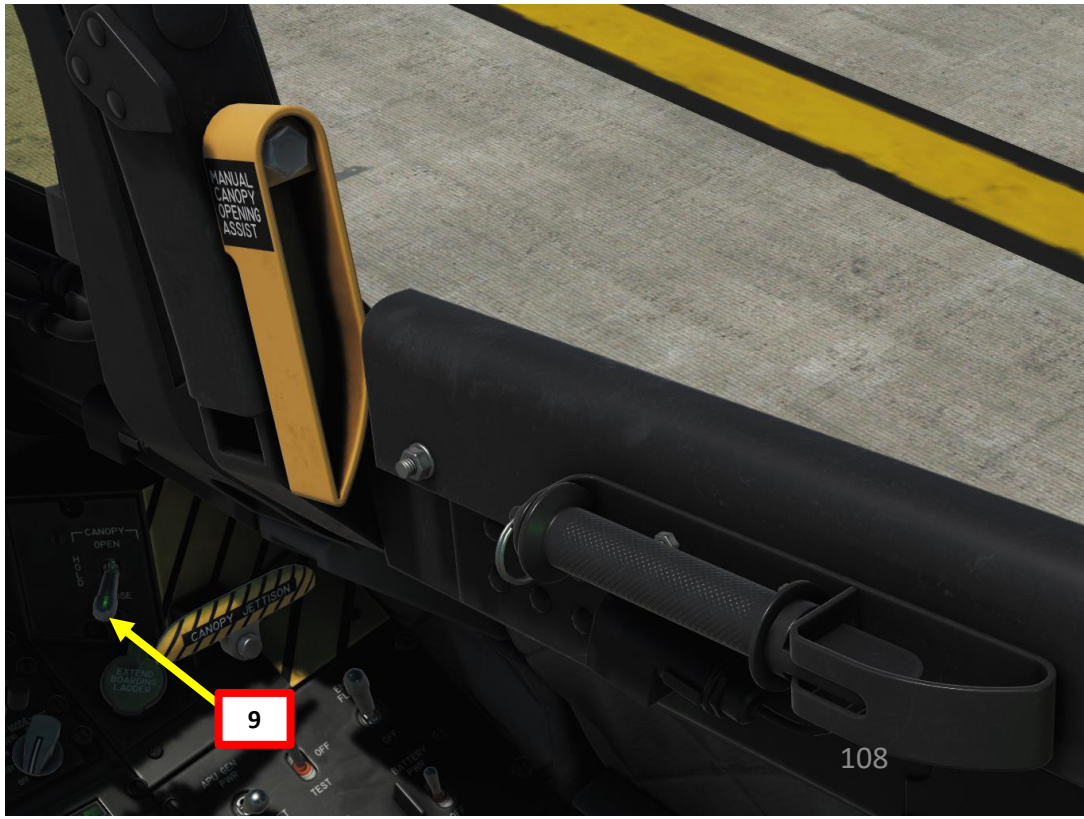
PRE-START

1. Battery - ON
2. Inverter – STBY
3. Emergency Flood Lights – ON (if doing a night operation)
4. AC Generators – PWR
5. Hold Signal Lights Lamp Test switch and confirm that caution light panel is functioning
6. Oxygen – ON
7. Hold OXY IND TEST switch and confirm that warning message for LOW OXY is displayed and audible
8. Hold Test Fuel Indicator switch to confirm fuel indicator is working properly
9. Close Canopy by holding the canopy switch DOWN (right click) or pressing “LCTRL+C”





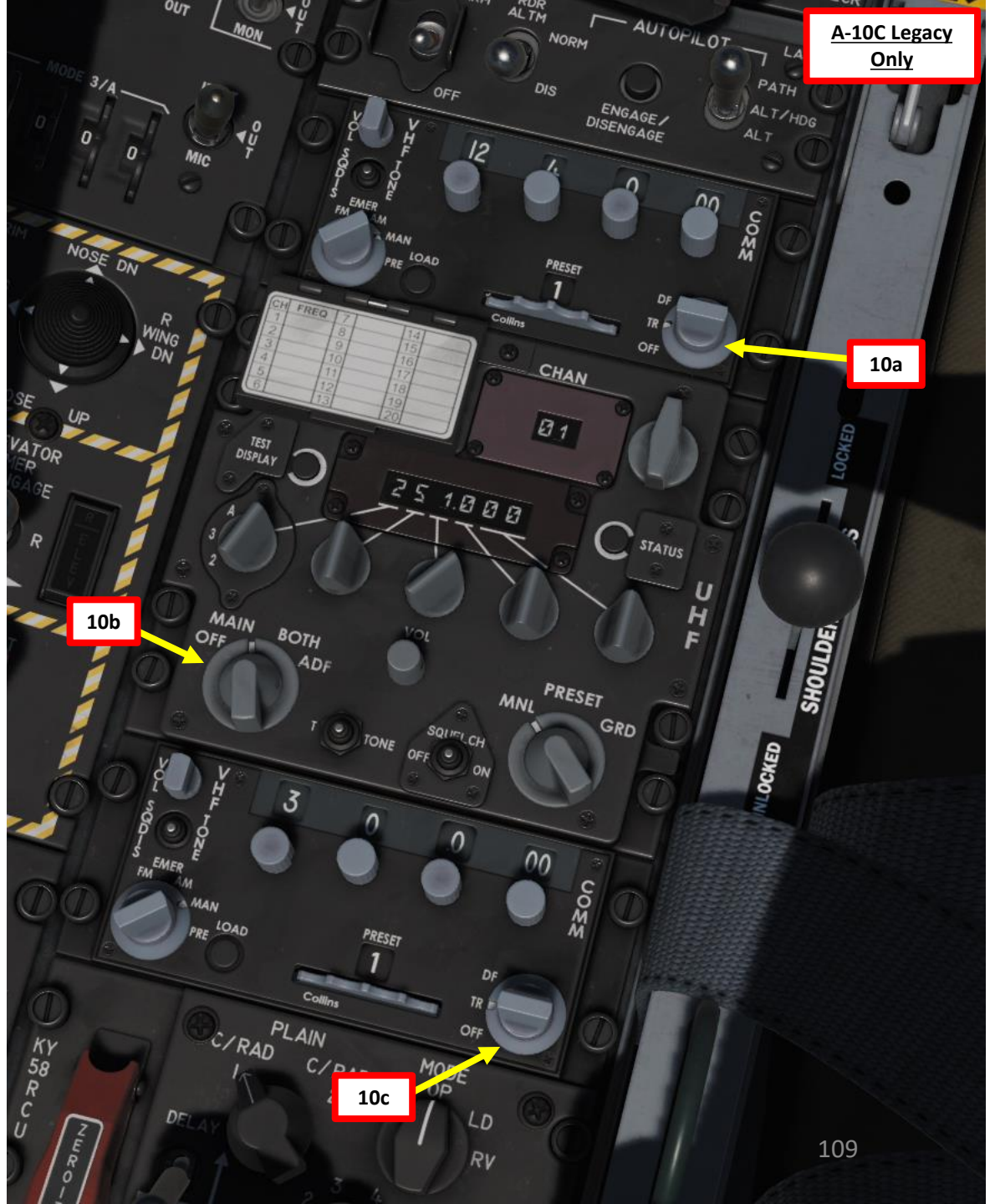




PRE-START

10. Set up radios

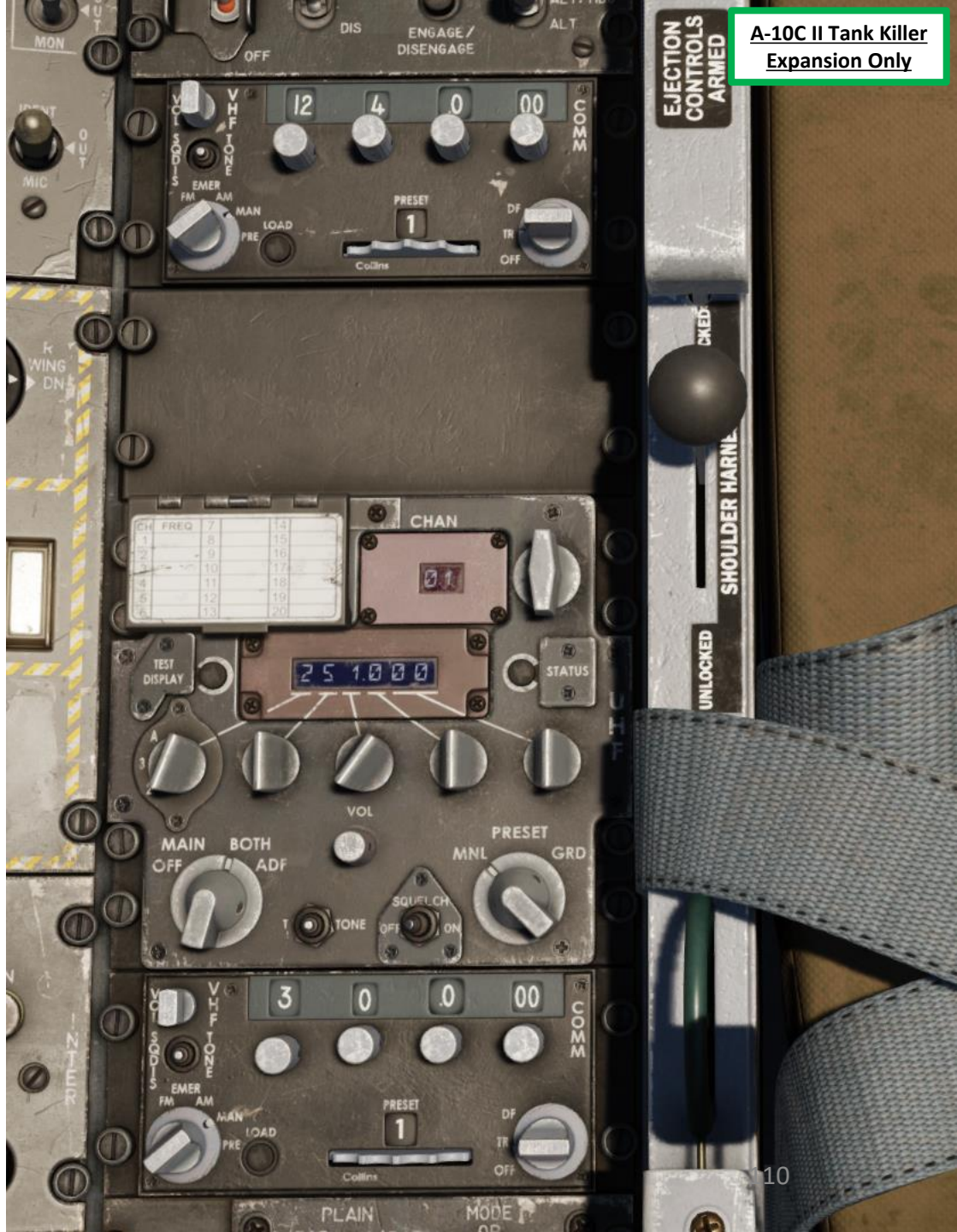
- **A-10C LEGACY:**
    a) Set VHF AM Radio #1 to TR (transmit-receive)
    b) Set UHF radio to MAIN
    c) Set VHF FM Radio #2 to TR (transmit-receive).
    d) Set proper radio frequencies as required.



PRE-START

10. Set up radios

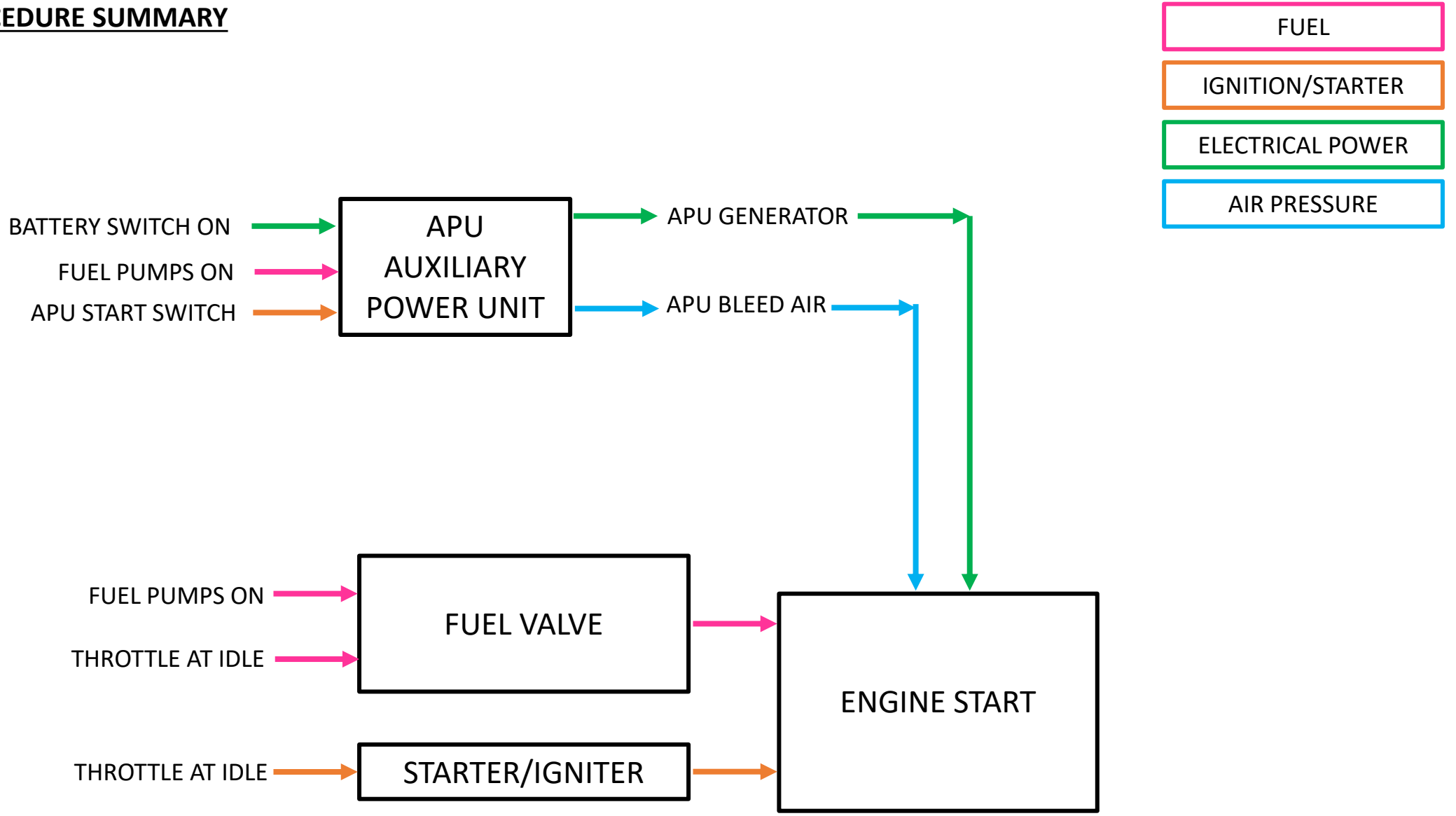
- **A-10C II TANK KILLER EXPANSION:**
    - ARC-210 Radio not available yet.



PRE-START

11. Boost pumps for MAIN and WING tanks - ON

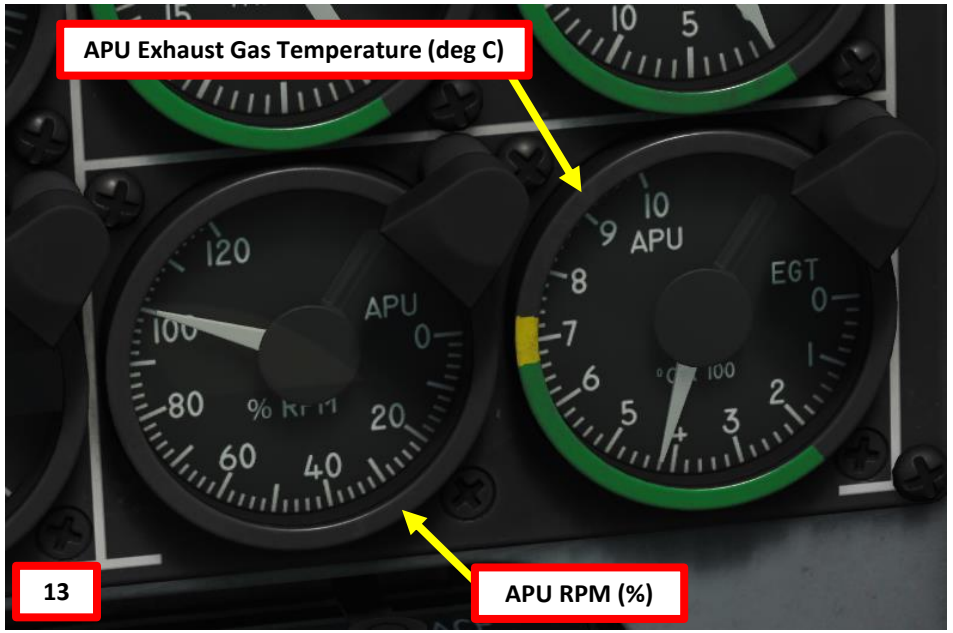
START PROCEDURE SUMMARY

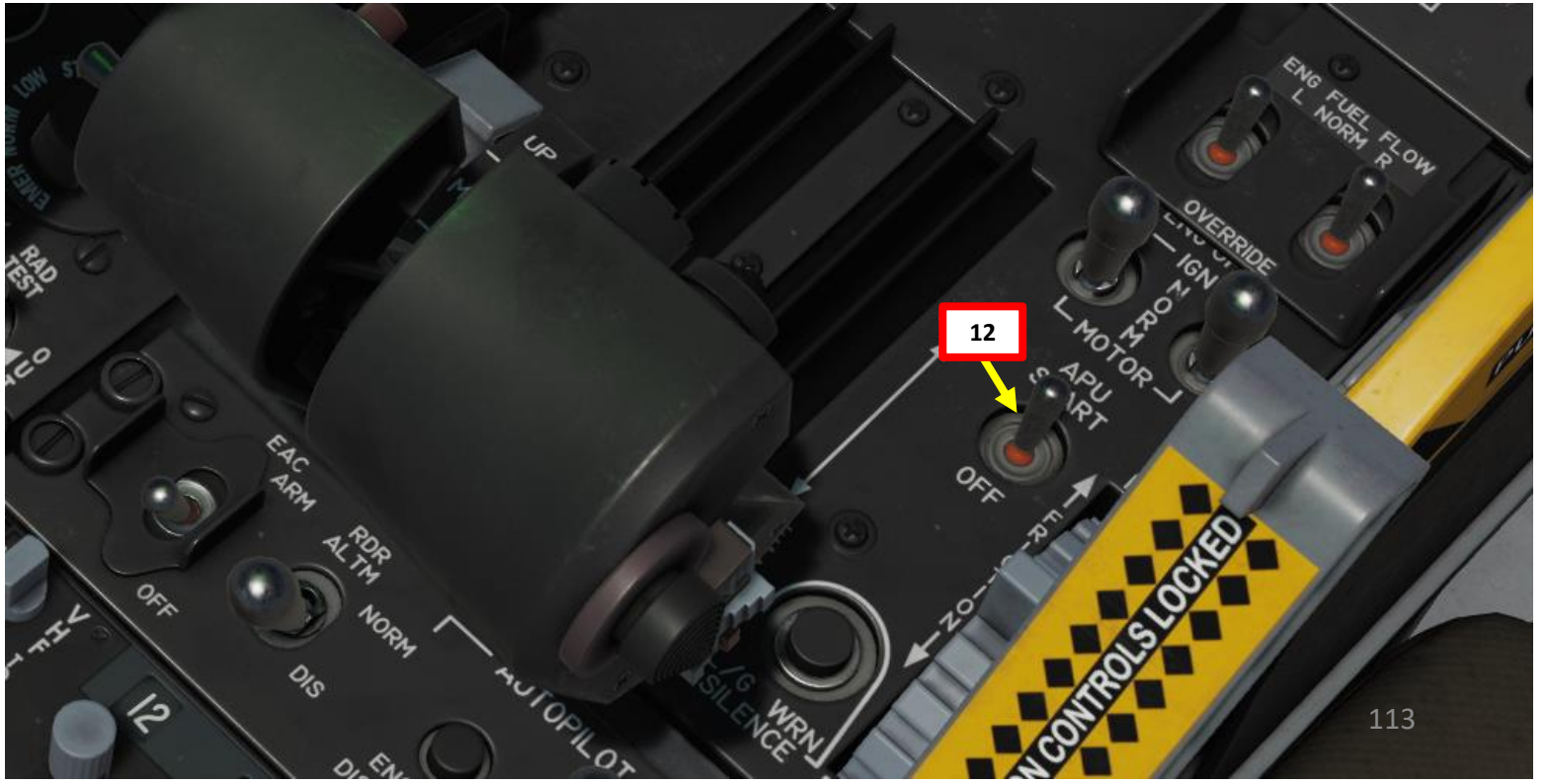


APU START

12. APU (Auxiliary Power Unit) switch – START
13. Wait until APU RPM reaches 100 %, then set APU Generator switch – ON.

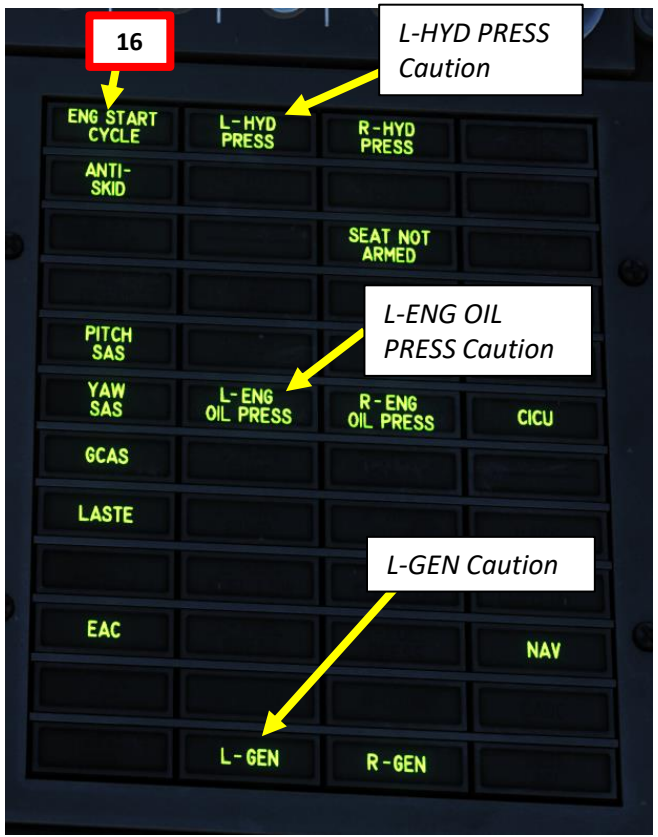
Note: The APU (Auxiliary Power Unit) generator supplies electrical power to the engine, and the APU bleed air will drive the engine starter.

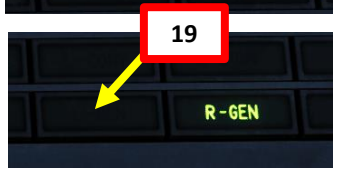


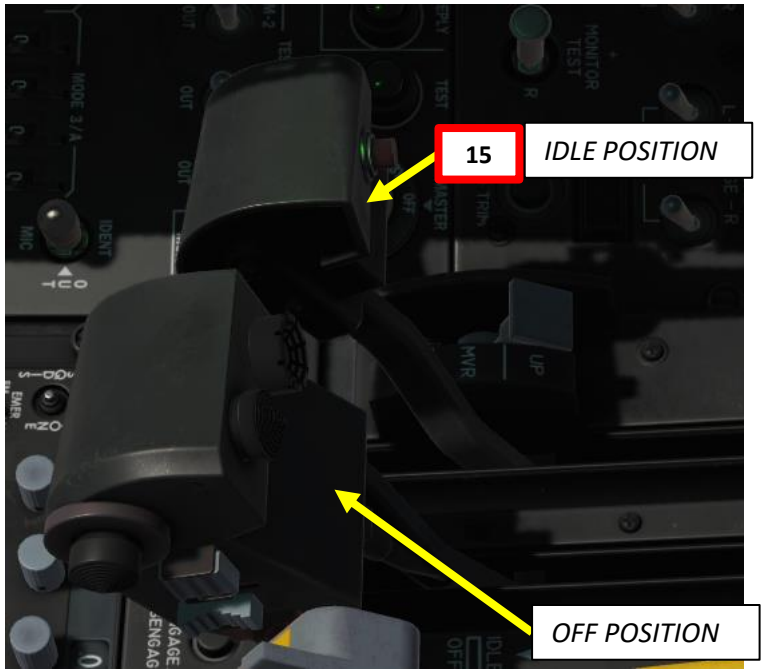


ENGINE START

14. Verify both Engine Operation switches are in NORM position
15. Crank up left engine by moving left throttle from OFF to IDLE (RALT+HOME). This will automatically initiate a left engine start with the automatic ignition. Once throttle is moved to IDLE, the DC fuel boost pumps will activate to feed that engine.
    - Note: On Warthog Throttle, you need to physically raise/pull up the throttle.
16. During start, ENG START CYCLE indication will be visible.
17. Confirm oil pressure increases during start. Interstage Turbine Temperature (ITT) will spike at 900 °C but will stabilize between 275 and 865 °C.
18. Wait until engine spools up to a stabilized core RPM of 56 % when idling on the ground. Monitor Left Hydraulic system pressure build-up, which should normalize between 2,800 and 3,350 PSI.
19. When engine reaches IDLE RPM, hydraulic pumps kick in and oil pressure has stabilized, L-GEN, L-HYD PRESS and L-ENG OIL PRESS cautions will extinguish.
20. When Master Caution warning sound is heard, click on “MASTER CAUTION” switch.

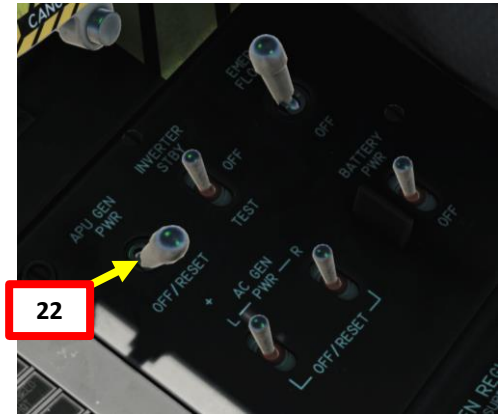


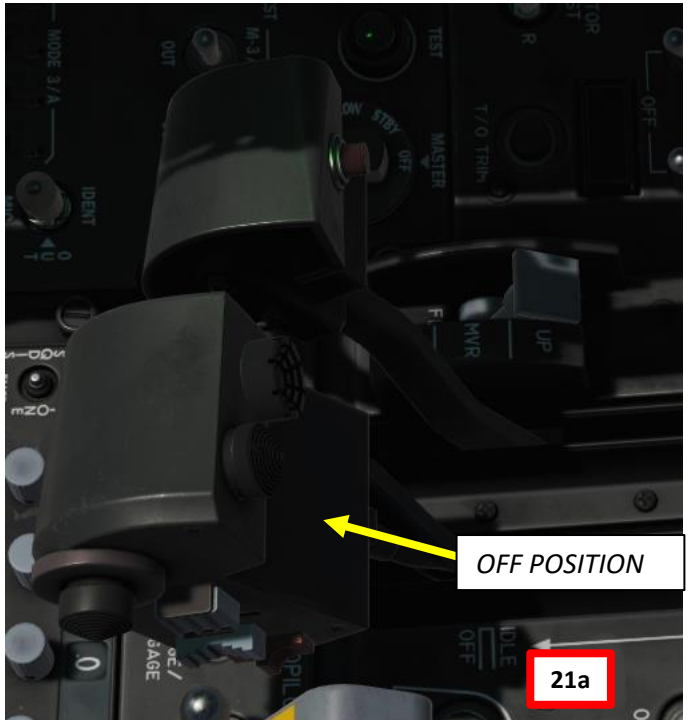


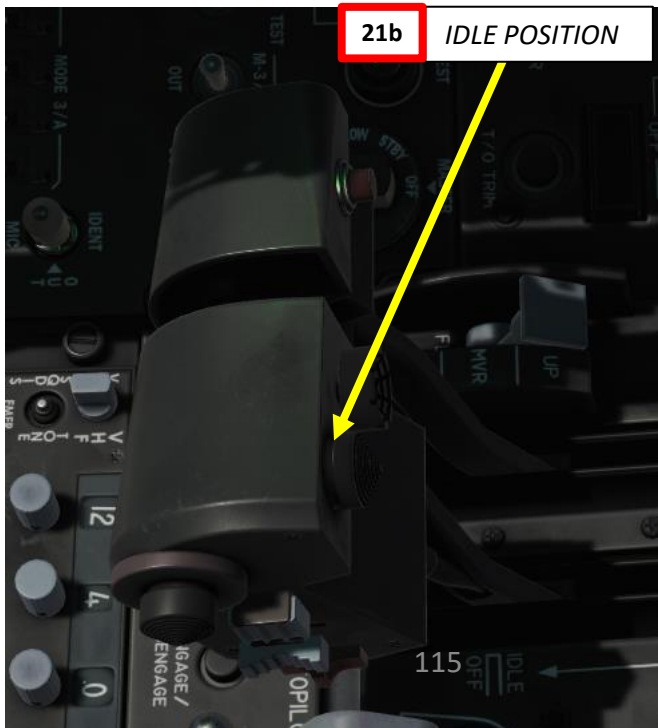


ENGINE START

21. Crank up right engine by moving right throttle from OFF to IDLE (RCTRL +HOME). Wait until engine spools up to IDLE settings as shown previously.
22. APU Generator – OFF/RESET
23. APU switch – OFF

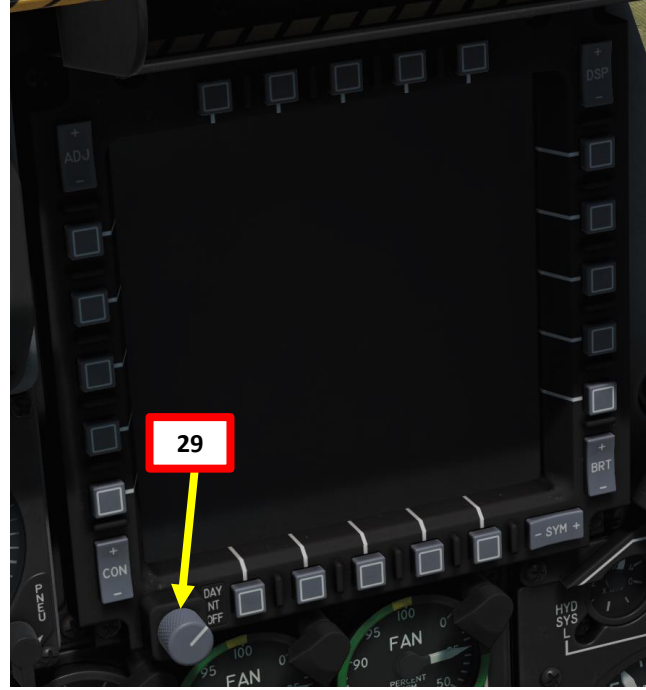


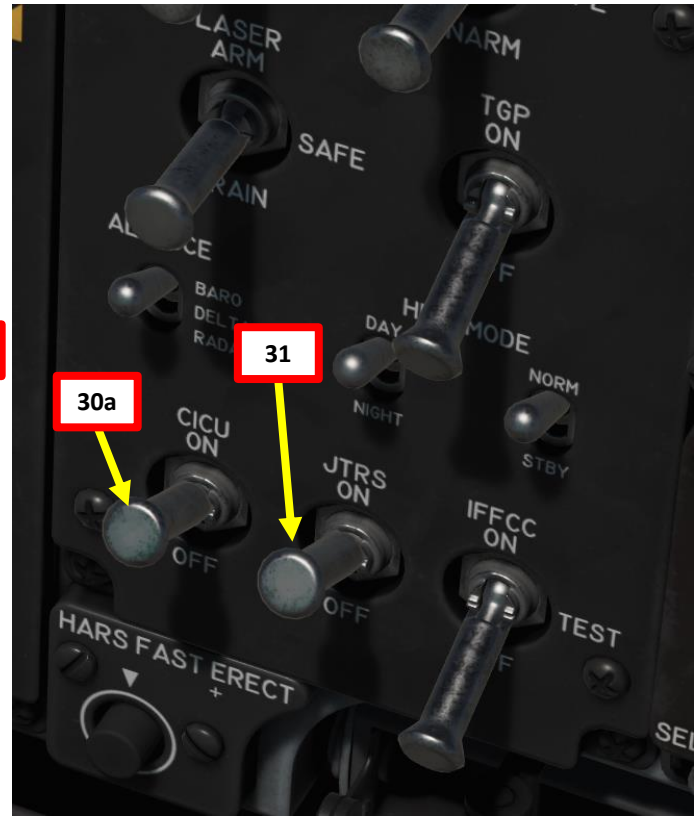


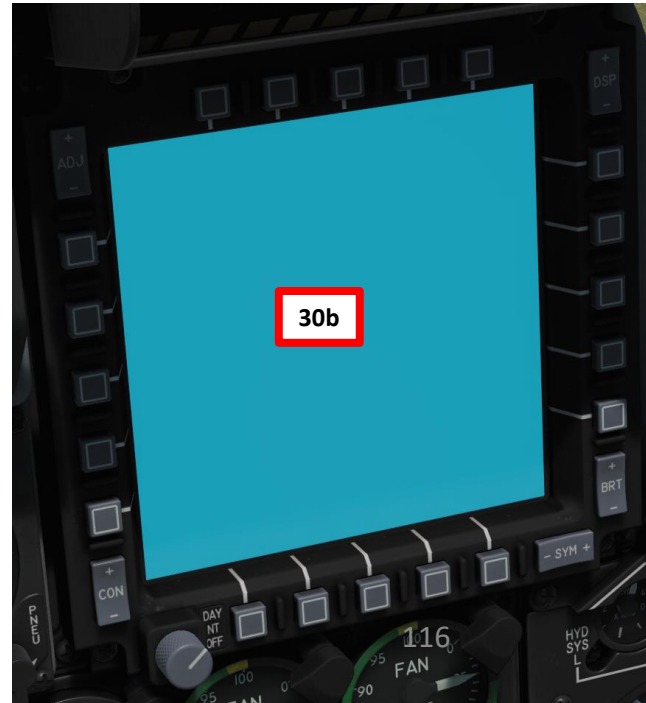


POST-START

24. Set Pitot Heat Switch – ON (FWD)
25. Set CDU (Control Display Unit) switch – ON
26. Set EGI (Embedded GPS-INS) switch – ON
27. Once EGI switch is ON, navigation system alignment will start and take approx. 4 minutes. The alignment status can be monitored on the CDU – ALIGN sub-page, but the MFCDs are not powered yet. We will come back to it later.
28. Uncage Standby Attitude Indicator (SAI)
29. Turn ON left and right MFCD (Multi-Function Color Display) screens by left-clicking twice on each power switch.
30. Set CICU (Central Interface Control Unit) switch – ON. The MFCDs will turn to blue.
31. Set JTRS (Joint Tactical Radio System) switch – ON
    - JTRS Powers Situational Awareness Datalink (SADL), which helps you to identify and see friendly/enemy forces on your monitors

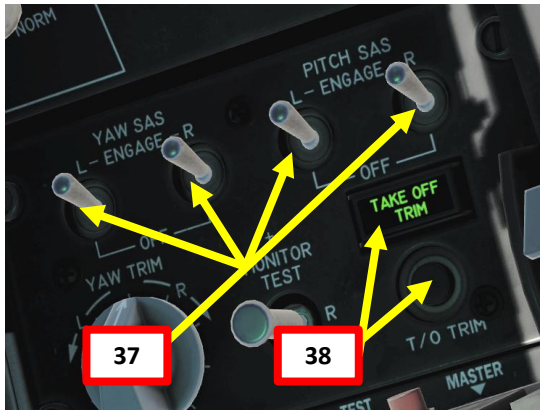


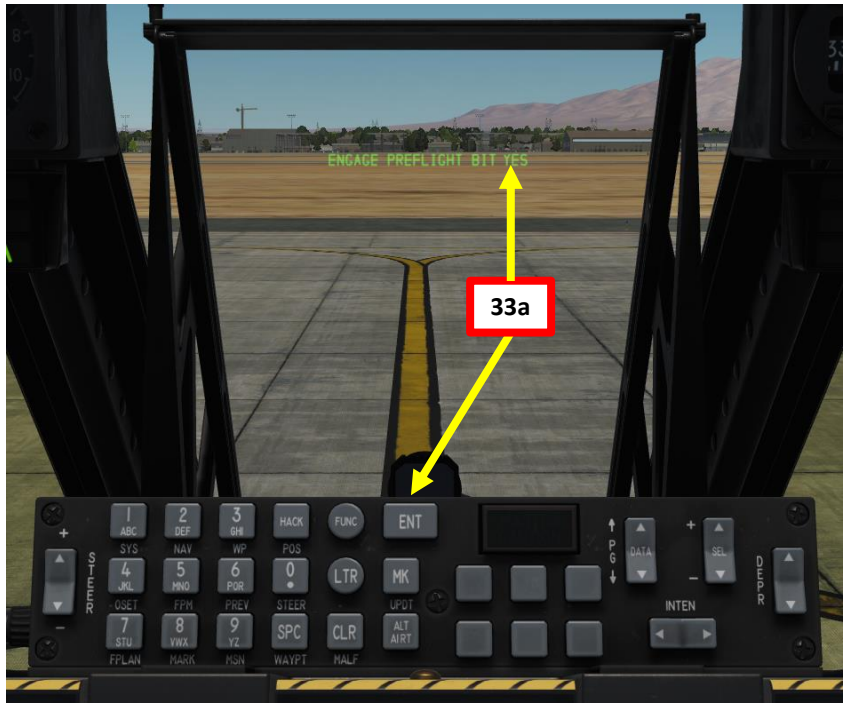


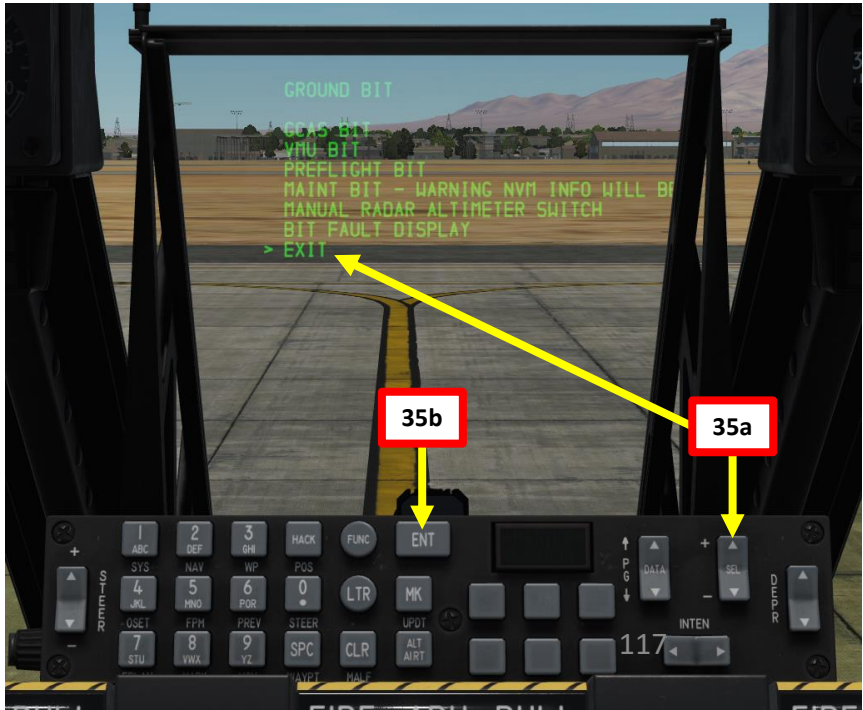


POST-START

32. Set IFFCC (Integrated Flight & Fire Control Computer) – TEST (middle position)
33. Press "ENT" on the UFC (Up Front Controller) to engage Preflight BIT
    - This will run an automated BIT (Built-In Test), which will take about 1 minute. The IFFCC does all these fancy calculations for weapon release, attitude control and HUD indications.
34. Once BIT is complete, press "ENT" on the UFC to exit the PREFLIGHT BIT menu.
35. Scroll down HUD menus using the "SEL" button and select EXIT by pressing the "ENT" button on the UFC.
36. Set IFFCC (Integrated Flight & Fire Control Computer) – ON (UP position)
37. Pitch and Yaw SAS (Stability Augmentation System) switches – ON
38. Hold TAKEOFF TRIM switch for 1-2 seconds. Pressing this button will automatically set all trim tabs to neutral, takeoff settings. When all trim tabs have been set to the proper setting, the takeoff trim light above the button will light and indicate TAKEOFF TRIM

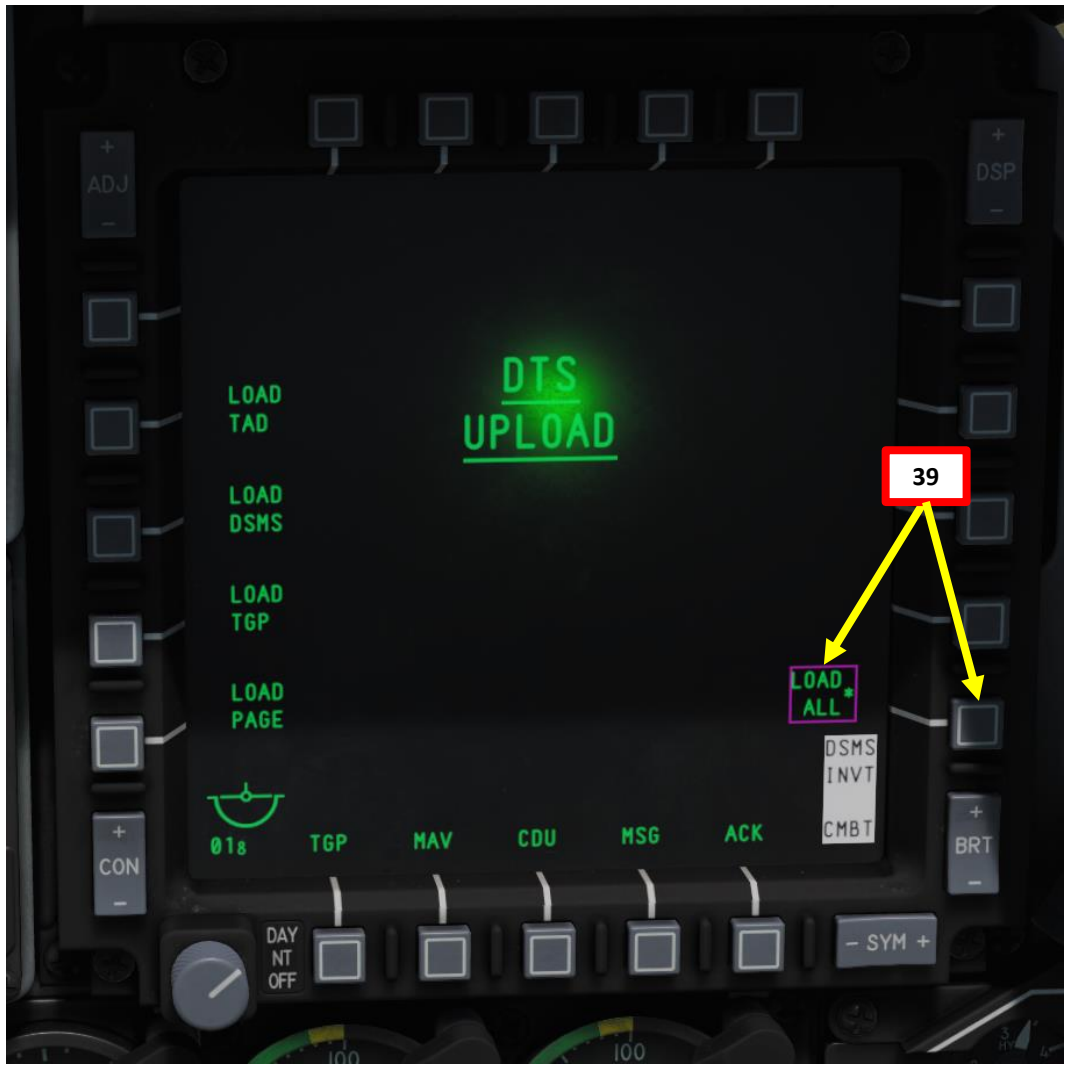






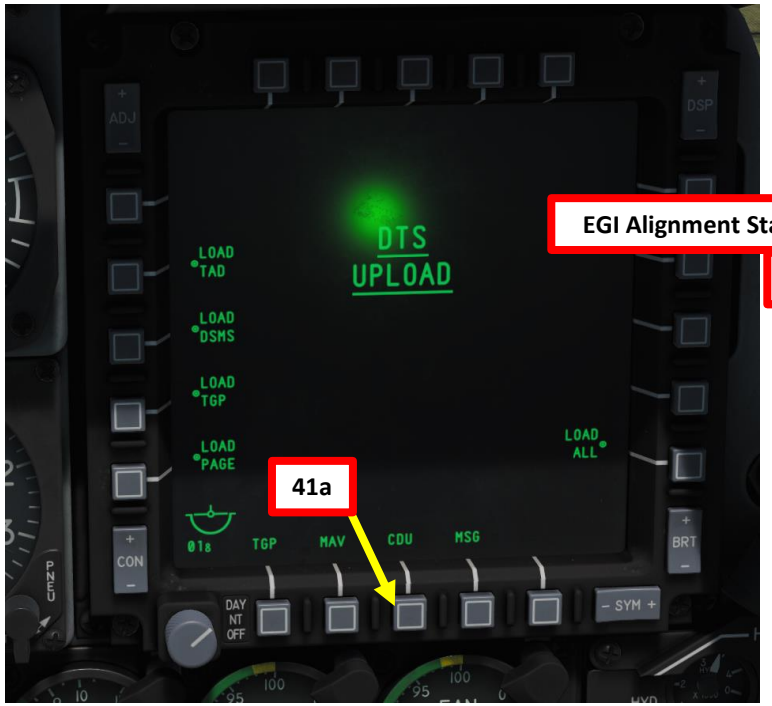
POST-START

39. Once you have a “DTS UPLOAD” page appear on your MFCD (Data Transfer System Upload), press the OSB (“Option Selection Button” on side of the screen) next to “Load All”. This will load the DTS (Data Transfer System) cartridge in your flight computer, which stocks your mission waypoints, weapon data, bullseye data and other navigation data set up from the mission editor.
    - NOTE: Data transfer will take about 15 seconds
40. Once DTS cartridge is loaded, the white DSMS, INVT and CMBT cautions will disappear and asterisks will appear next to every menu (* means loaded).



POST-START

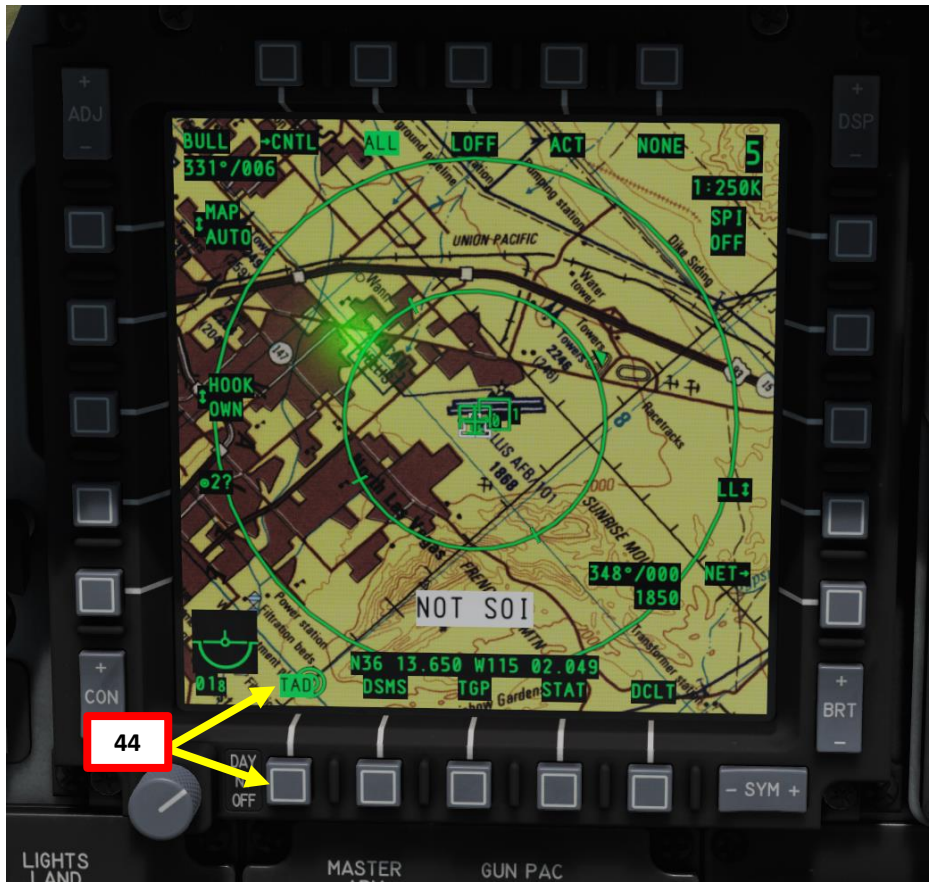
41. Select the OSB next to “CDU” (Control Display Unit) on the right MFCD to display EGI (Embedded GPS-INS) Alignment data on this screen.
    - Once the alignment status timer goes to “T = 4.0 0.8”, the EGI is aligned.
42. Set STEERPOINT selector to FLIGHT PLAN. This will allow you to use waypoints on your HUD and TAD to navigate.
43. On the right MFCD where CDU data is displayed, select NAV mode by pressing the OSB next to the NAV menu. Once NAV mode is selected, an asterisk will appear next to it.



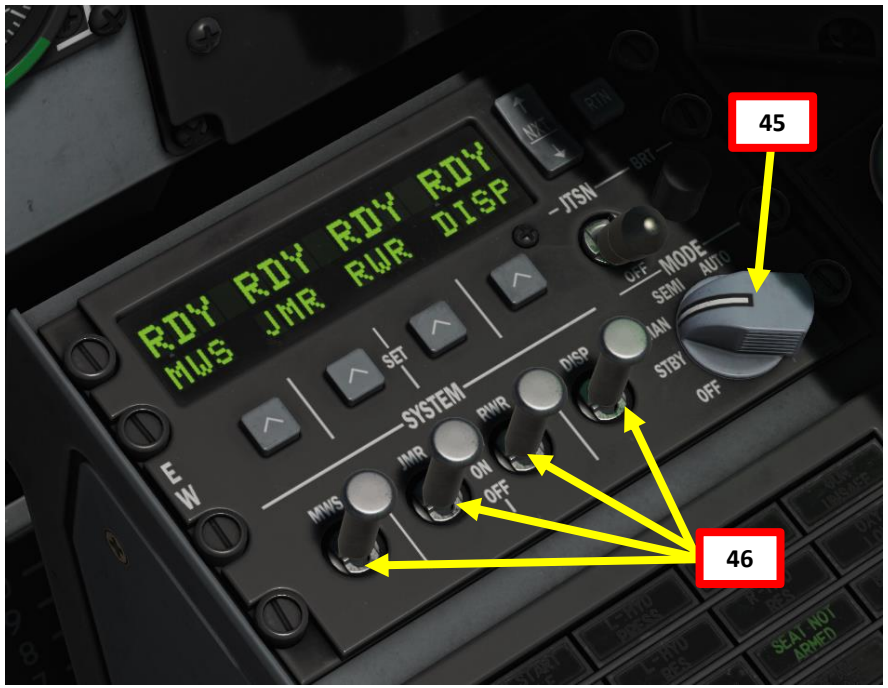
POST-START

44. Select the OSB next to “TAD” (Tactical Awareness Display) on the left MFCD to display TAD data on this screen.
45. Set CMS (Countermeasures) mode to “MAN”
46. Set MWS (Missile Warning System), JMR (Electronic Countermeasures Jammer), RWR (Radar Warning Receiver) and DISP (Countermeasure Dispenser) switches ON.
47. Engage Nosewheel Steering (pinky switch on HOTAS stick). You can also use the “INSERT” key.

47 Nosewheel Steering Button



44

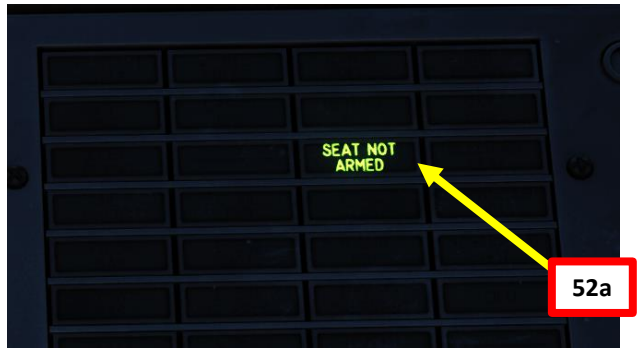


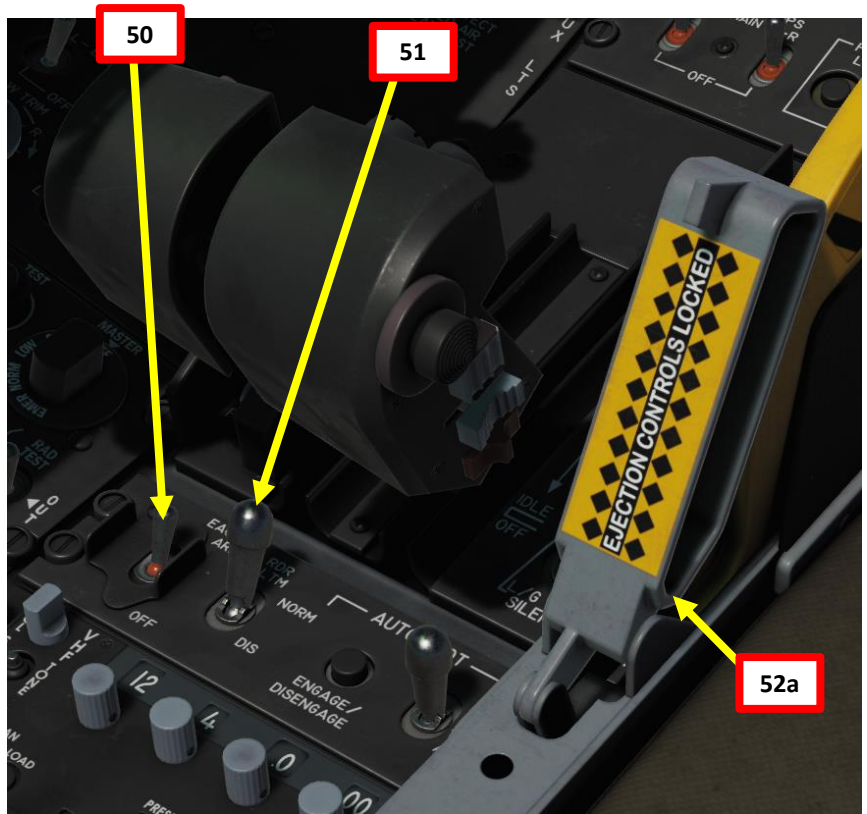
45

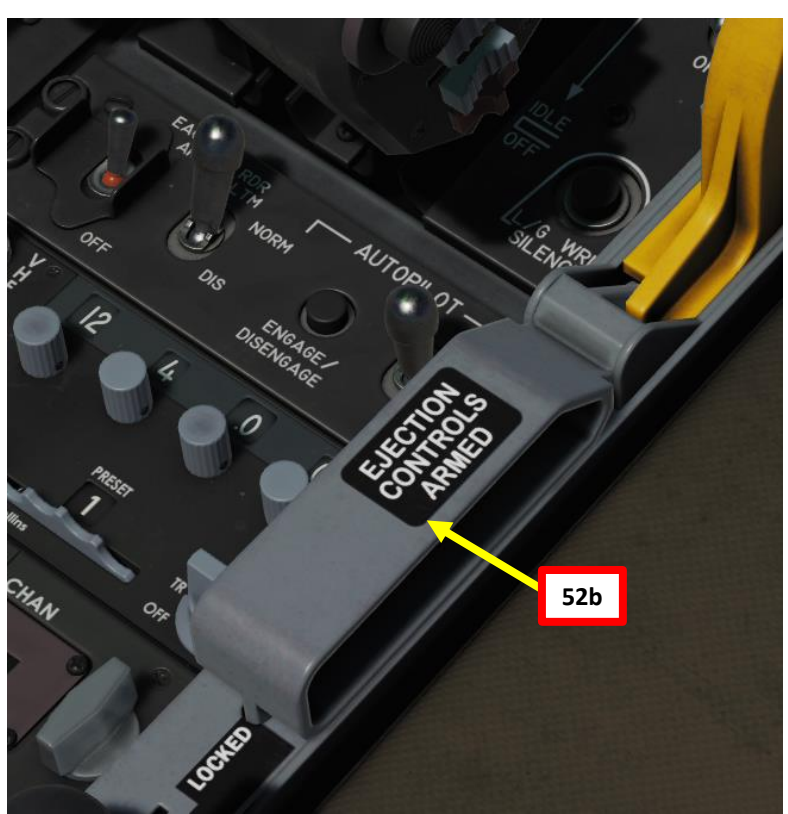
46

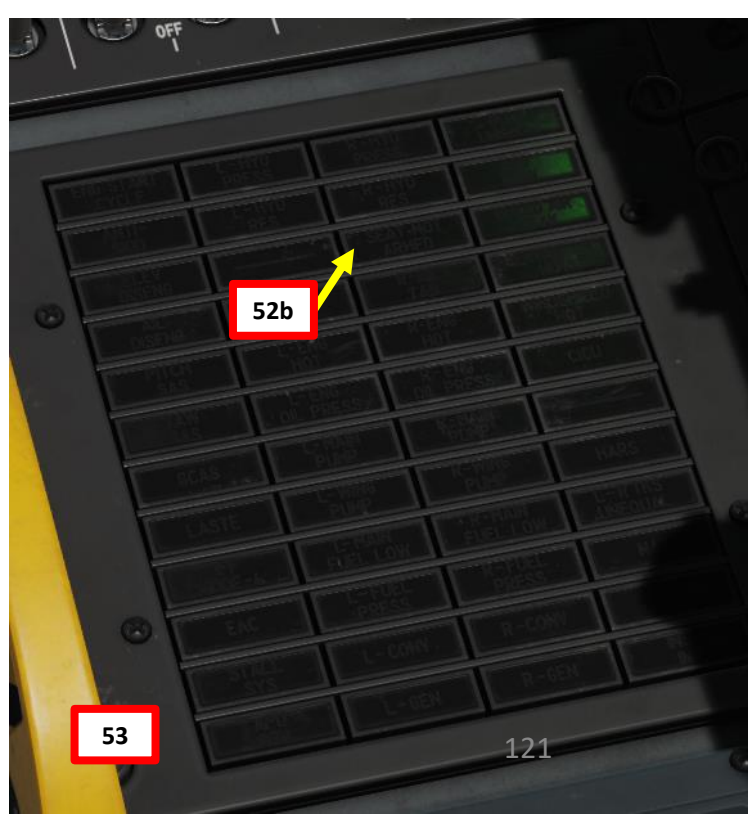
POST-START

48. Set Anti-Skid Switch – ON
49. Select EGI (Embedded GPS Inertial Navigation System) navigation mode.
50. Set EAC (Enhanced Attitude Control) Switch – ARMED
51. Set RDR ALTM (Radar Altimeter) Switch – NORMAL
52. Arm Ejection Seat (Lever DOWN). SEAT NOT ARMED caution should disappear.
53. Check your Caution Panel: any message displayed on it will tell you if you forgot something.









POST-START

54. Scorpion HMCS (Helmet-Mounted Cueing System) Power Switch – ON (FWD)

A-10C II Tank Killer Expansion Only

PRE-FLIGHT – WHAT YOU NEED TO DO, AND WHY IT MATTERS

Some people start their aircraft and are up in the air 10 minutes later.

Some people start their aircraft and are up in the air 1 hour later.

It's not always a matter of how "quickly" you can go through the start-up procedure. It is mostly a matter of flying your aircraft "smartly". The A-10C is an incredibly complex module, and it is no surprise that the DCS manual is more than 650 pages long. This guide will not teach you everything a real life A-10C pilot does: it would probably take much more than 1000 pages and months to learn. This guide is meant to be a quick n' dirty tutorial to start the machine, communicate and operate with other players, fly and destroy targets while staying alive. You will not learn how to use every bomb. You will not learn how to use advanced functionalities of the CDU. You will not learn every tactic, every manoeuver, every emergency procedure… What you'll learn is the basics that allow you to **build a solid knowledge basis** that will allow you to expand upon it by reading the manual.

Many new pilots complain about the length of the start-up procedure and think that doing the pre-flight checks we're about to do is a **huge waste of time** since you spend 5 to 10 more minutes on the ground instead of flying. In all honesty, I thought that way too at the beginning. I wanted action, and I just thought that firing up the Hog and taking off as quickly as possible was the most efficient way to go find some trouble. Experience taught me that it is better to spend 5 additional minutes on the ground to prepare your systems in a relaxed environment than to spend 10 minutes in the air in a stressful situation to do the same task. You are much more likely to make mistakes and start panicking when you are in a stressful situation, just like pilots in real life. **Be structured, be prepared**, and you will be amazed to realize how much more efficient you can be.

One of the key things I tell new guys is to **concentrate on your systems** when you are on the ground and to **concentrate on flying** when you are in the air. One of the biggest challenges for modern aircraft is the workload: it is critical to manage this workload properly if you do not want to be overwhelmed by it. Set up your systems properly on the ground so you don't have to worry about them in the air.

Here are the things you can do on the ground that will save you precious time and brain cells:

1. **Identify yourself on the TAD (Tactical Awareness Display) and identify your wingmen**
2. **Programming your weapons using the DSMS (Digital Stores Management System)**
3. **Setting up your countermeasure programs (or simply use a preset program that suits your needs)**
4. **Set up your radio frequencies (usually given through mission briefing)**
5. **Get to know your flight plan in advance (consult waypoints/steerpoints on your TAD)**

Example of full mission in multiplayer: https://www.youtube.com/watch?v=zRgoUqfiO5I

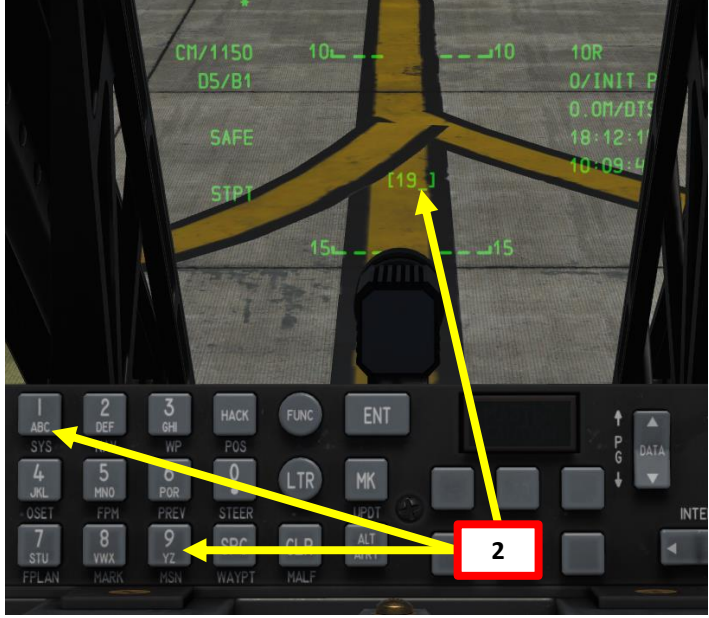
PRE-FLIGHT – IDENTIFYING YOURSELF ON THE TAD

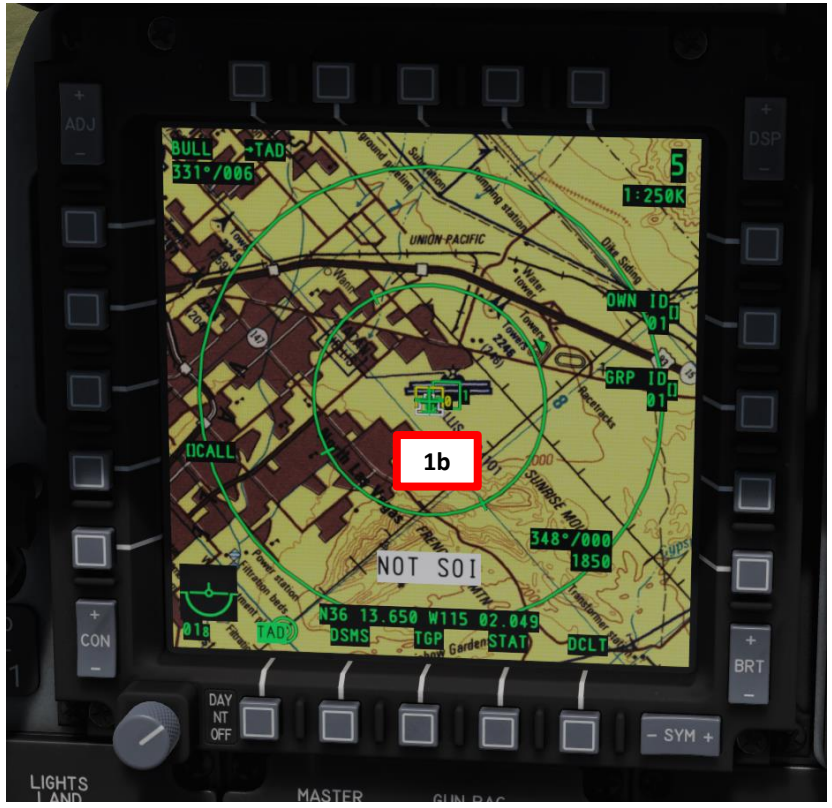
The TAD (Tactical Awareness Display) allows you to know where you are, and who is next to you.

In a single-player mission, you are unlikely to fully appreciate the functionality behind the TAD. A multiplayer session allows you to better understand why the TAD is so useful and how it should be used to give you information that is both precise, concise and relevant. A common practice to do when your TAD is loaded is to set your own ID. You have both a GROUP ID and a personal OWN ID. You don't really need to touch the GROUP ID (apart from situations where there are way too many planes in a same sector, which is unlikely to happen in DCS), but setting up your OWN ID is useful for your wingman. Why? Because if you set your own ID, all members with your same GROUP ID will be able to see your OWN ID pop up on their TAD. For instance, if I set my OWN ID to "19" and my GROUP ID to "1", every person in GROUP ID #1 will see an icon with "19" pop on their TAD. This way, they can know where I am. They can even send me messages, target locations and track my position using the HUD and their flight computers!

To set up your own ID:

1. Click on "NET" OSB on your TAD.
2. Enter your desired ID number on your UFC (Up Front Controller)
3. Press the "OWN ID" OSB to set your OWN ID to the number you just entered through the UFC.
4. You can go back to the TAD by clicking the "TAD" OSB.





PRE-FLIGHT – DSMS, OR HOW TO MANAGE YOUR BOMBS, MISSILES AND SHIT

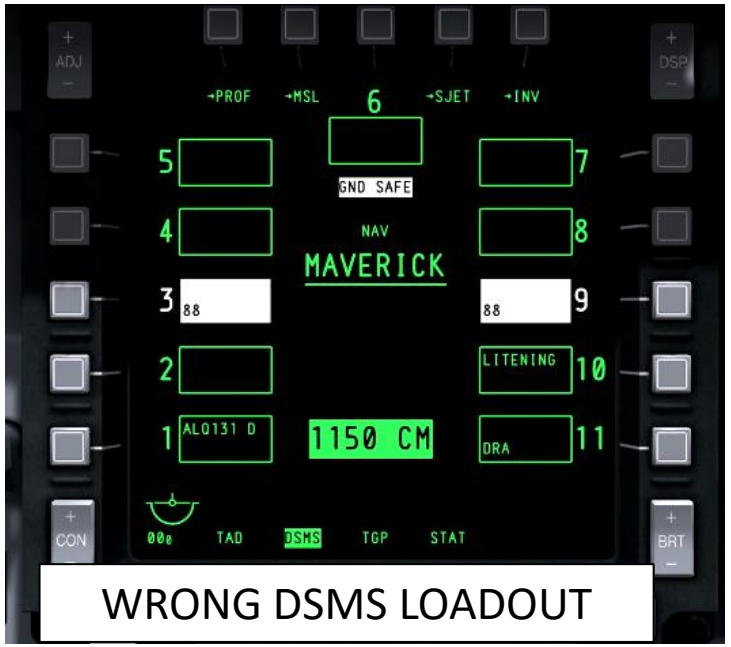
When you spawn, you typically have a set of various weapons mounted on your wing pylons. The reality is that more often than not, you will want to change your loadout and set it to your own liking.

This is where the **DSMS (Digital Stores Management System)**, also nicknamed "DIZMAS" comes into play. Most WWII/Korea/Vietnam era weapons were relatively simple since most of the aiming was done manually or with gyro-assisted gunsights. However, with the coming age of computers, dropping bombs and guiding missiles with pin-point accuracy became possible. Ground strikes became much more precise, but such complexity required an interface for the pilot to work with. In order to manage "smart" bombs and missiles, the DSMS was created to help the pilot to program them: how many are launched, how they behave, how and when they explode, etc.

It is easy to feel overwhelmed by the DSMS page at first. You can customize pretty much anything you could think of on any kind of ordnance you are carrying. No need to panic yet: there is no way in hell you will be able to remember every single procedure by heart. We will simply explore together how the Dizmas works, so you can operate it by yourself and know what you are doing… without ever needing to read this godawful wall of text ever again. Deal?

First, we will assume that you are starting your mission from scratch and that you load your weapons manually using "\" and the Ground Crew. The DSMS cannot "guess" if you changed your weapon loadout or not, so you need to tell the computer to check or re-check what ordnance is loaded.

NOTE: You can avoid having to re-load your DSMS by simply spawning, choosing your desired loadout, and **only then** proceed with the start-up procedure.

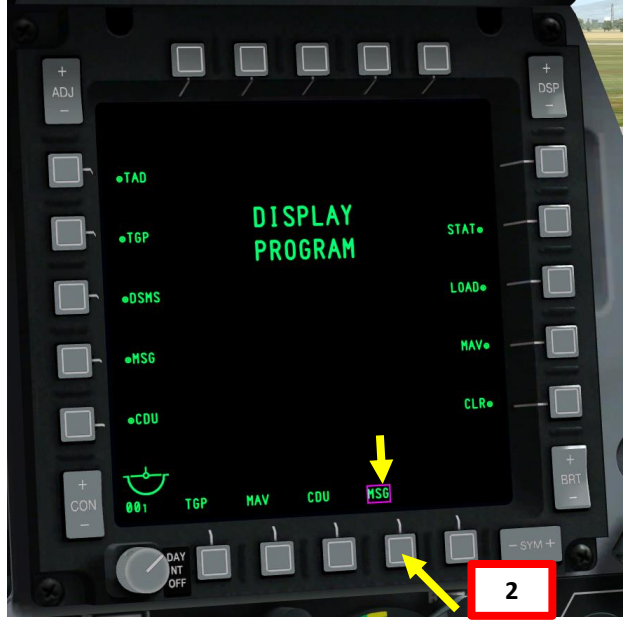


WRONG DSMS LOADOUT

GOOD DSMS LOADOUT

HOW TO RELOAD DSMS

1) Click on “CDU” menu OSB on right MFCD



2) Click and hold “MSG” OSB until you see the menus appear next to the right OSBs.

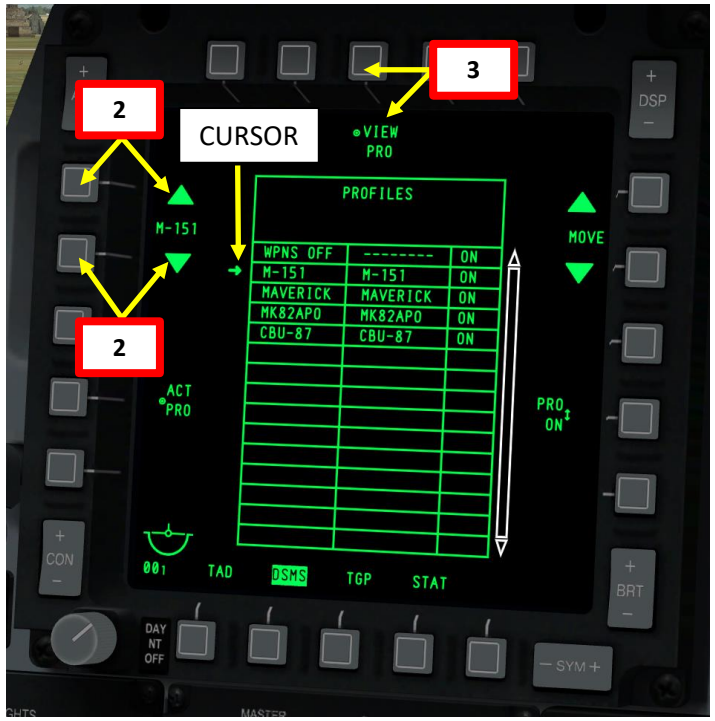
3) Click on “Load” OSB on the right menus
4) Click on lower “MSG” OSB. OSB will change from “MSG” to “LOAD”.

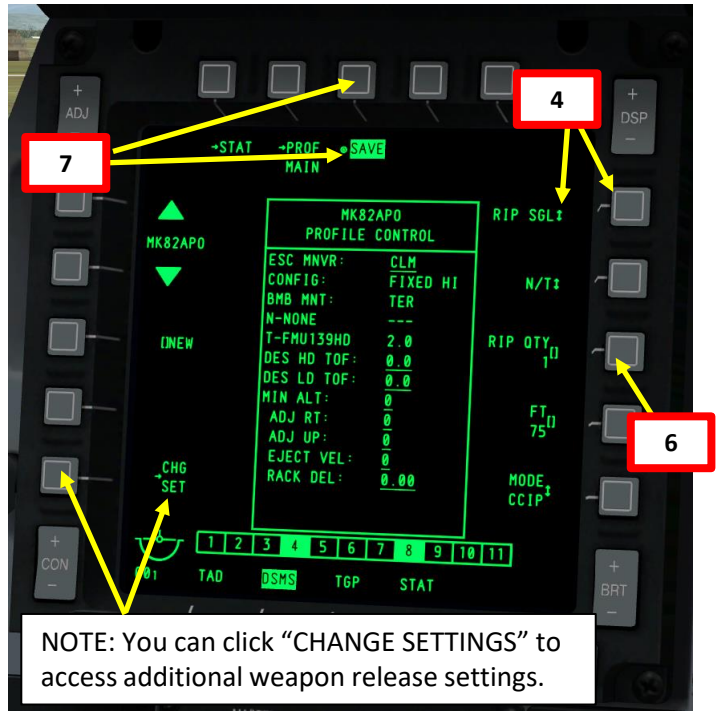
5) Click on the new lower “LOAD” OSB menu.

6) Click on “LOAD ALL” OSB on the right to reload all DSMS stations.
Reload is complete when asterisks appear next to every menu.

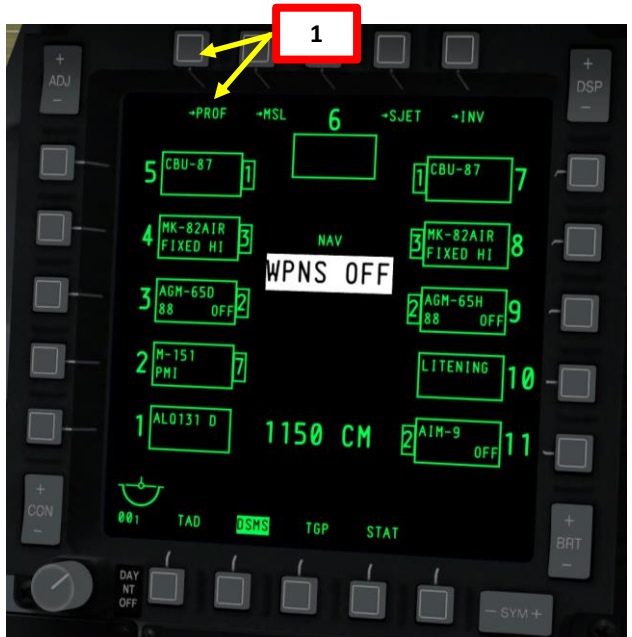
HOW TO MODIFY WEAPON PROFILES

1. From the MAIN DSMS menu, select “PROF” OSB.
2. Move green cursor using the OSBs to the left to cycle through weapon profiles.
3. Once green cursor is next to desired weapon profile, select “VIEW PRO” OSB to open profile settings/options.
4. Select appropriate firing mode (Ripple Single is recommended) and choose what setting on the right OSB row you want to modify.
5. Using the UFC scratch pad, enter in the HUD the new value for the setting you want to modify (ex: “1” for RIPPLE QUANTITY)
6. Select appropriate OSB for the setting you want to change (ex: “RIP QTY”).
7. Click “Save” OSB to save profile once all settings are OK.





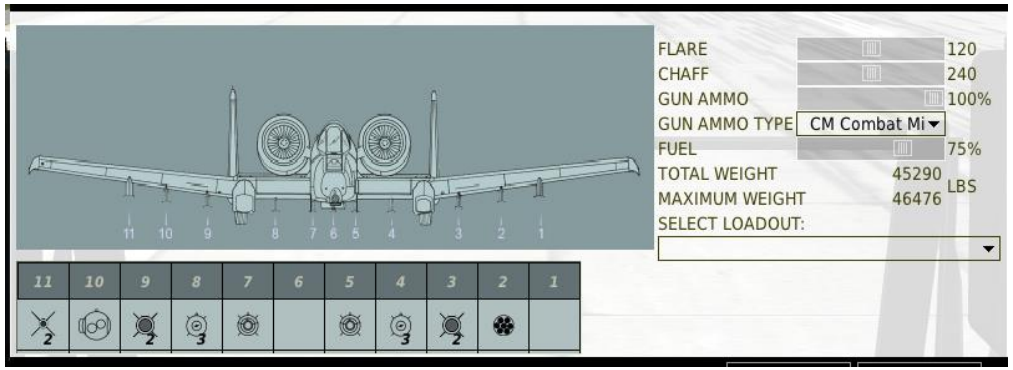
NOTE: You can click “CHANGE SETTINGS” to access additional weapon release settings.



NOTE: In other words, you modify a profile setting by entering the new setting value from the scratch pad first, and THEN you select the setting you want to apply this value to. Note that some settings like CCRP/CCIP weapon release mode do not require user input from UFC scratch pad: you can just click the OSB next to the parameter to toggle it.

“CLEAR” UFC IF YOU MADE A MISTAKE OR GET THE “ERR” NOTICE ON HUD.

MISSION LOADOUT



RECOMMENDED WEAPON LOADOUT

STATION	STORE	DESCRIPTION
1	**AN/ALQ-131 ECM JAMMER POD**	**Electronic Countermeasures Jammer Pod**
2	7 x 2.75 in M-151 Rockets	Unguided Rocket Pod
3	2 x AGM-65D MAVERICK	Air-to-Ground Missile 125 lbs D variant: Infrared Seeker
4	3 x MK-82	General Purpose Unguided Bomb
5	1 x GBU-38	Guided Bomb (JDAM)
6	EMPTY	
7	1 x GBU-38	Guided Bomb (JDAM)
8	3 x MK82	General Purpose Unguided Bomb
9	2 x AGM-65H MAVERICK	Air-to-Ground Missile 125 lbs H variant: Electro-Optical Seeker
10	**AN/AAQ-28 LITENING POD**	**Targeting Pod (TGP)**
11	2 x AIM-9M SIDEWINDER	Air-to-Air Missile
GUN	1150 rounds	GAU-8 30 MM GUN Combat Mix
FLARE DISPENSER	120	Disrupts IR heat-seeking missiles
CHAFF DISPENSER	240	Disrupts semi-active radar homing missiles
FUEL	75 %	

ESSENTIAL → STATION 1

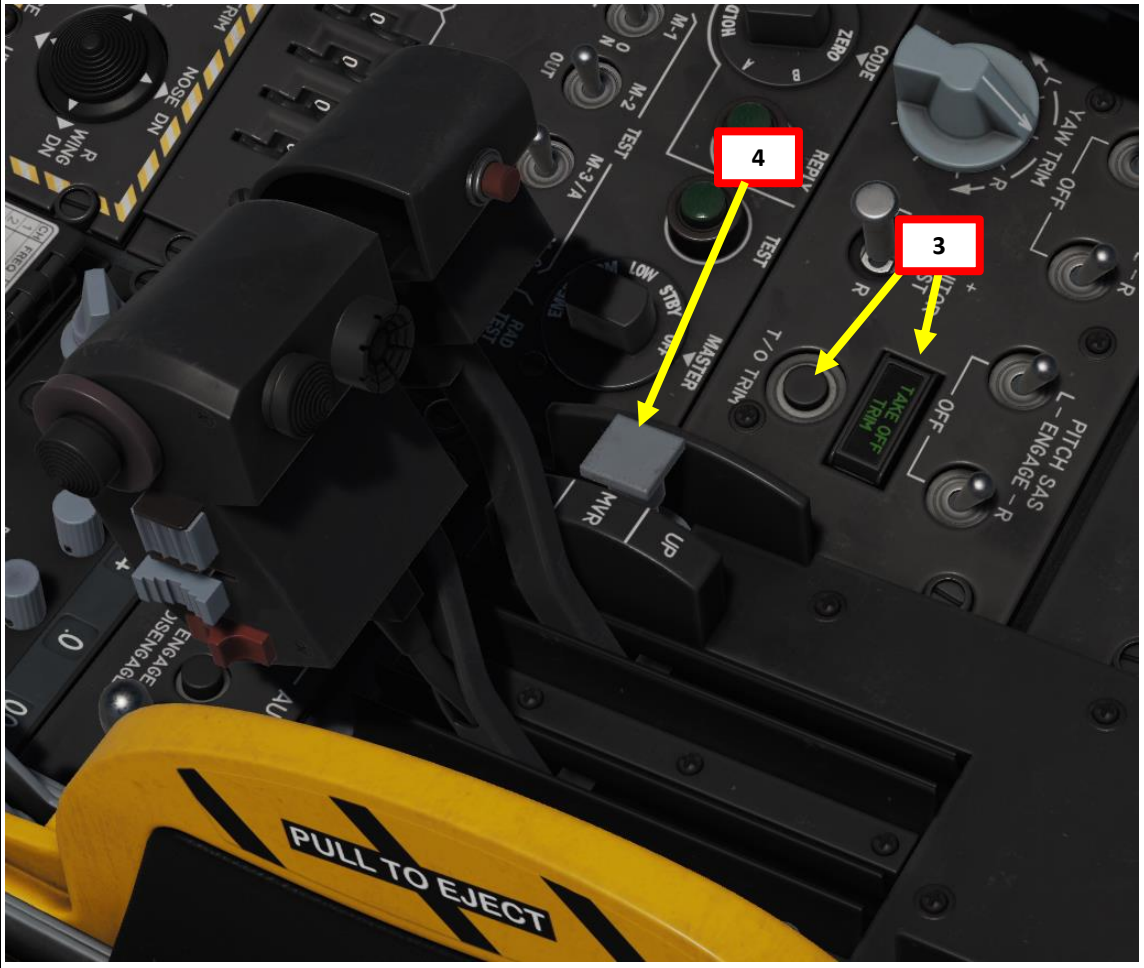
ESSENTIAL → STATION 10

TAXI

1. Ensure ANTI-SKID is on.
2. Ensure Nosewheel Steering is ON (keyboard binding: “INSERT”).
3. Move throttles forward slowly as required to start forward movement
4. Use the rudder pedals to steer the aircraft left and right; do not use differential braking to steer.
5. Taxi speed should be between 15 and 25 knots.
6. While taxiing, the canopy should never be opened or closed while turning.
7. Use the toe brakes to slow and stop the aircraft.

TAKEOFF

1. Line up on the runway
2. Make sure your Pitot Heat is ON during cold conditions.
3. Press the TAKEOFF TRIM switch to ensure you are trimmed for takeoff.
4. Set flaps for takeoff (MVR middle position, 7 deg) and ensure speedbrakes are retracted.



TAKEOFF

5. Hold down brakes, MAX throttle.
6. Release brakes and start rolling.
7. Disengage Nosewheel Steering (OFF) when you reach 70 kts.
8. Rotate at 135 kts. Set Landing Gear Lever UP and set Flaps UP.
9. Start climbing at an angle of 10 units of AoA (Angle of Attack). Do not yank back on the stick to get airborne: let it fly off the runway by itself.

TAKEOFF

NORMAL 360-DEGREE LANDING APPROACH

1. Initial Approach
   - Maintain altitude of 2000 ft
   - Keep airspeed between 250-300 kts
2. Downwind leg
   - Maintain altitude of 2000 ft
   - Keep airspeed between 200-250 kts
3. Base Leg
   - Maintain altitude of 1500 ft
   - Maintain airspeed of 150 kts
4. Before Glide Path Final Approach
   - Extend Airbrakes (40 %)
   - Lower Landing Gear
   - Flaps DOWN (fully extended)
5. On Glide Path Final Approach
   - -500 ft/min descent rate
6. Touchdown by letting yourself glide on the runway. No need to flare.

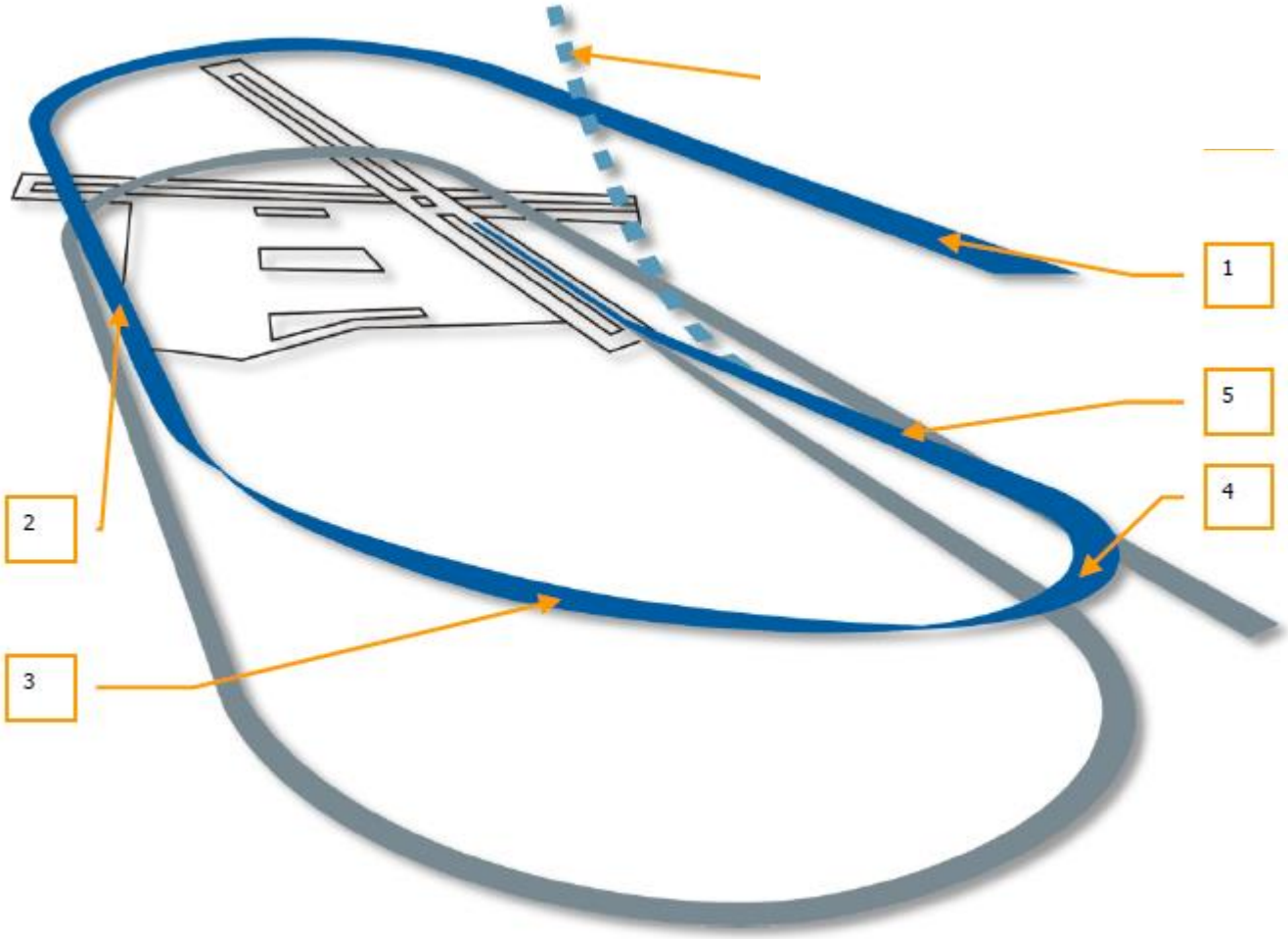


Figure 383. Circling 360-degree Landing Approach

NORMAL 360-DEGREE LANDING APPROACH

NORMAL 360-DEGREE LANDING APPROACH

AoA (Angle of Attack) Indexer

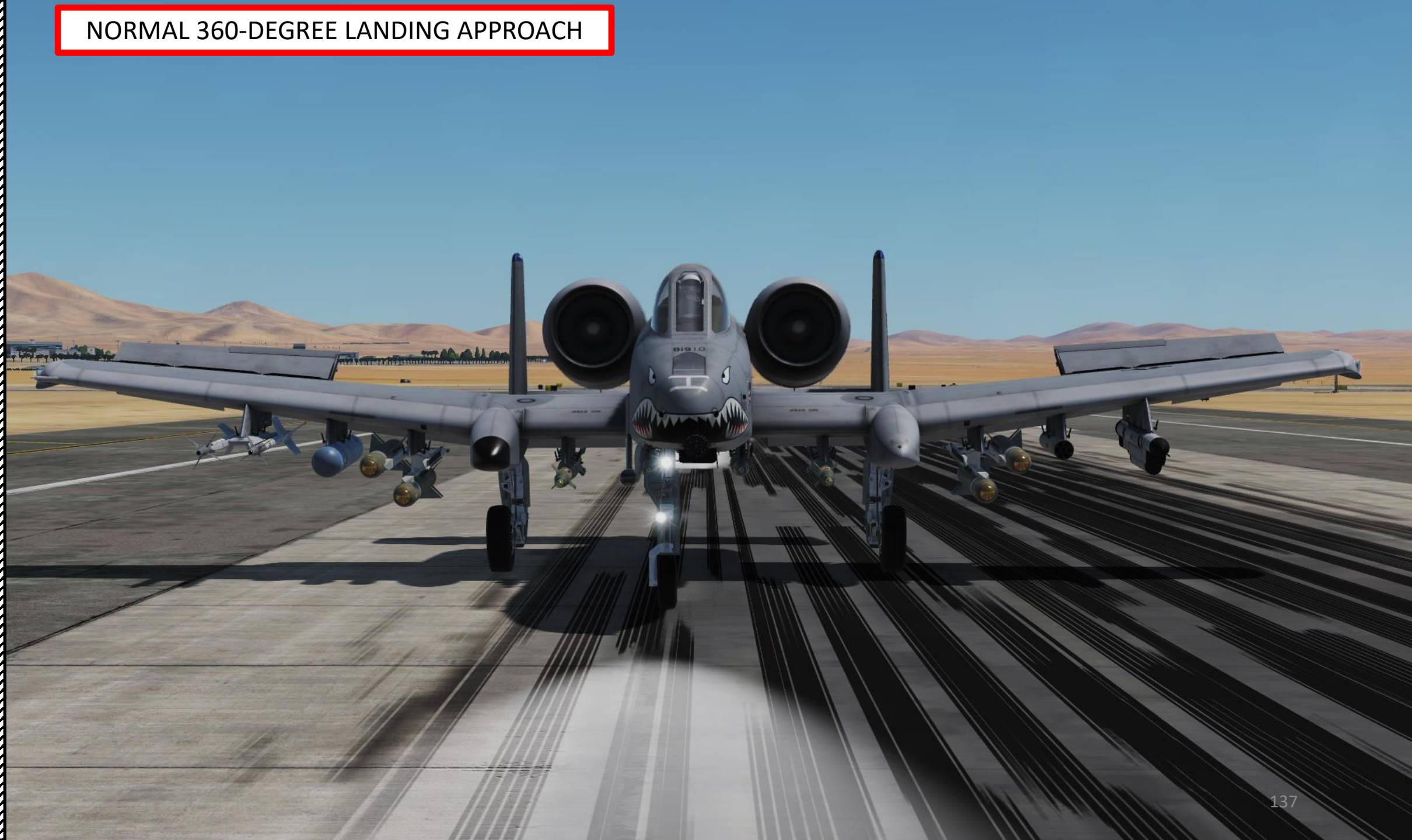
The indexer presents the information by displaying illuminated green and yellow symbols.

- *Low-speed symbol "\ /"*
- *On-speed symbol "circle"*
- *High-speed symbol "/ \".*
- *Slightly low/high speed is indicated by the on-speed and low/high speed symbols coming on simultaneously.*

Note: The AOA indexer lights operate only when the nose gear is down.

NORMAL 360-DEGREE LANDING APPROACH

NORMAL 360-DEGREE LANDING APPROACH



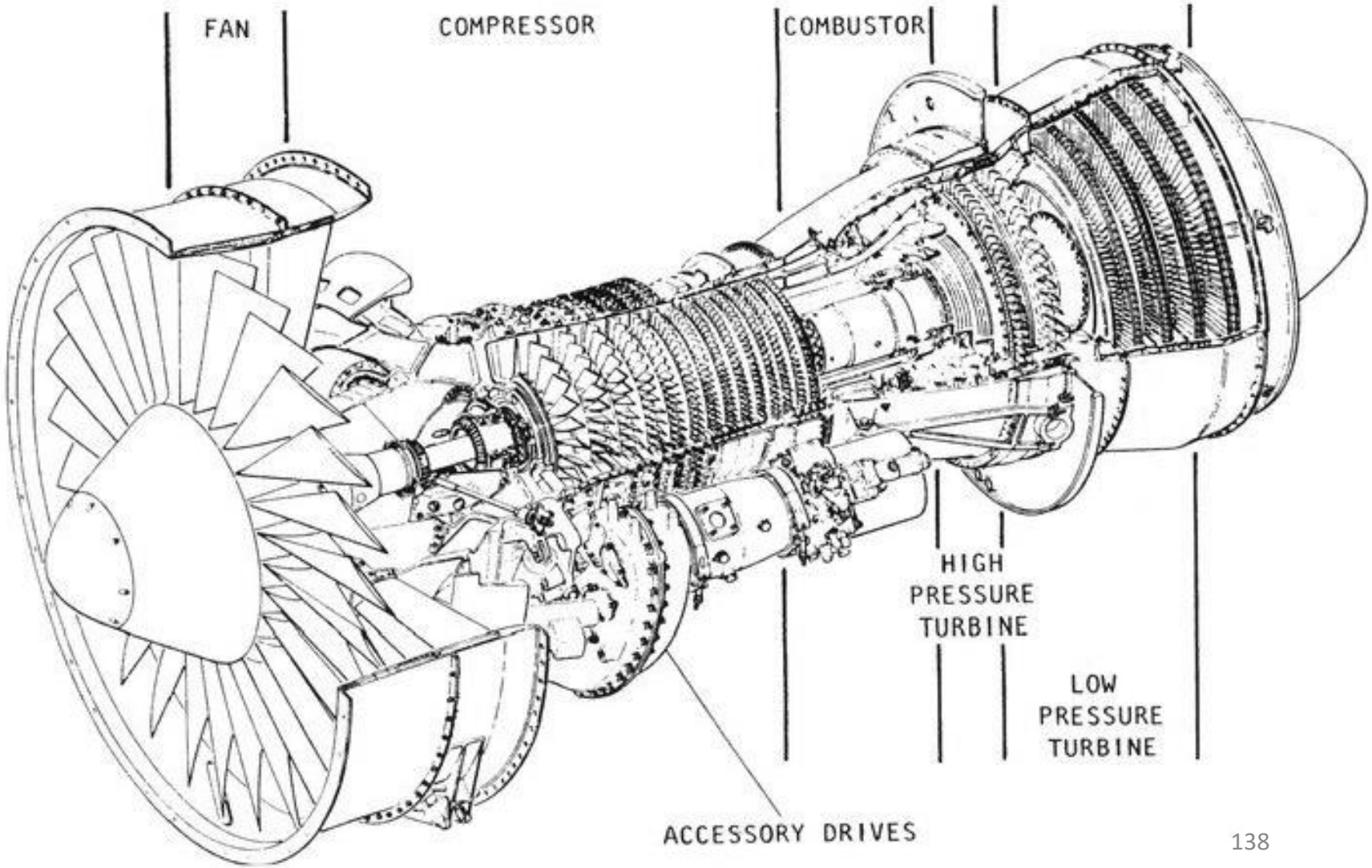
GENERAL ELECTRIC TF-34 ENGINE

The A-10C is powered by General Electric TF-34-GE-100A engine. The TF-34 is a high-bypass turbofan that generates 85% of its thrust with bypass air. To do so, it uses a single-stage bypass fan and a 14-stage axial flow compressor. Because the vast majority of thrust is generated by the bypass fan, the best indication of thrust in the cockpit is from the fan speed indicators. Bleed air can be siphoned from the fan to power additional systems.

Each engine is housed in a nacelle with maintenance doors that provide easy access. At maximum thrust, each engine produces 8,900 pounds of standard thrust at sea level on a standard day.

Although there has long been talk about upgrading the A-10 engines, this has yet to actually happen. As such, the A-10 is not a speed demon, but it does have reliable, fuel economic and durable engines in its current form.

From engine IDLE to MAX takes approximately 10 seconds at sea level. Thrust (amount of fuel supplied to the engines) is governed by the two throttle levers in the cockpit.



GENERAL ELECTRIC TF-34 ENGINE

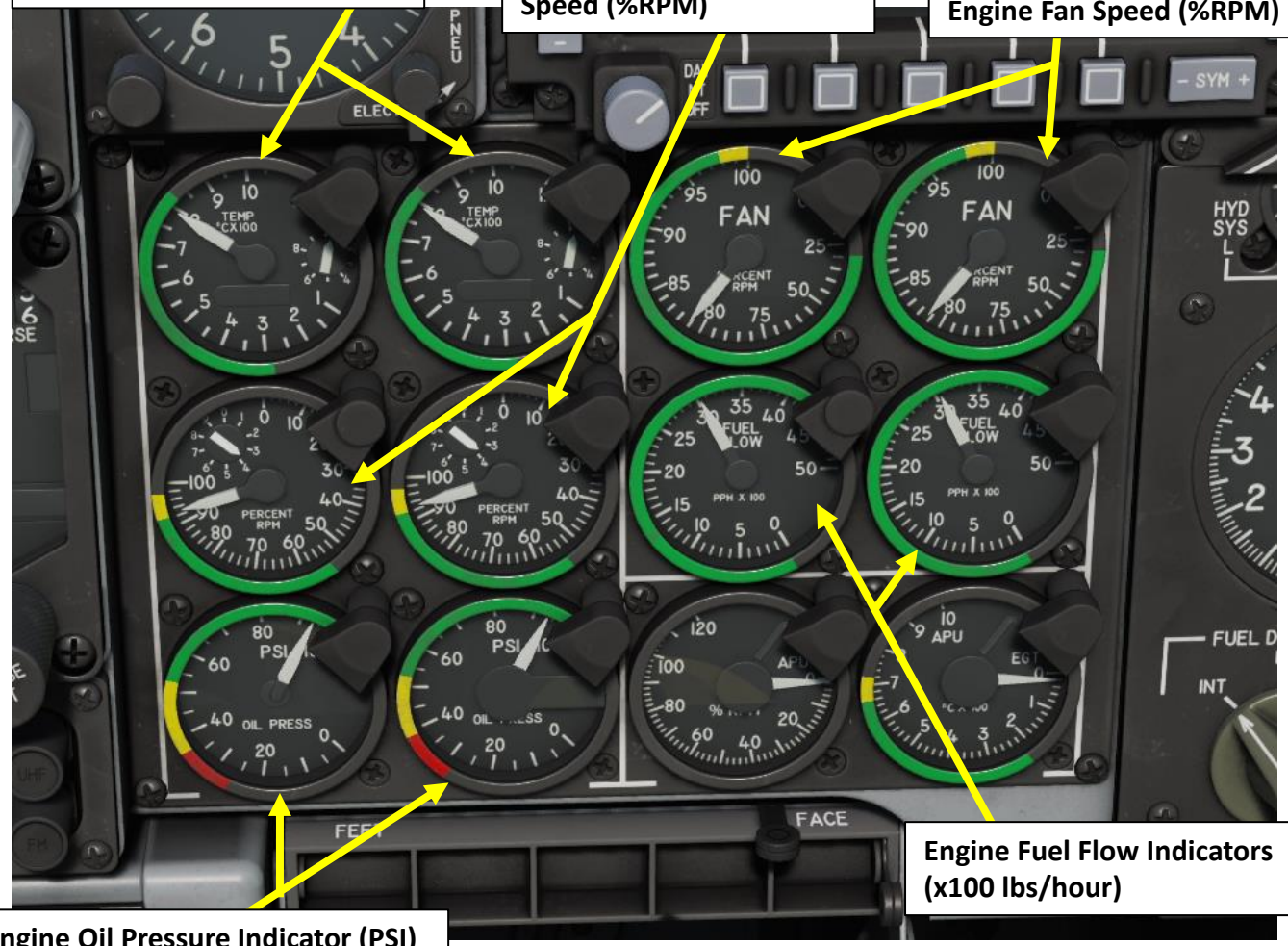
The TF-34-GE-100A engines of the A-10C are placed in a rather unusual configuration: they are mounted high on the rear fuselage between the wings and the rear stabilizers. The vertical stabs provide additional protection against small arms fire: it is an intelligent design choice when you consider the fact that the A-10C is a ground-pounder and sometimes has to go pretty close to provide accurate close air support (CAS) to the troops on the ground.

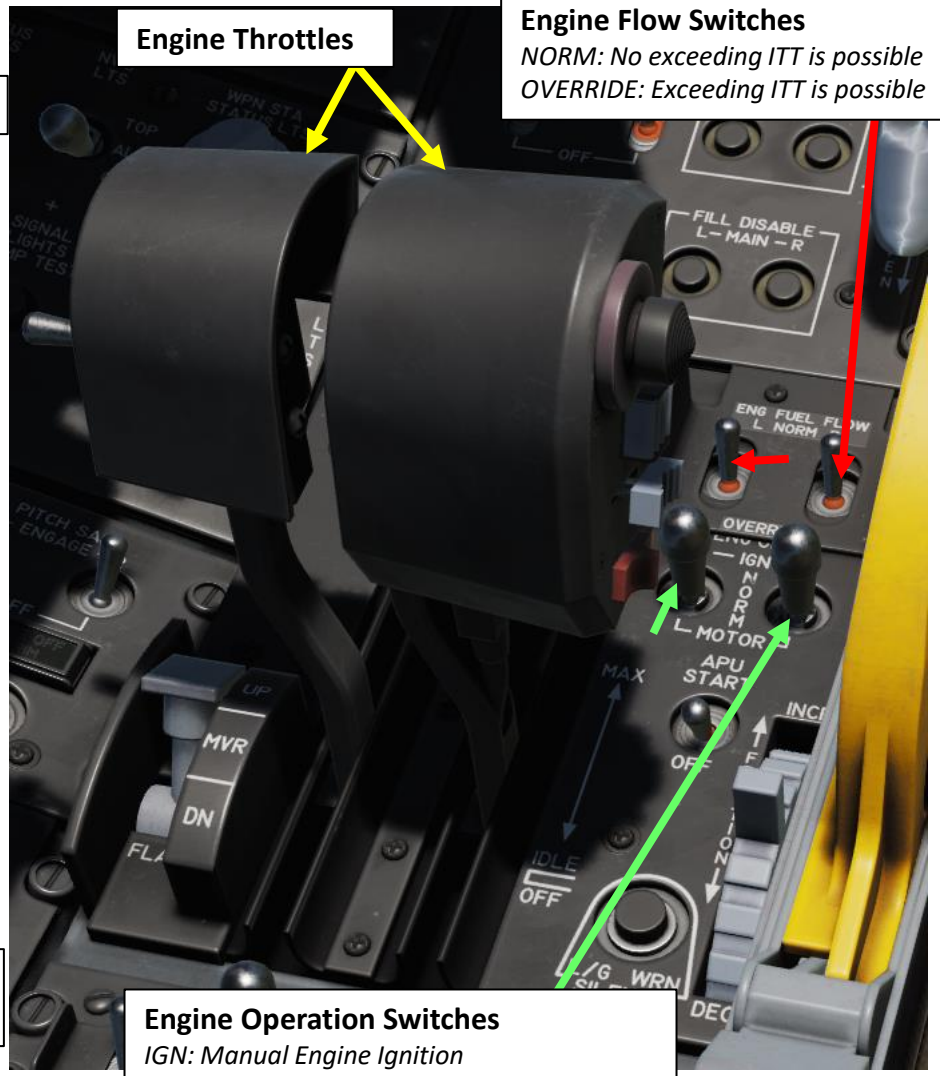
Some of the advantages are quite interesting:

- The high mounting reduces the likelihood of the engines ingesting Foreign Object Debris (FOD) when operating from rough, forward bases in war-time.
- Engines can remain running when aircraft is being rearmed and refueled. This leads to faster mission turn-around.
- Ease of servicing the engines.
- Reduced IR signature from below due to the shielding of the horizontal stabilizer.

ENGINE CONTROLS & PARAMETERS

Here is an overview of engine parameters.



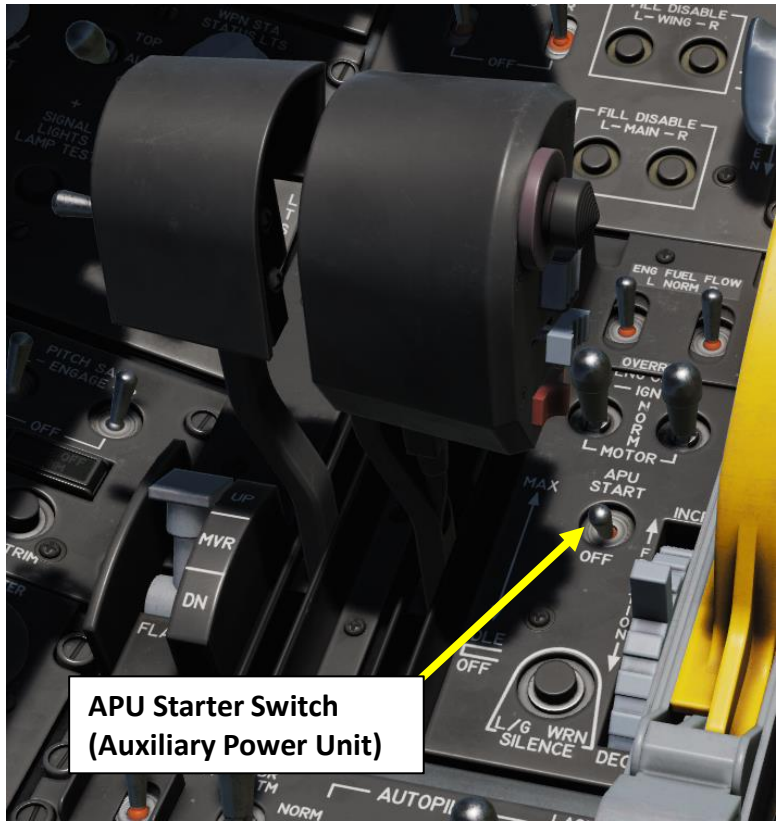


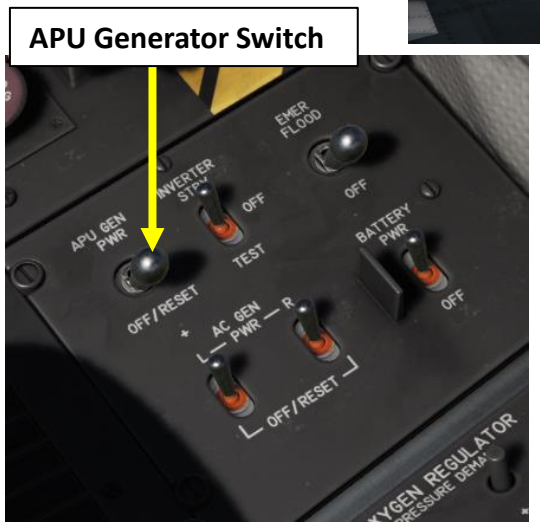
APU (AUXILIARY POWER UNIT)

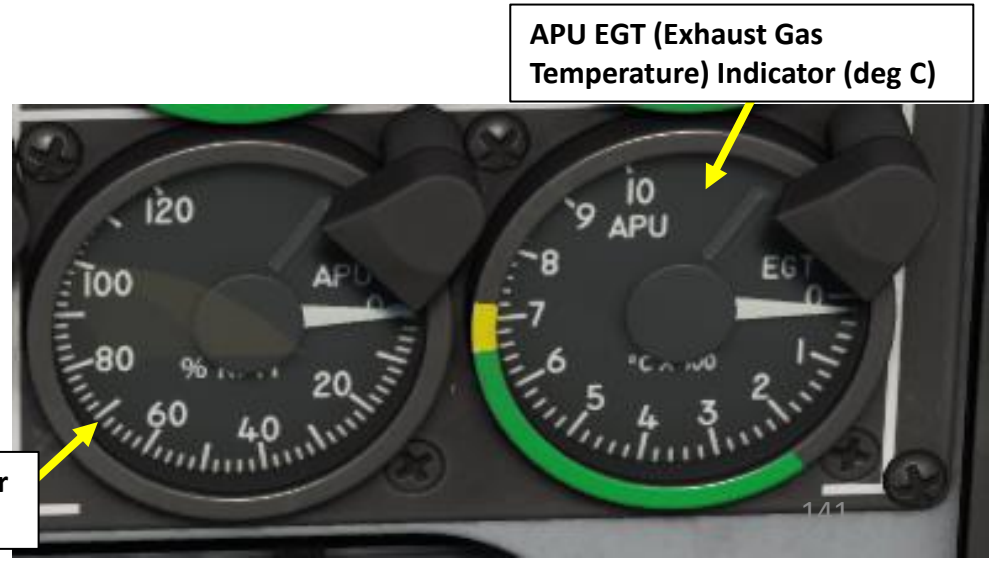
Located in the rear fuselage between the engine mounts is the APU (Auxiliary Power Unit).

The APU is a small engine in itself and draws fuel to run. When running, the APU supplies compressed air to turn the compressor fans to start the engines. The APU also drives an electrical generator and a hydraulic pump.

Once both engines are started and their generators enabled, the APU and APU generator can be shut down. You would only need to use the APU again in case of an engine re-start.







ENGINE & APU LIMITS

Here is an overview of engine parameters limits as per the Eagle Dynamics user manual.

Engine Oil Pressure:
- Maximum: 95 psi
- Normal IDLE range: 55 to 85 psi
- Acceptable when core RPM is 85 %: 40 to 55 psi
- Minimum Pressure: 40 psi

Engine Core Speed:
- Engine operation should not exceed 102 %
- Engine operation between 100 and 102 % should not exceed 3 seconds
- Normal operating range should be between 56 and 98 %

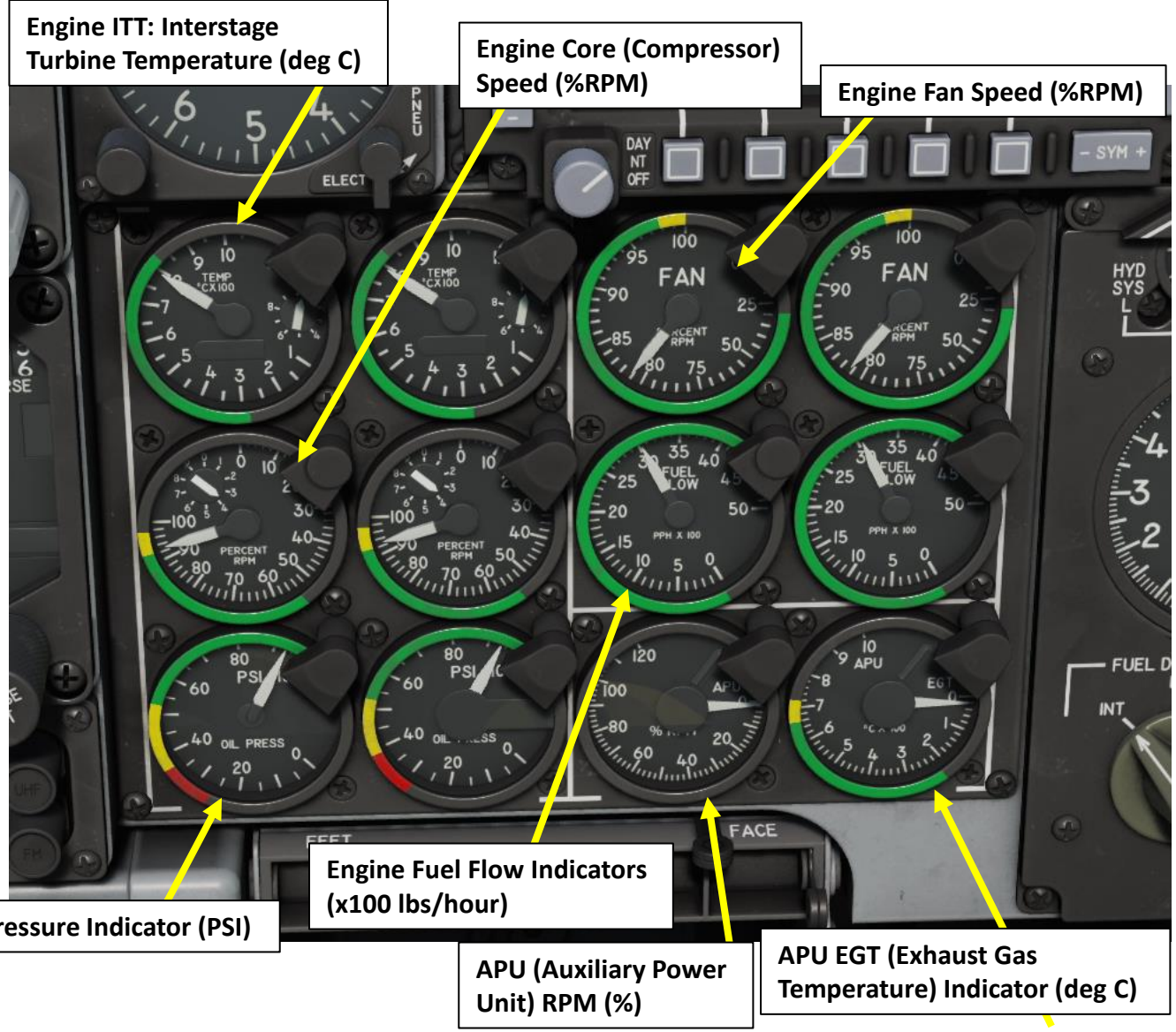
Engine Fan Speed:
- Normal operation is approx 82 % at takeoff

Engine ITT (Interstage Turbine Temperature):
- Stabilized temperature above 865 deg C indicates engine malfunction
- A short period at 900 deg C is possible during engine start
- Normal operating range is between 275 and 865 deg C

Engine Fuel Flow:
- Normal fuel flow is between 1500 and 410 pph (lbs per hour)

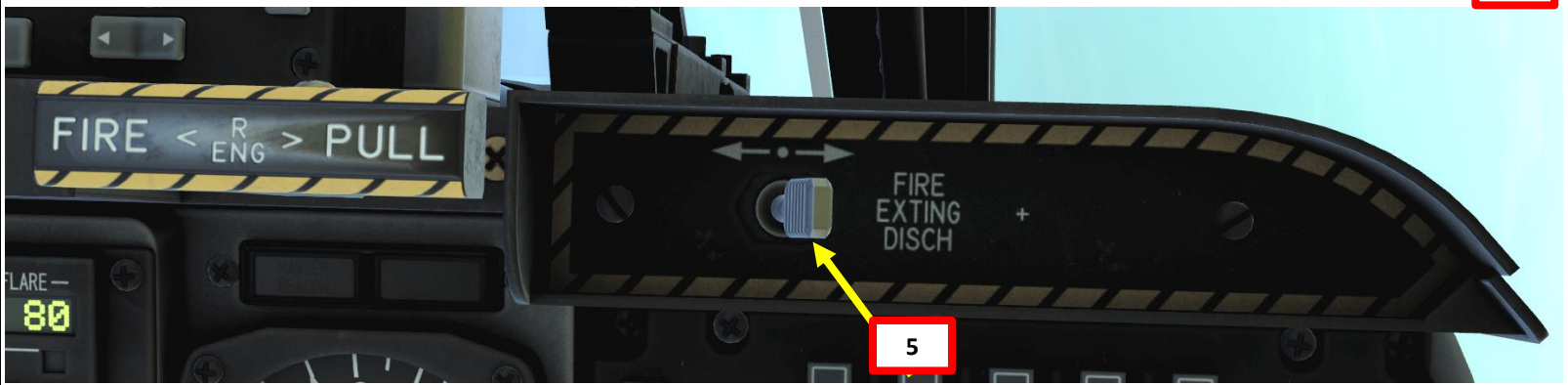
APU (Auxiliary Power Unit) EGT (Exhaust Gas Temperature):
- Normal operation between 200 and 715 deg C
- Maximum at engine start for two seconds is 760 deg C

APU (Auxiliary Power Unit) RPM:
- Normal operation at 100 %
- Maximum operation at 110 %
- Engine start minimum of 60 %



ENGINE FIRE EMERGENCY PROCEDURE

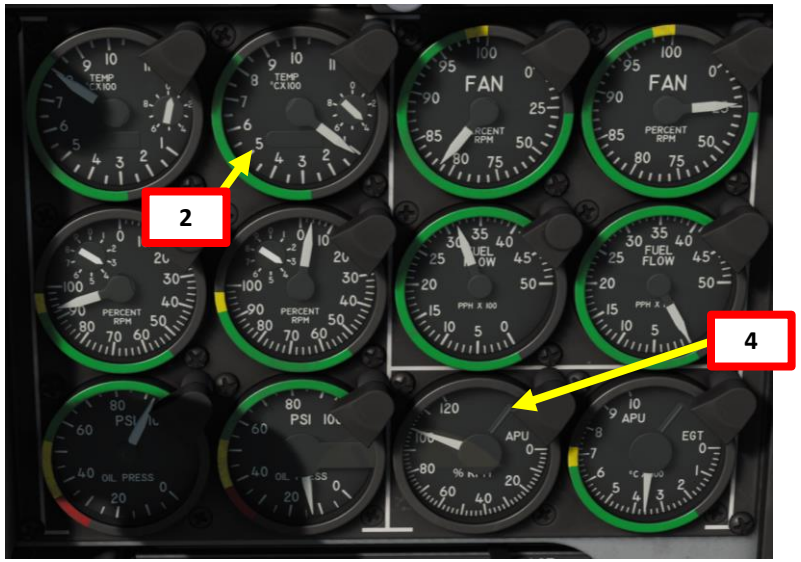
1. An engine fire is detected when one of the T-shaped fire handles illuminate.
2. Reduce power to affected engine and monitor if the fire light goes out.
3. Set the throttle of the affected engine to OFF (RALT+END for left engine, or RCTRL+END for right engine).
4. Pull the fire handle of the affected engine (or APU if APU fire is detected) to close its respective fuel shutoff valve.
5. Set the Fire Extinguisher Agent Discharge switch either left or right (there are two extinguisher agent bottles).
6. Keep in mind that using the fire extinguisher chemical agent may very well prevent the engine from being restarted.

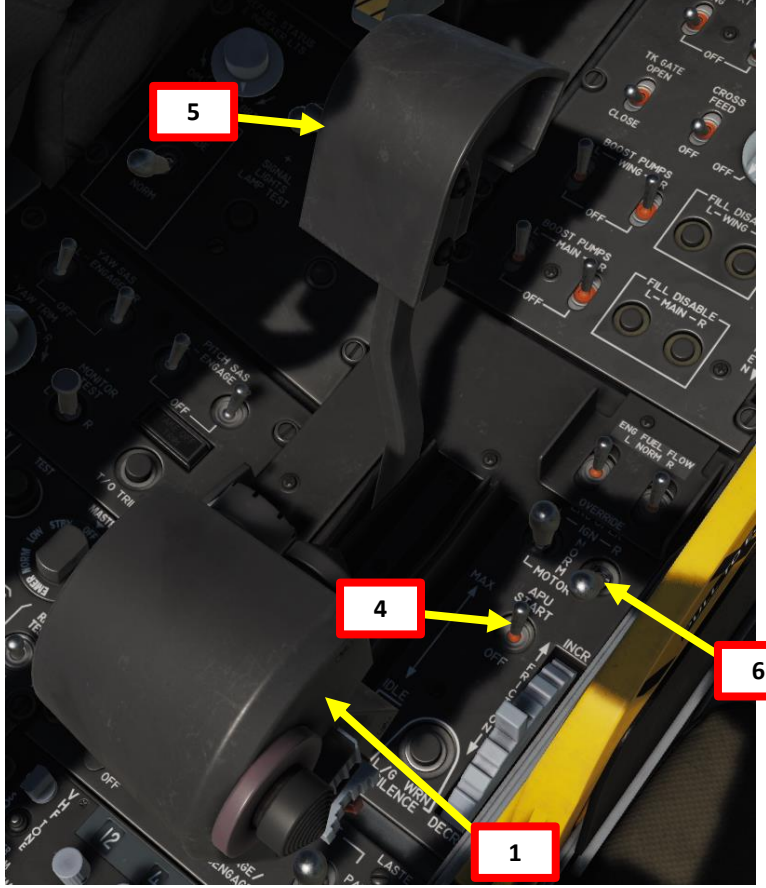


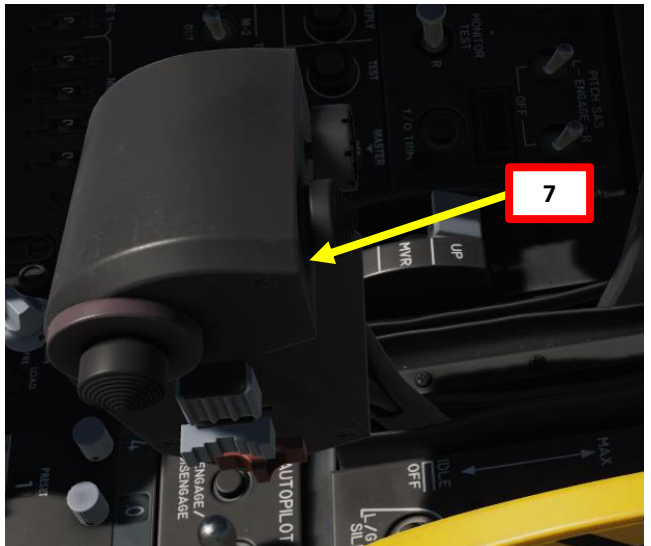
ENGINE RELIGHT PROCEDURE – APU-ASSISTED

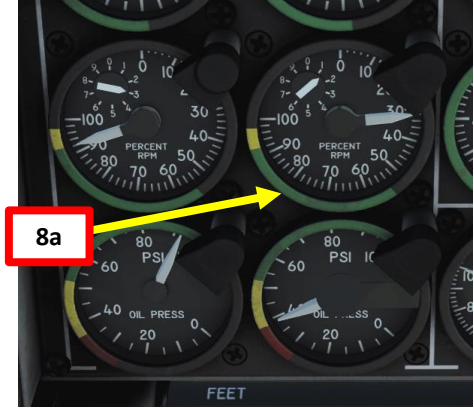
Remember you can't start your engines via APU (Auxiliary Power Unit) above 18000 ft. To perform an APU-assisted engine restart:

1. Move the inoperative engine throttle to the OFF position.
2. Observe that the shut down engine ITT value cools down rapidly.
3. Aircraft altitude should be below 20,000 ft MSL and increase airspeed.
4. When below 15,000 ft MSL, move the APU power switch to the START position. Wait until APU RPM reaches 100 %.
5. Move the still operating throttle to MAX.
6. Set the Engine Operate switch of the affected engine to the MOTOR setting (AFT).
7. When affected engine ITT is below 100 °C and altitude below 15,000 ft MSL, restart the affected engine by moving the throttle from OFF to IDLE (RALT+HOME for left engine, or RCTRL+HOME for right engine).
8. Engine dry motoring will start (core speed will increase to 20-30%). To allow engine ignition and fuel flow, move the Engine Operate switch of the affected engine back to the NORM position.
9. If engine restart is successful, reengage the SAS switches and set engine operate switch back to NORM.





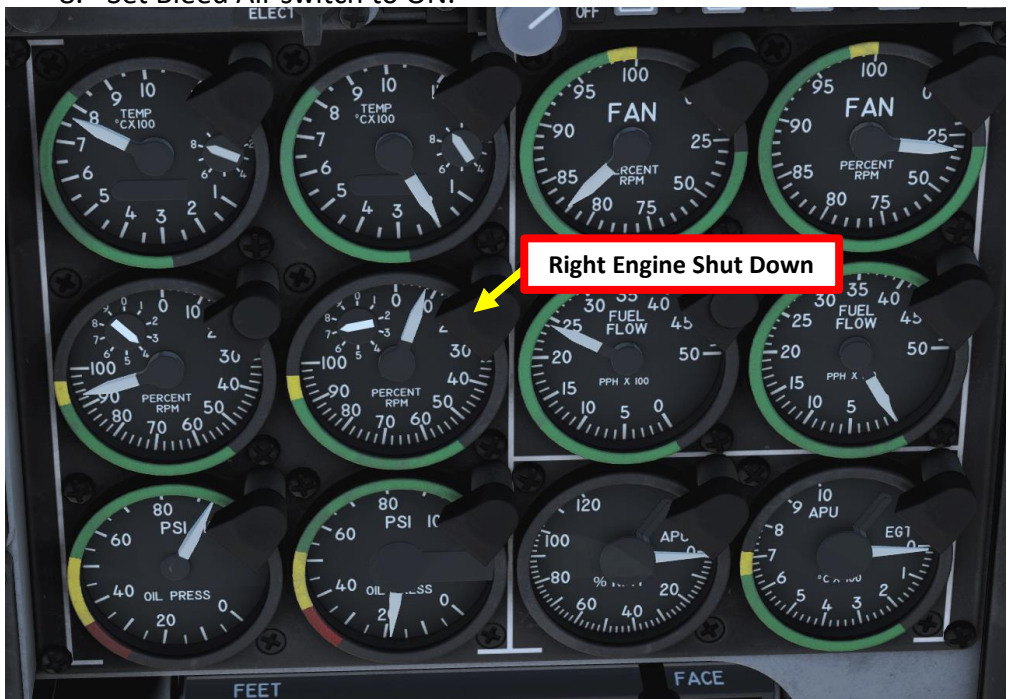


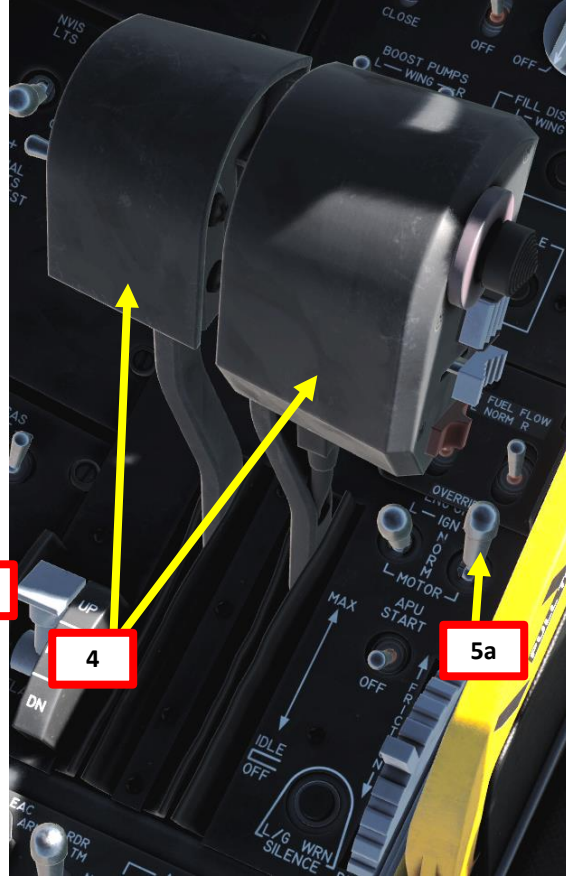


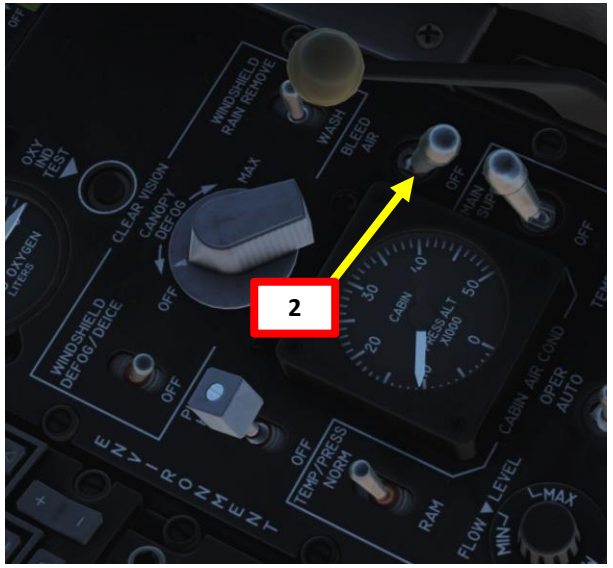
ENGINE RELIGHT PROCEDURE – WINDMILLING

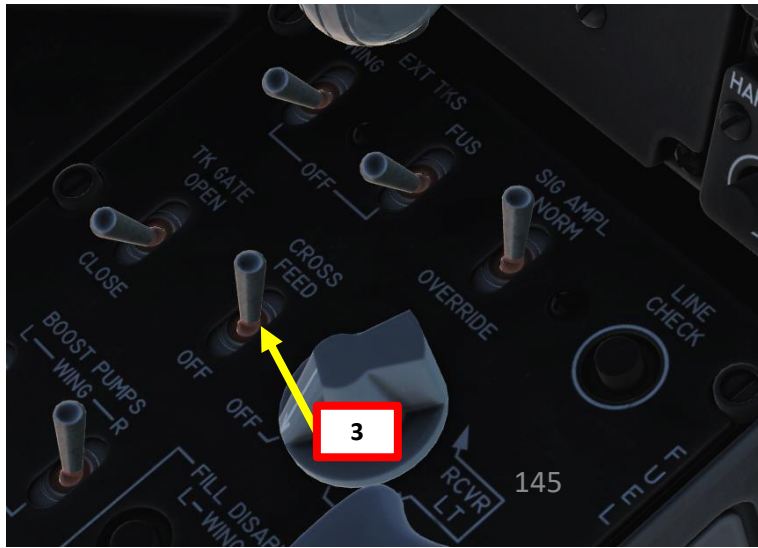
A “windmilling” engine start is an engine start performed with air flow driving the engine compressor blades. Using a windmill start will take 6,000 to 8,000 ft to complete because it requires a steep dive of at least 30-degrees. Given the altitude requirement, this is not an option when below 10,000 ft AGL. To perform a windmill engine restart:

1. Place the aircraft in a 30-degree dive to maximize airspeed during the dive.
2. Set the Bleed Air switch to OFF.
3. Set the Crossfeed switch to CROSSFEED. This will link the two fuel systems and allow boost pumps to feed both engines.
4. Once ITT of affected engine is below 150 °C, set both throttles to MAX.
5. Set and hold the Engine Operate switch of the affected engine to IGN until engine ignition occurs.
6. Once engine is operating, move Engine Operate switch back to NORM.
7. Move Crossfeed switch to OFF.
8. Set Bleed Air switch to ON.





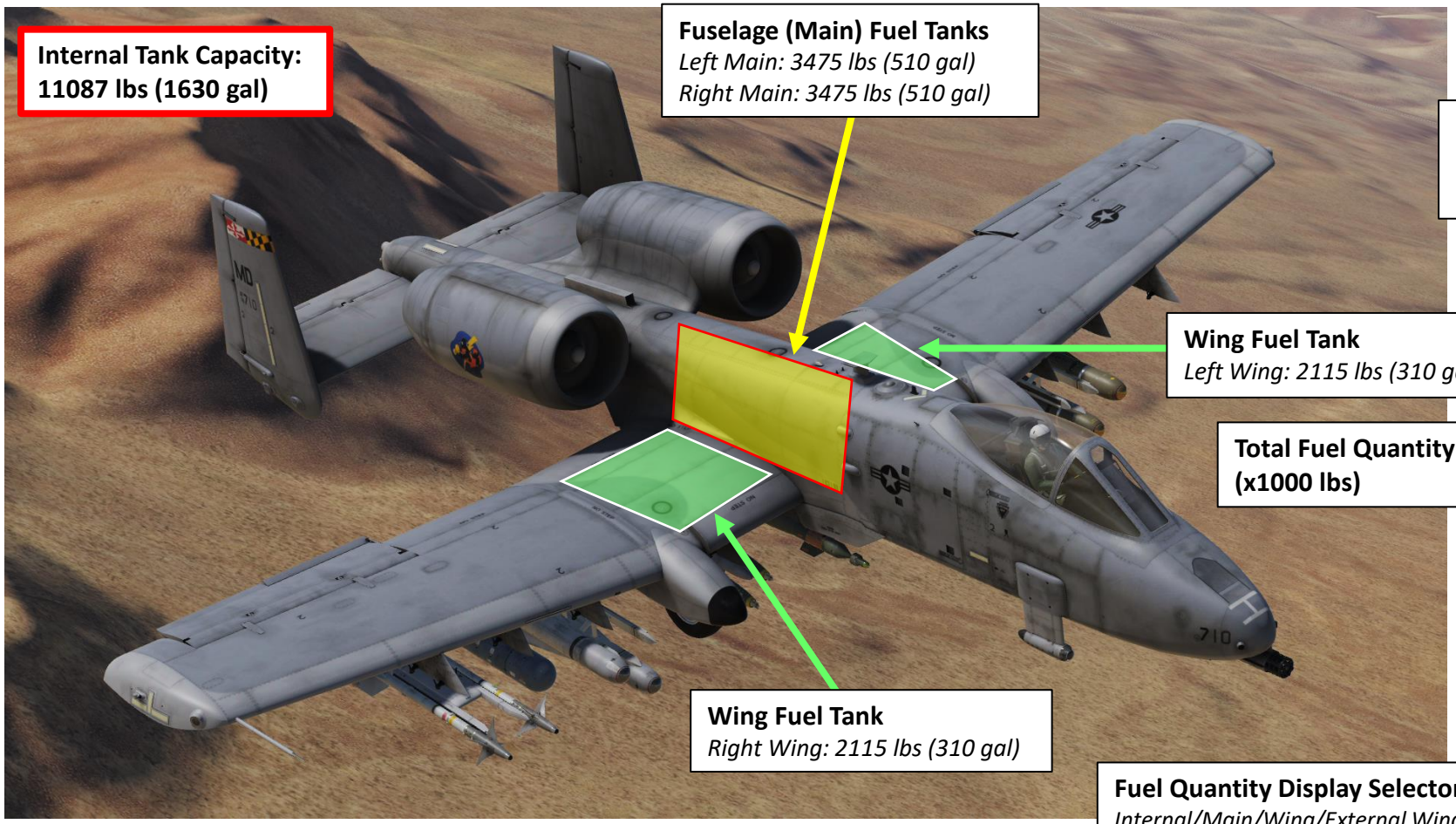




FUEL SYSTEM OVERVIEW

The fuel storage system for the A-10C consists of left and right internal wing tanks and right and left fuselage tanks. The right side fuel tanks feed the right engine and the left side tanks feed the left engine and APU. To provide fuel pressure, each tank has a co-located boost pump. Due to differing boost pump pressures, the wing tanks will automatically empty before the fuselage tanks. Wing and Fuselage tanks are self-sealing and filled with a flexible foam to prevent a fuel tank explosion.

For negative G flight, the A-10C has collector tanks that will supply the engines with sufficient fuel for 10 seconds of operation at MAX power. **If you fly at negative G for more than 10 seconds, you risk the engines shutting down due to lack of fuel supply**.

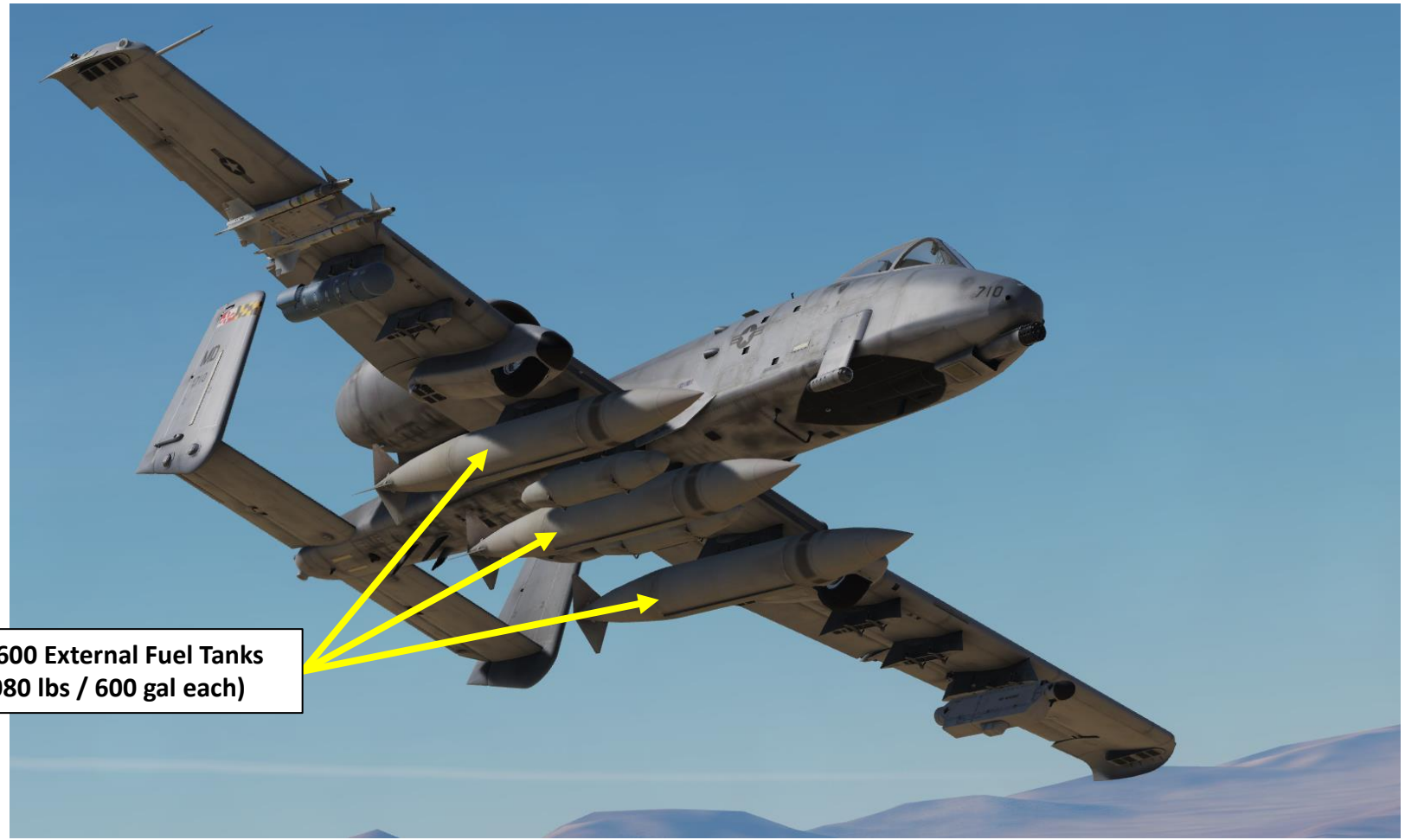


FUEL SYSTEM OVERVIEW

Additionally, the aircraft can be loaded with up to three 600 gallon external fuel tanks (TK600 external store). Fuel readings on external tanks require the FUEL DISPLAY SEL switch to be set to either EXT WING or EXT CTR depending on where the fuel tanks are installed.

The TK600 external fuel tanks can be carried on stations 4, 6 and 8. The fuel tank is unarmored and has no self-sealing capability. As such, this fuel tank is only carried during ferry missions and is never flown with in combat.

To jettison external tanks, see the “Jettison Ordnance” tutorial sub-section in the Weapons section.



Fuel Quantity Display Selector
Internal/Main/Wing/External Wing/External Centerline

FUEL SYSTEM OVERVIEW

Fuselage EXT TKS Switch
Transfer fuel from external fuselage tank

Signal Amplifier Switch
(not functional)

Exterior Lighting Brightness Control Knob
Used to help during aerial refueling

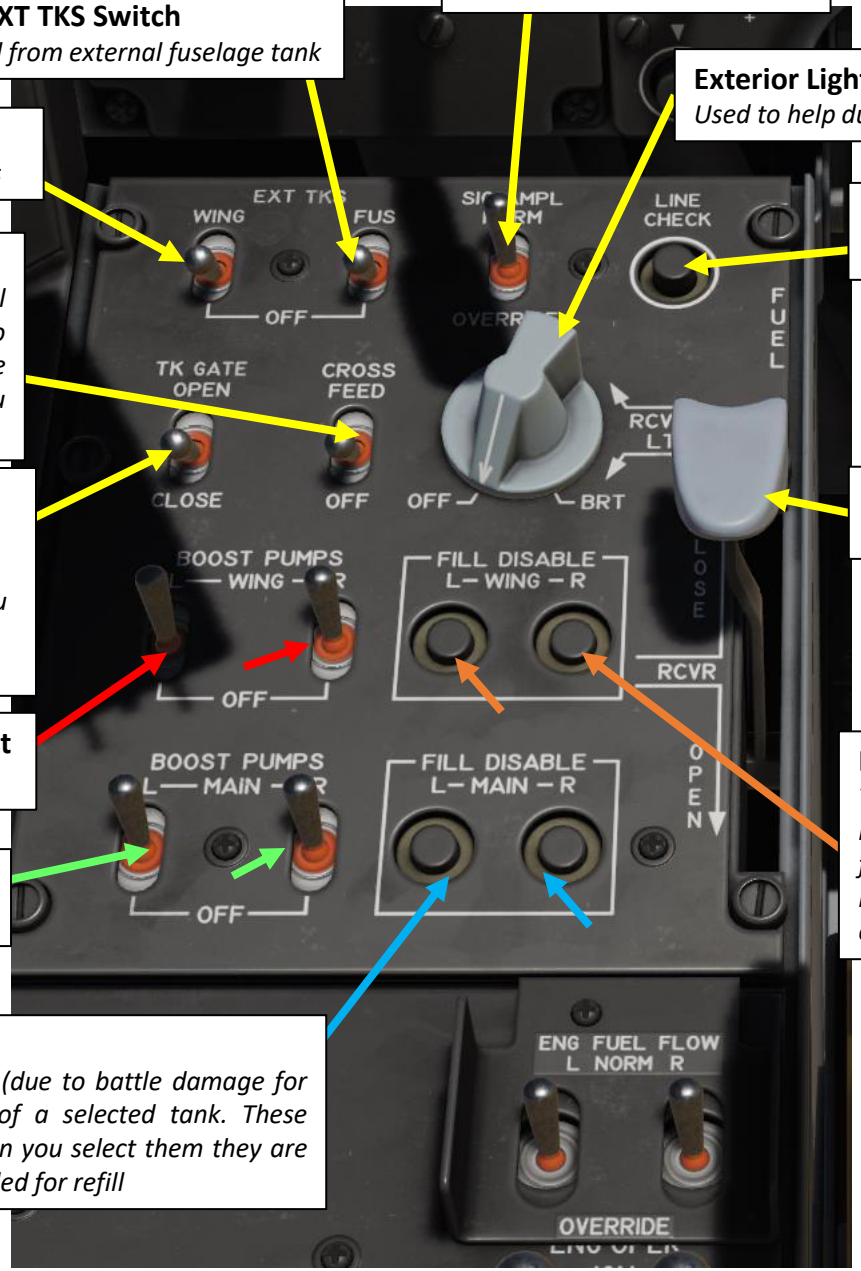
Wing EXT TKS Switch
Transfers fuel from external wing tanks

Fuel Line Check Button
(not functional)

Fuel Crossfeed Switch
Although the A-10C fuel system is designed with two parallel fuel systems, setting the Crossfeed switch to CROSSFEED will link the two fuel systems and allow the boost pumps to feed both engines. If the Crossfeed switch is set to OFF, both fuel systems are isolated. You would most often use Crossfeed when one of the boost pumps fails.

Internal Fuel Tank Gate Open/Close
Linking the left and right main fuel tanks is a transfer valve that may be opened by setting the TK GATE switch to the OPEN position. Setting this switch to CLOSE will isolate the two tanks from each other. Generally you will want to keep this switch disabled as being enabled can lead to fuel center of gravity problems

Air Refueling Door Control Lever
Open/close refueling port slipway door



Wing Fuel Tank Boost Pump Switches

Main Fuel Tank Boost Pump Switches

Fill Wing Fuel Tank Disable
To disable the filling of the wing internal tanks (due to battle damage for instance), you can elect to disable filling of a selected tank. These switches act like circuit breakers in that when you select them they are pulled out and the selected tank will be disabled for refill

Fill Main Fuel Tank Disable
To disable the filling of main internal tanks (due to battle damage for instance), you can elect to disable filling of a selected tank. These switches act like circuit breakers in that when you select them they are pulled out and the selected tank will be disabled for refill

THE MYSTERY OF THE HUD AND MULTI-FUNCTION COLOR DISPLAYS

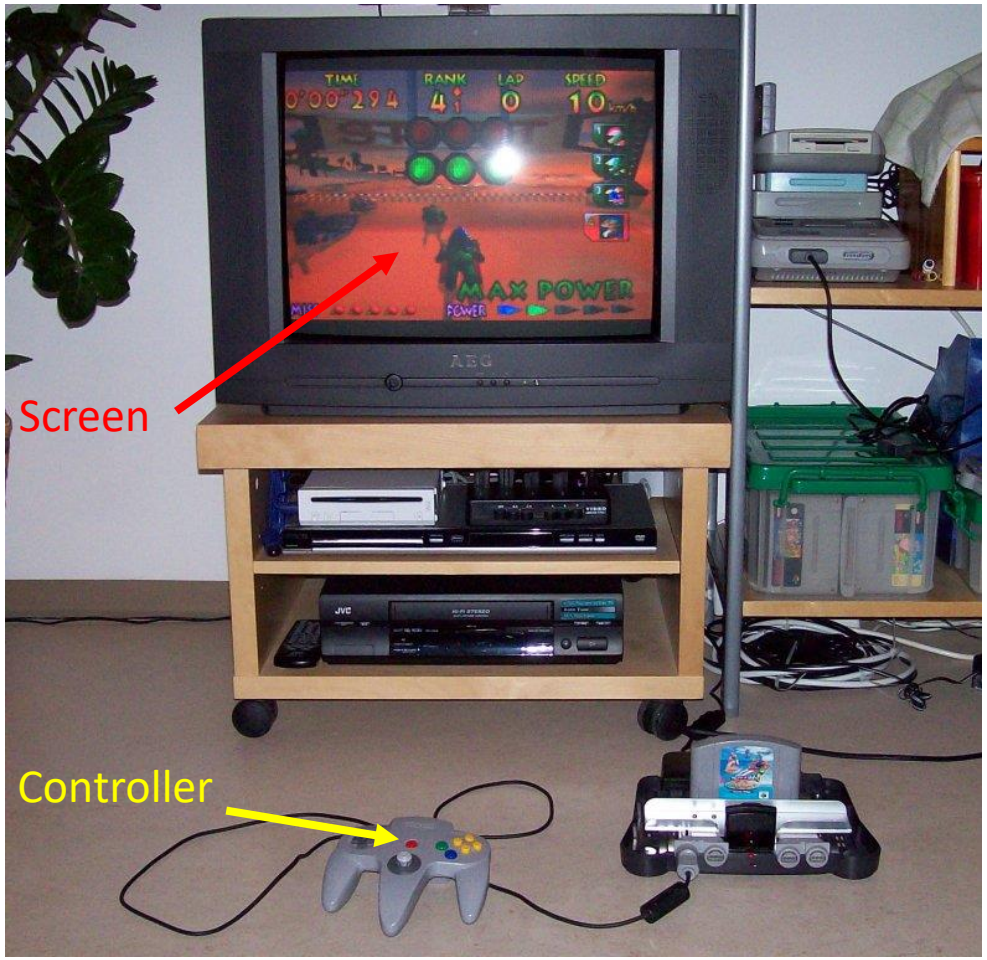
The MFCDs (Multifunction Color Display) often seem to confuse new pilots. It is hard to go from a prop plane to an aircraft that works just like a computer, isn't it? So many different programs, so many switches, so many settings… It is easy to feel at a loss when you have no idea what is under the hood.

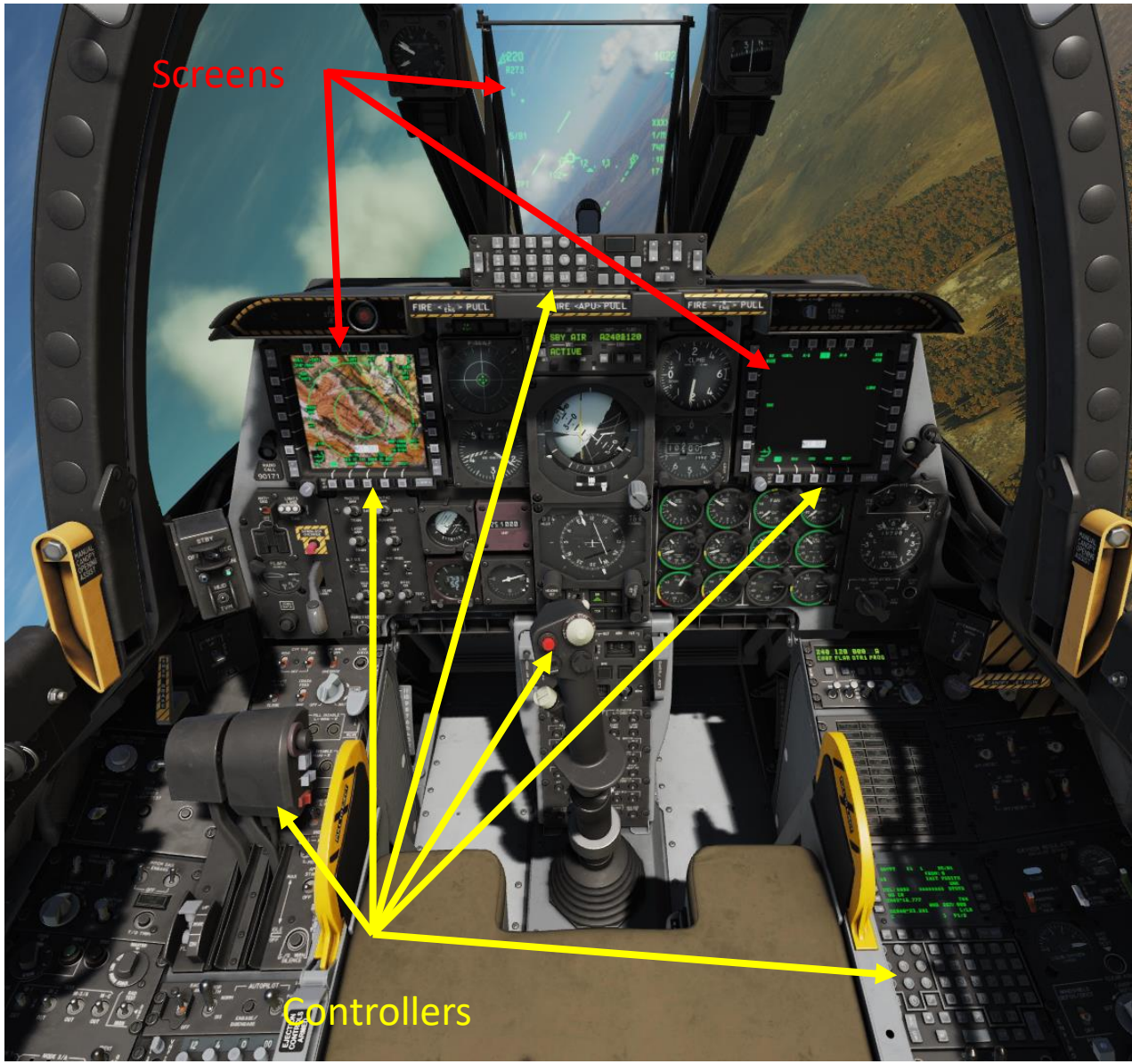
The trick in understanding how the HUD and MFCDs work is to think of them like computer monitors. In fact, it works almost exactly like a computer. While you are having Google Chrome, Itunes, Word and other programs running simultaneously on a single screen, you can switch between different windows, right? Well, this time you're flying an A-10C, not a PC or a Mac. The **TAD, TGP, MAV, CDU and DSMS** are all different systems that can run at the same time (just like the computer programs and apps a la Candy Crush that you use in your everyday life). The MFCDs can only "display" two system interfaces at once, though… it kind of makes sense since you only have two screens, doesn't it? Just like in a computer, you can choose what you want to show on any screen.

A computer screen is pretty, but it is useless if you cannot use it. This is why you have a mouse and keyboard. However, the A-10C does not have a mouse and keyboard: instead, it has sets of grey OSBs (Option Select Button) around each MFCD, a UFC (Up Front Controller) on your front dash, another keyboard next to your CDU (Control Display Unit) on the right console and it has a HOTAS (Hand On Throttle-and-Stick), which are the fancy buttons on your joystick and throttle.

With the **HOTAS, UFC, CDU keyboard and OSBs**, you can easily control your systems. It's like having an old Nintendo 64 controller: if you want to play, you need to know how to use it properly.

THE MYSTERY OF THE HUD AND MULTI-FUNCTION COLOR DISPLAYS





HOTAS: HOW TO USE IT

The philosophy of concept of “Hands on Throttle-and-Stick” (HOTAS) is that you can access the majority of your systems by keeping on hands on your throttle and your joystick 99 % of the time.

These controls are ESSENTIAL to remember!

- **TMS SWITCH: Target Management System**
  - **Typically used to lock on targets and set your SPI…**
- **DMS SWITCH: Data Management Switch**
  - **Used to zoom in/out, cycle through waypoints or weapons…**
- **SLEW CONTROL**
  - **Used to control where your Sensor of Interest (SOI) is looking**
- **COOLIE HAT**
  - **Controls DSMS (what weapons you want to use), swaps MFCD screens (like an ALT+TAB), lets you pick a Sensor of Interest (SOI), etc…**
- **BOAT SWITCH**
  - **Cycle through different FLIR (forward looking infrared) camera modes**
- **CHINA HAT**
  - **Set different FOV (field of view) angles and slave all sensors to your SPI (your cameras and missiles will be looking at where you tell them to look, like a target)**

Based on what sensor is selected (SOI), these switches will do different things.

Not only do these switches **do different things based on your Sensor of Interest**, but they also do different things based on **how long you hold the switch.**

For example, TMS UP LONG means that you press the TMS switch UP for 1 to 3 seconds. DMS RIGHT SHORT means that you press the DMS switch RIGHT for a very short duration of time (less than 1 second), or like a simple button press.

HOTAS STICK CONTROLS SUMMARY (A-10C LEGACY)

A-10C Legacy Only

1. **Master Mode Control Button (MMCB).** Functions according to SOI include:

Duration	TAD	TGP	HUD	AIM-9	MAV
Short	Toggle HUD				
Long	Air-to-Air Mode				

2. **Data Management Switch (DMS).** Functions according to SOI include:

Direction	Duration	TAD	TGP	HUD	AIM-9	MAV
Forward	Short	TAD Scale Increase	Zoom Increase	Steerpoint Increment		Reticle Up
Aft	Short	TAD Scale Decrease	Zoom Decrease	Steerpoint Decrement		Reticle Down
Left	Short		FLIR Auto Focus	Gunsight Cycle	A-A Target Toggle	Reticle Left
Left	Long	Broadcast SPI				
Right	Short	Center/ Depressed Mode	Laser Toggle	Gunsight Cycle	A-A Target Toggle	Reticle Right
Right	Long		LSS Toggle			

3. **Target Management Switch (TMS).** Functions according to SOI include:

Direction	Duration	TAD	TGP	HUD	AIM-9	MAV
Forward	Short	Hook	Track Toggle	Stabilize	Scan	Track
Forward	Long	Make SPI				
Aft	Short	Un-hook	INR Track	Set SPI Submode	Break Lock	Ground Stabilize
Aft	Long	SPI to Steerpoint				
Left	Short	Reset WCN				
Left	Long					Space Stabilize
Right	Short	Markpoint				
Right	Long					

4. **Nosewheel Steering (NWS) Button.** Functions according to SOI include:

	TAD	TGP	HUD	AIM-9	MAV
On Ground	NWS				
In Air	Lase / AR disconnect				

5. **Countermeasures Switch (CMS).** Functions according to SOI include:

	TAD	TGP	HUD	AIM-9	MAV
Forward	Start Program				
Aft	End Program				
Left	Previous Program				
Right	Next Program				
Down / Z-axis	Activate ECM				

6. **Weapon Release Button.** Functions according to SOI include:

TAD	TGP	HUD	AIM-9	MAV
Release Weapon				

Note: For some weapons like JDAM and laser-guided bombs, you will need to hold down the weapon release button for a full one second.

7. **Trim Switch.** Functions according to SOI include:

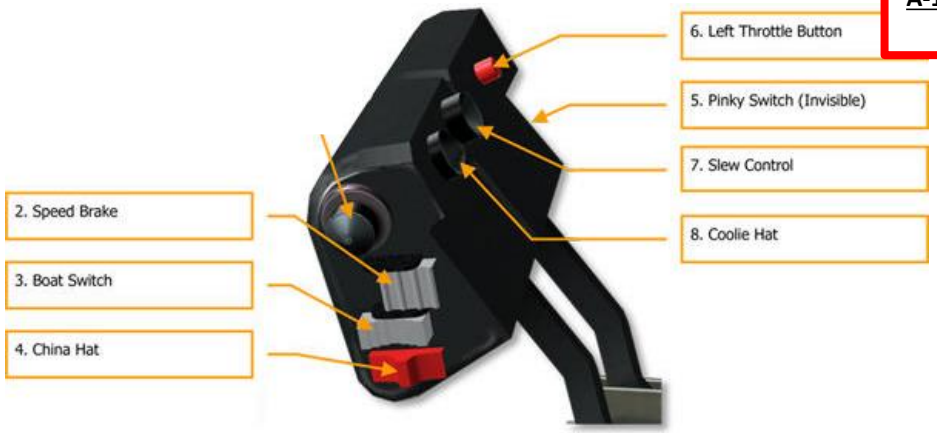
	TAD	TGP	HUD	AIM-9	MAV
Forward	Trim Pitch				
Aft					
Left	Trim Roll				
Right					

8. **Trigger.** Functions according to SOI include:

TAD	TGP	HUD	AIM-9	MAV
Fire Cannon				

HOTAS THROTTLE CONTROLS SUMMARY (A-10C LEGACY)

A-10C Legacy Only



1. **Mic Switch**. Functions according to SOI include:

Direction	TAD	TGP	HUD	AIM-9	MAV
Forward	VHF 1 Transmit				
Aft	VHF 2 Transmit				
Up					
Down	UHF Transmit				

2. **Speed Brake**. Functions according to SOI include:

Direction	TAD	TGP	HUD	AIM-9	MAV
Forward	Retract Brakes				
Center	Hold Brake Position				
Aft	Extend Brakes				

3. **Boat Switch**. Functions according to SOI include:

Direction	TAD	TGP	HUD	AIM-9	MAV
Forward		FLIR BHOT			Black Symbols
Center		CCD			Force Correlate / AUTO
Aft		FLIR WHOT			White Symbols

4. **China Hat**. Functions according to SOI include:

Direction	Duration	TAD	TGP	HUD	AIM-9	MAV
Forward	Short	FOV EXP Toggle	FOV Wide / NARO Toggle	Set MAV as SOI	Uncage	FOV Toggle
	Long	Slave all to SPI			Slave AIM-9 to TGP LOS	Slave all to SPI
Aft	Short	Reset Cursor	Boresight TGP	Cage TDC to TVV	Missile Step	
	Long	Slave TGP to Steerpoint				

5. **Pinky Switch**. Functions according to SOI include:

Direction	TAD	TGP	HUD	AIM-9	MAV
Forward	Default External Lights				
Center	Exterior lights off				
Aft	Lights according to Panel				

6. **Left Throttle Button**. Functions according to SOI include:

TAD	TGP	HUD	AIM-9	MAV
Toggle Autopilot				

7. **Slew Control**. Functions according to SOI include:

TAD	TGP	HUD	AIM-9	MAV
Slew TAD cursor	Slew TGP LOS	Slew TDC	Slew AIM-9 Seeker / Consent	Slew Maverick / Consent

8. **Coolie Hat**. Functions according to SOI include:

Direction	Duration	TAD	TGP	HUD	AIM-9	MAV
Up		HUD as SOI				
Down	Short	Swap MFCD Content				
	Long	DSMS Quick Look				
Left	Short	Cycle Left MFCD				
	Long	Set Left MFCD as SOI				
Right	Short	Cycle Right MFCD				
	Long	Set Right MFCD as SOI				

HOTAS STICK CONTROLS SUMMARY (A-10C II TANK KILLER)

A-10C II Tank Killer Expansion Only

Hotas Commands - Stick

Switch	Action		Selected SOI							
			TAD	TGP	HUD	A/A	MAV	HMCS	HMCS B/S	MSG
MMCB	Depress	Short	Toggle HUD							
		Long	Enter A/A							
DMS	FWD	Short	TAD Scale Decrease	Zoom & Focus Increase	Steerpoint Increment	Steerpoint Increment	MAV BS Rect UP	Brightness Increase	Text Rotate CCW	Change Shape
		Long	Map Quick Toggle				MAV BS Rect UP/ Gyro Stab			Drop Shape
	Aft	Short	TAD Scale Increase	Zoom & Focus Decrease	Steerpoint Decrement	Steerpoint Decrement	MAV BS Reticle Down	Brightness Decrease	Text Rotate CW	
		Long	Select TAD Center Option							
	Left	Short	CEN/DEP Mode CNTR Own	R MFCD Video on HMD	Gunsight Toggle Profile Toggle	Gunsight Toggle Profile Toggle	MAV BS Recticle Left	R MFCD Video on HMD	Boresight Roll CCW	
		Long	HMD ON/OFF							HMD ON/OFF
	Right	Short	Cycle TAD Center Option	Laser/IR Pointer Toggle	Gunsight Toggle Profile Toggle	Gunsight Toggle Profile Toggle	MAV BS Recticle Right	Cycle HMCS Profiles	Boresight Roll CW	
		Long	Slave TGP to HMCS LOS				Slave MAV to HMCS	Slave TGP to HMCS		Slave TGP to HMCS

Hotas Commands - Stick

Switch	Action		Selected SOI							
			TAD	TGP	HUD	A/A	MAV	HMCS	HMCS B/S	MSG
TMS	FWD	Short	Hook Symb under Cursor	Area/ Point/NR Track	TDC Ground Stabilize	Conical Scan	Track	Hook Symb under Crosshair	Compl BS Sett Occl Point	
		Long	Make Hooked Obj SPI	Make SPI				Make Hooked Obj SPI	Complete Occl Pt	
	Aft	Short	Un-Hook Symbol	FLIR Auto-Focus	IFFCC Wpns Sol SPI	Break Lock	Ground Stabilize	Un-Hook Symbol	Remove Occl Pnt	
		Long	Reset SPI to Current Steerpoint							
	Left	Short	Acknowledge W/C/N (includes message receipt ackn.)							
		Long	SPI Broadcast							
	Right	Short	Mark at TAD Cursor	Mark at TGP LOS	Mark at TGP	Mark at TGP	Mark at MAV LOS	Mark at HDC		
		Long	Make Last Markpoint SPI							
NWS	Ground		NWS Engage/Disengage							
	Air		Laser/IR Pointer HOT Fire and Toggle Fire							
		AR	AR Disconnect/Reset							
CMS	FWD	Short	1 Flare							
		Long	Next Program							
	Aft	Short	1 Chaff							
		Long	Previous Program							
	Left	Short	6 Flares							
	Right	Short	6 Chaff							
	Depress	Short	Activate/Deactivate Selected Program							
		Long	Activate/Deactivate ECM							

HOTAS THROTTLE CONTROLS SUMMARY (A-10C II TANK KILLER)

A-10C II Tank Killer Expansion Only

HOTAS Commands - Throttle

Switch	Action		Selected SOI							
			TAD	TGP	HUD	A/A	MAV	HMCS	HMCS B/S	MSG
Mic Switch	Fwd		Transmit Front Radio (Rotary = VHF)							
	Aft		Transmit Aft Radio (Rotary = Anything)							
	Up		No Transmit (Rotary = Anything)							
	Down		UHF							
Speed Brake	Fwd		Retract Speedbrakes							
	Aft		Extend Speedbrakes							
	Center		Hold Speedbrakes Position							
Boat Switch	Fwd		TGP FLIR Black Hot				MAV Dark/Cold Light/Hot	TGP FLIR Black Hot		
	Aft		TGP FLIR White Hot				MAV Light/Hot Dark/Cold	TGP FLIR White Hot		
	Center		TGP CCD				Boresight Forced Correlation Auto	TGP CCD		
China Hat	Fwd	Short	FOV Toggle	FOV Change LSS FOV Change	MAV Video/ MAV SOI	Uncage/ Consent to Self-Track	FOV Change	TGP FOV Change - LSS FOV Change		
		Long	Slave All to SPI							
	Aft	Short	Reset Cursor	LSS Toggle	Reset/Cage TDC to TVV	Recage/ Manual Sequence	Recage/ Manual Sequence	Reset/Cage HDC to Crosshair		
		Long	Slave TGP to Current Steerpoint							
Pinky Switch	Forward		Position Lights to DimSteady / Strobes OFF							
	Aft		Exterior Lights per Lighting Panel							
	Center		Black Out All Exterior Lights							
Left Throt Btn	De-press	Short	LAAP (Low Altitude Autopilot)							
		Long	Image Capture							
Slew/ Track	Slew		Slew TAD Cursor	Slew TGP	Slew TDC	Slew AIM-9	Slew MAV	Slew HDC	Slew Boresight	Slew Cursor
	Depress									
Coolie Switch	Up	Short	HUD as SOI							
		Long	Message Quick Look							
	Down	Short	HMCS as SOI							
		Long	Display DSMS Weapon Status Page & Selected Profile							
	Left	Short	Cycle Left MFCD Page							
		Long	Left MFCD as SOI							
	Right	Short	Cycle Right MFCD Page							
		Long	Right MFCD as SOI							

SECTION STRUCTURE

- 1 - Sensors
  - 1.1 – Introduction to Sensors
  - 1.2 – Sensors Display Selection (SOI, SPI)
  - 1.3 – HUD (Heads-Up Display) & TDC
  - 1.4 – TISL (Target Identification Set, Laser)

- 2 - AN/AAQ-28 LITENING Targeting Pod
  - 2.1 – Introduction
  - 2.2 – Displays
  - 2.3 – Controls
  - 2.4 – Start-Up & Lasing Procedure
  - 2.5 – Slaving TGP to a Steerpoint
  - 2.6 – Boresight Function
  - 2.7 – Laser Spot Search (LSS) Mode
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  - 4.3 – HMCS Symbology
    - 4.3.1 – Basic HMD Symbology
    - 4.3.2 – Navigation HMD Symbology
    - 4.3.3 – Unit HMD Symbology
    - 4.3.4 – Designation HMD Symbology
    - 4.3.5 – Targeting Pod HMD Symbology
  - 4.4 – HMCS Controls
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    - 4.5.1 – Hooking HMD Symbols
    - 4.5.2 – Creating a SPI (Sensor Point of Interest) via HMCS
    - 4.5.3 – Targeting Pod Slaving to LOS (Line-of-Sight) via HMCS
    - 4.5.4 – Markpoint Creation via HMCS

1 – SENSORS

1.1 – INTRODUCTION TO SENSORS

The A-10C Warthog is by definition one of the most versatile aircraft when it comes to armament and sensors. Here is an overview of how the Warthog can "see" the outside world.

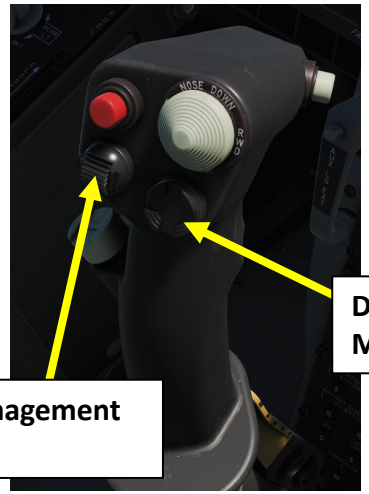
- **AN/AAQ-28 LITENING Targeting Pod**: Targeting system developed to provide precision strike capability. Target designation is achieved by using a laser designator/range finder or an infrared laser marker, which can be created by the pod itself. It is also capable of displaying a FLIR (Forward-Looking Infrared) thermal imagery.

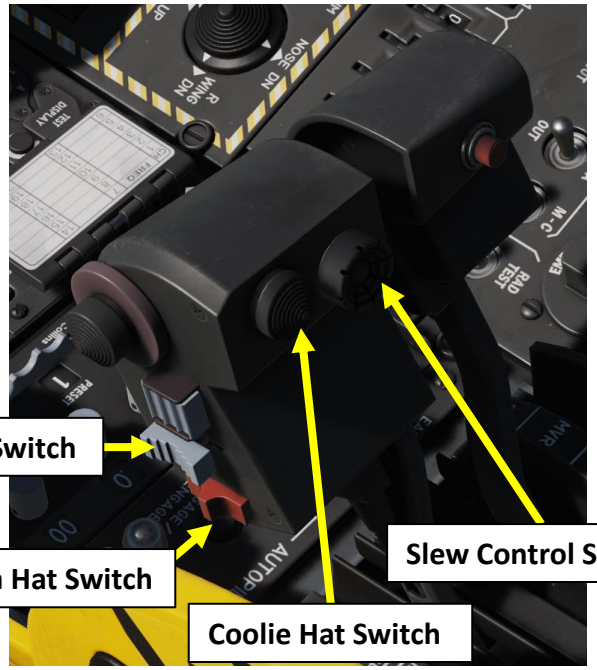
- **AMG-65 IR Maverick** Seeker Head feed: Maverick air-to-ground missiles have seeker heads that have video capability and that can be used as supplemental sensors.

1 – SENSORS

1.1 – INTRODUCTION TO SENSORS

This section will introduce you to various sensors. You will get the « what », but the « how » will be demonstrated later in the Weapons section since the use and application of sensors will make more sense to you once you start using them for a specific purpose. Just keep in mind that your sensors can be monitored from the HUD (Heads-Up Display) and various displays, while they can be operated from the HOTAS stick and throttle.





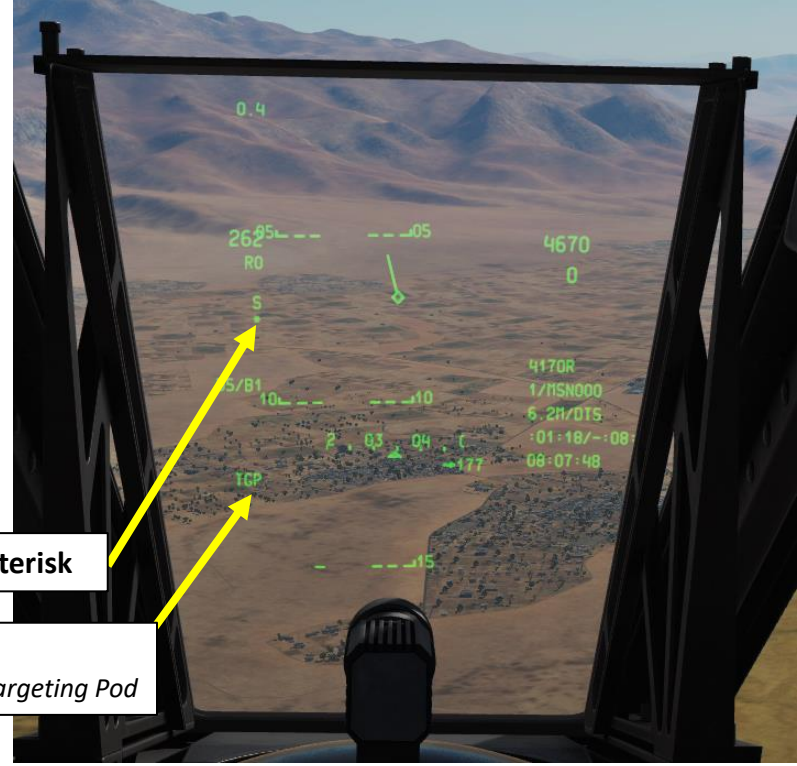
1 – SENSORS

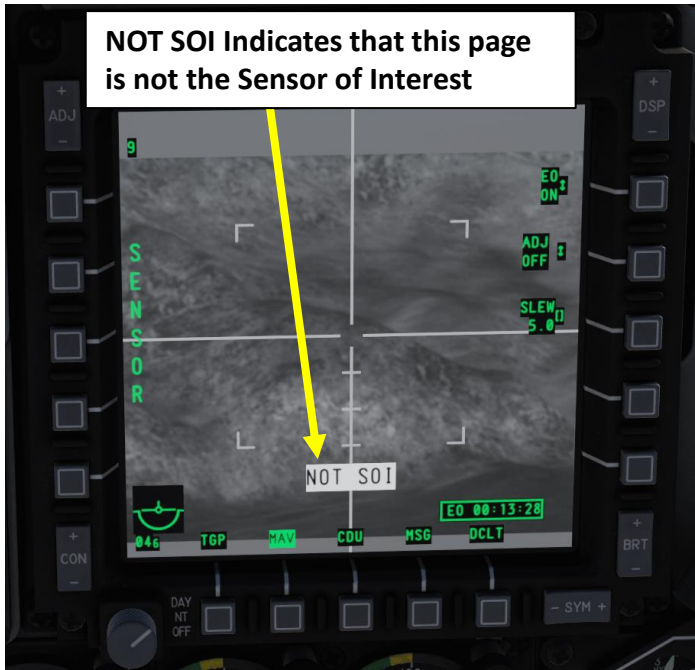
1.2 – SENSORS DISPLAY SELECTION (SOI, SPI)

You will hear these terms all the time: **SOI, which means "Sensor of Interest"** and **SPI, which means "Sensor Point of Interest".**

The A-10C can "see" in many ways: you can look through the canopy, but you can also use different sensors like the TGP (Targeting Pod), the MAV (Maverick Air-to-Ground missile), the TAD (Tactical Awareness Display) or even the HUD (Heads Up Display). They are all different sensors that can be controlled with the different "controls" we spoke about earlier… like the HOTAS. Making a sensor SOI basically means that you take control of this sensor. In "computer terms", it is the equivalent of using Alt-Tab to select which window you want to use your mouse and keyboard in. If you want to control the infrared camera embedded in your TGP, you need to select the TGP by "making it your SOI".

A **SPI (Sensor Point of Interest)**, on the other hand, is where your SOI (the Sensor of Interest that you are currently controlling) is pointing. It is basically your mouse's cursor. In other words, you use a SPI to lock on targets and throw shit at it that blows up. In order to use a weapon, the procedure is always the same: choose a Sensor of Interest (SOI) like your TGP, your HUD or a MAVerick Missile's seeker head, and once you have made this sensor your SOI, control your SPI (camera "cursor"), move it on a target, slave your sensors to this SPI, lock your target and fire your weapons according to the procedures elaborated in the WEAPONS part of this guide.





1 – SENSORS

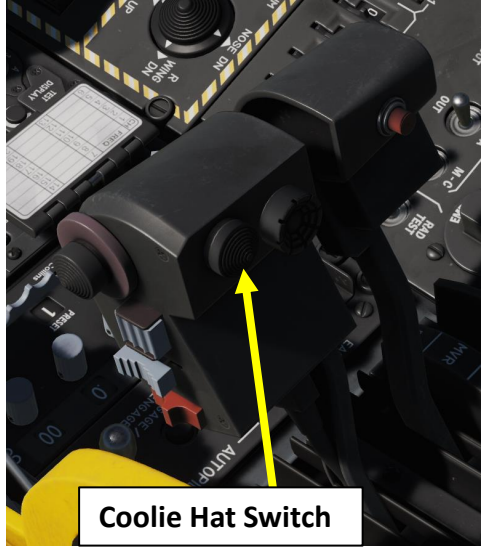
1.2 – SENSORS DISPLAY SELECTION (SOI, SPI)

The **Coolie Hat Switch** is used to determine a SOI (Sensor of Interest).

As an example, if we have the TGP page on the left MFCD and the Maverick Page on the right MFCD and we want to set the TGP page as the Sensor of Interest (SOI):

- Press the Coolie Hat Switch LONG in the direction of the MFCD that displays your TGP feed (LEFT since we have the TGP page on the left MFCD). This will set the TGP as the SOI (Sensor of Interest).

To set the Heads-Up Display as the SOI, press the Coolie Hat Switch UP.



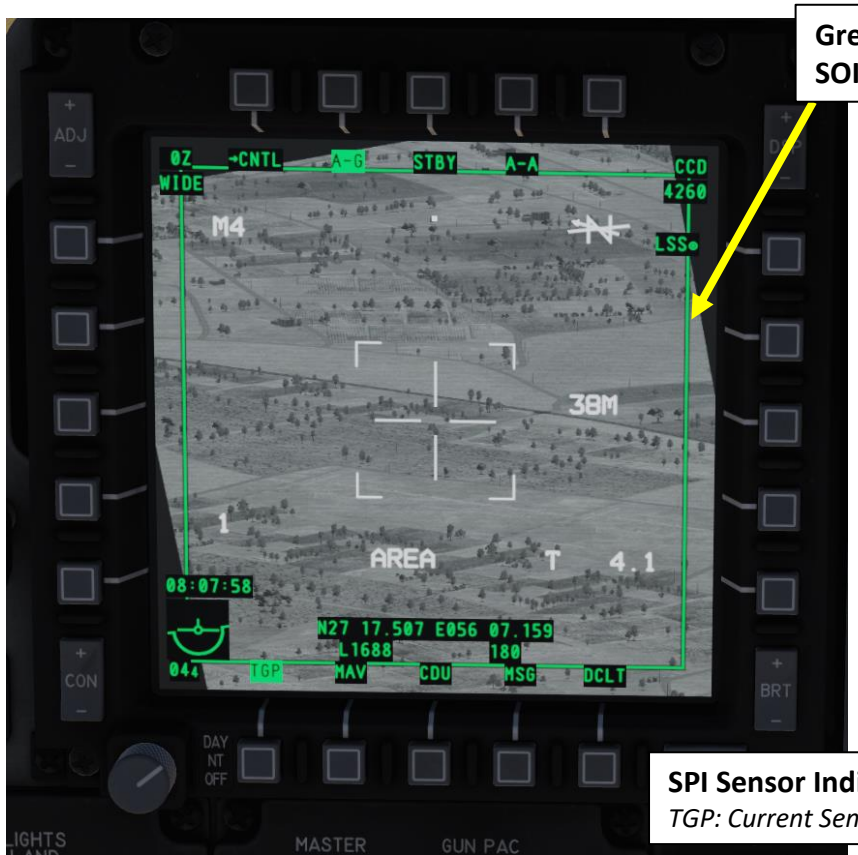
1 – SENSORS

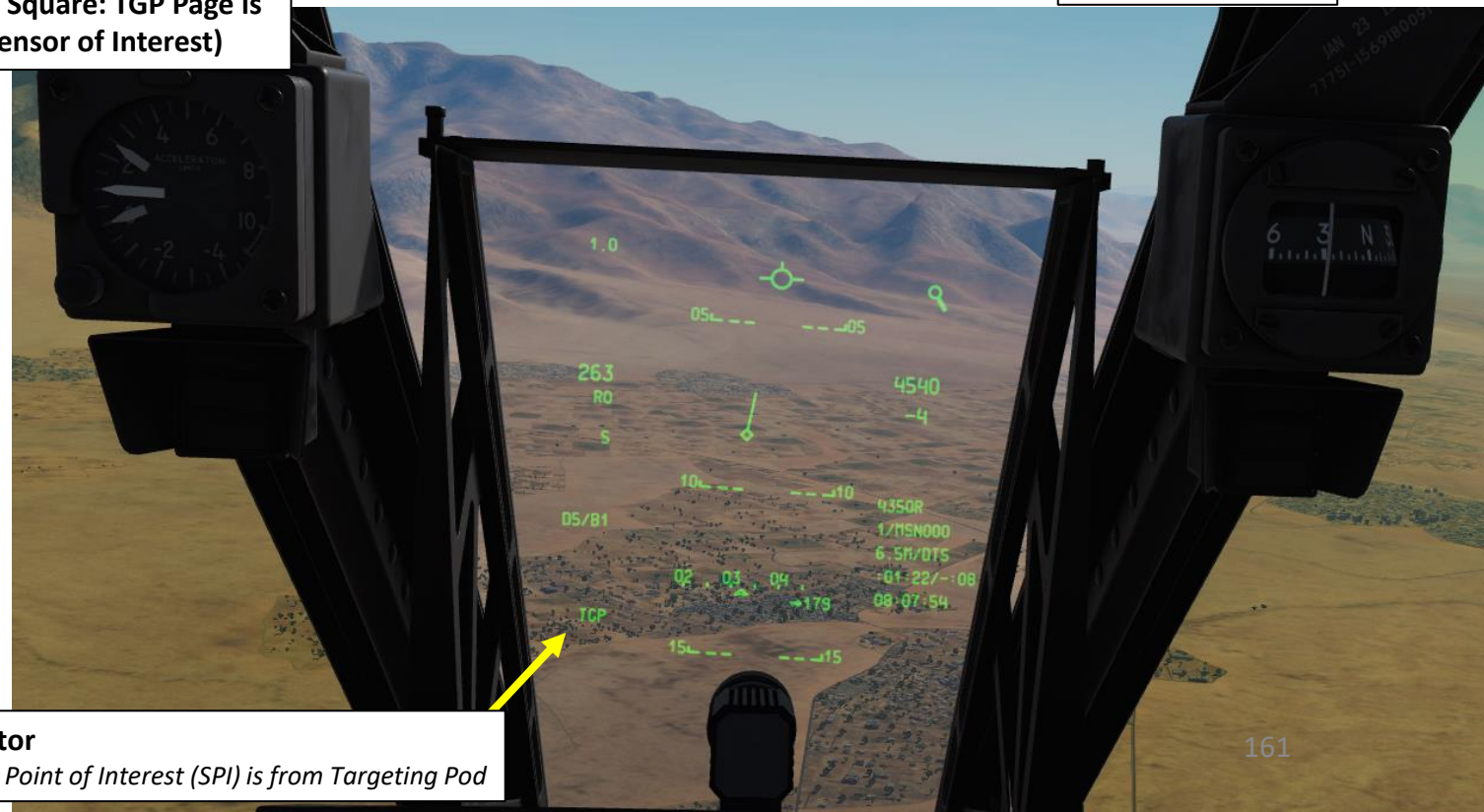
1.2 – SENSORS DISPLAY SELECTION (SOI, SPI)

The **Target Management Switch (TMS)** is used to create a SPI (Sensor Point of Interest) based on what sensor is the Sensor of Interest.
The **China Hat Switch** is used to slave sensors like the Targeting Pod to the SPI.

- **TMS SWITCH: Target Management System**
  - FWD LONG: Creates SPI (Sensor Point of Interest)
  - AFT LONG: SPI set to Steerpoint

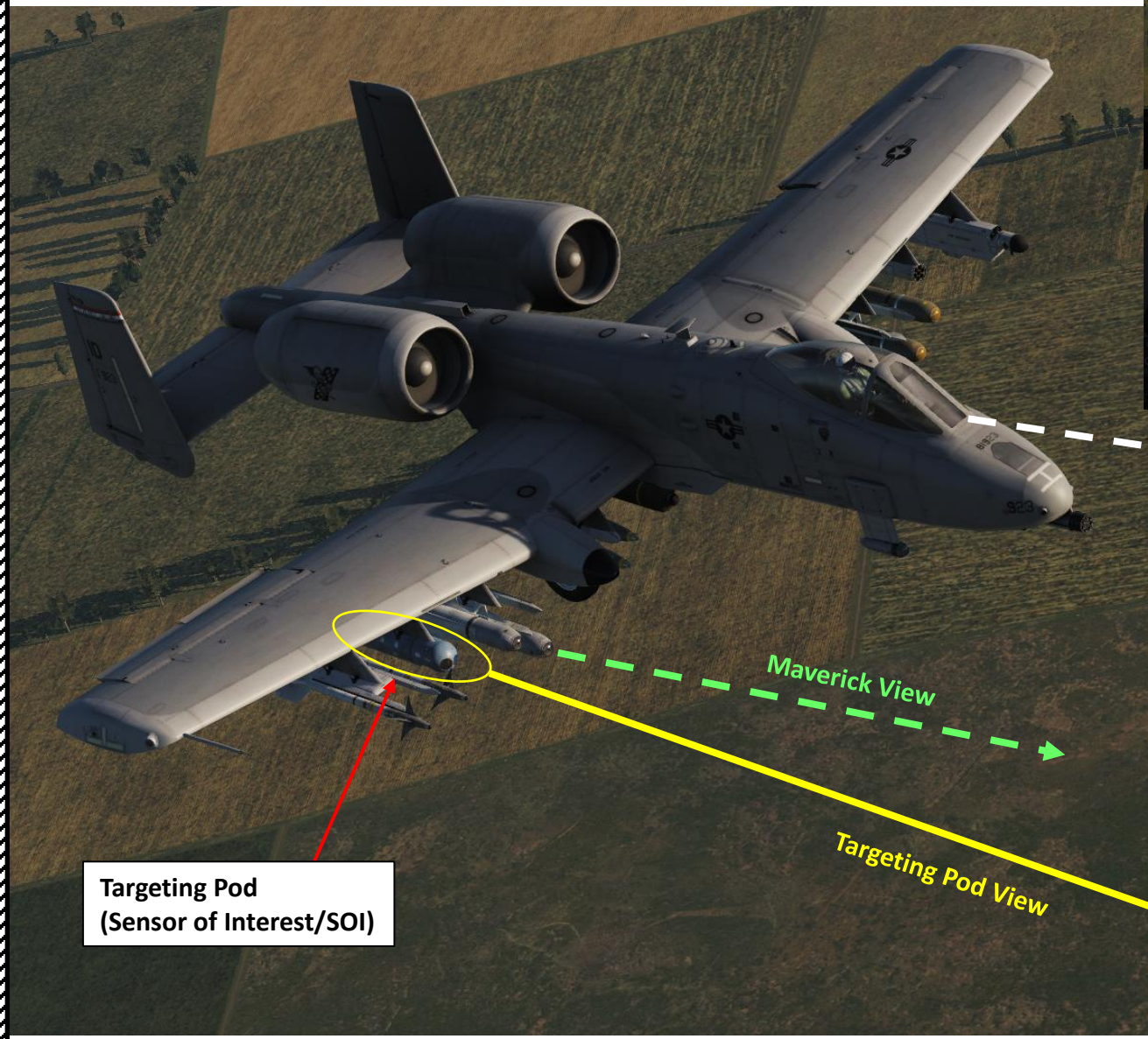
- **CHINA HAT**
  - FWD LONG: Slaves all sensors to SPI (Sensor Point of Interest)
  - AFT LONG: Slaves TGP to Steerpoint

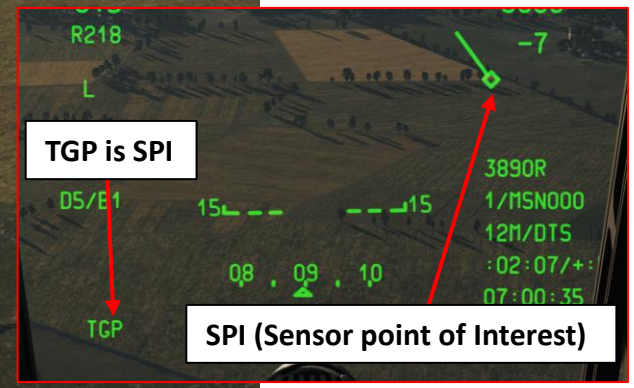




1 – SENSORS
1.2 – SENSORS DISPLAY SELECTION (SOI, SPI)

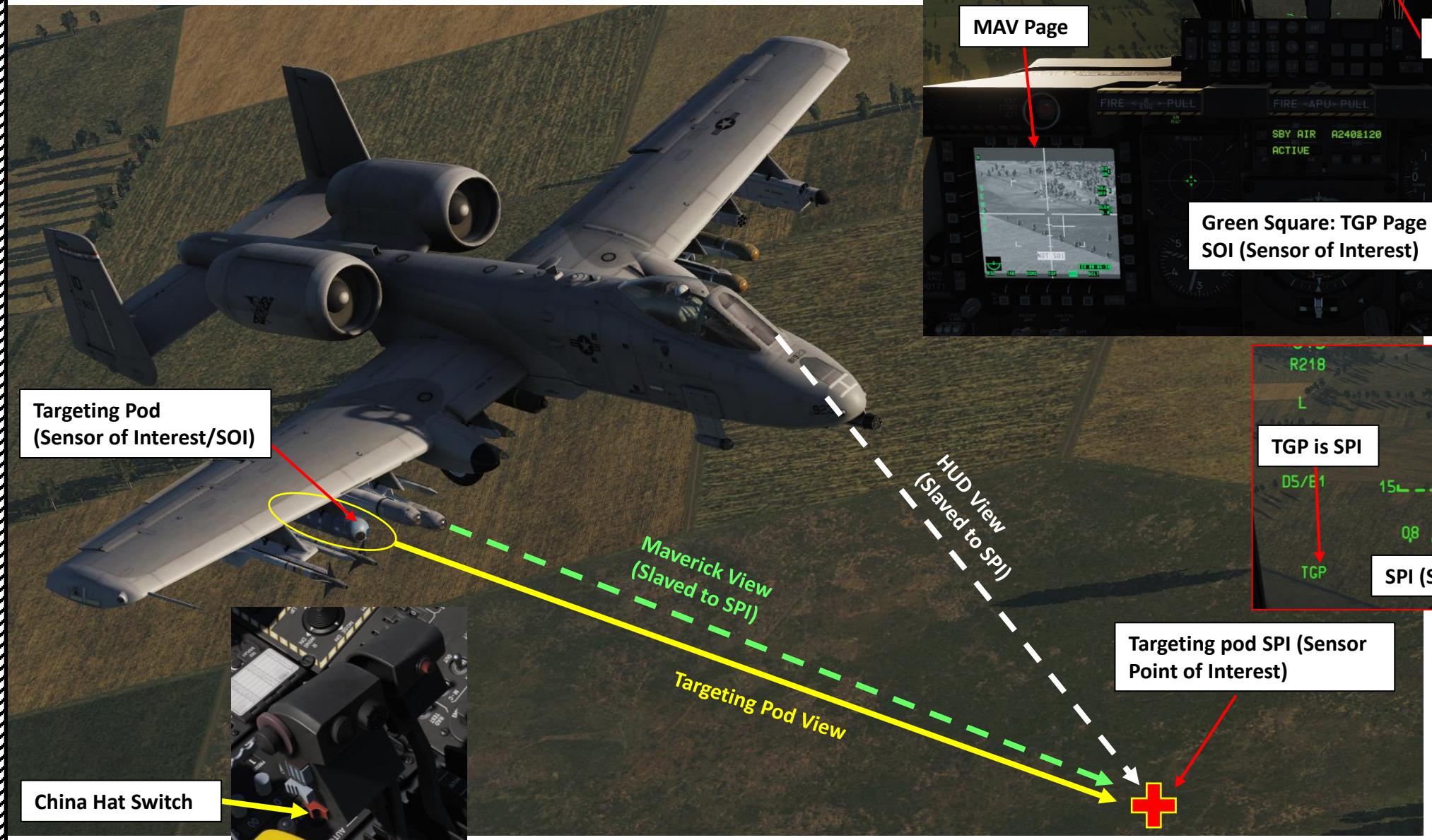
Example 1: Targeting Pod (TGP) is the Sensor of Interest, SPI has been defined on the TGP.

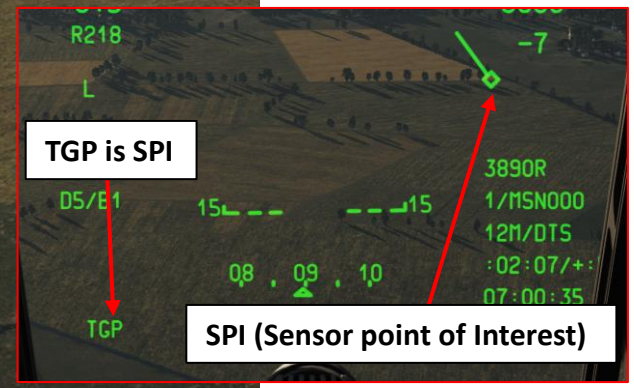




1 – SENSORS
1.2 – SENSORS DISPLAY SELECTION (SOI, SPI)

Example 2: Targeting Pod (TGP) is the Sensor of Interest, SPI has been defined on the TGP. All sensors have been slaved with the China Hat Switch FWD LONG.





1 – SENSORS
1.3 – HUD (HEADS-UP DISPLAY) & TDC

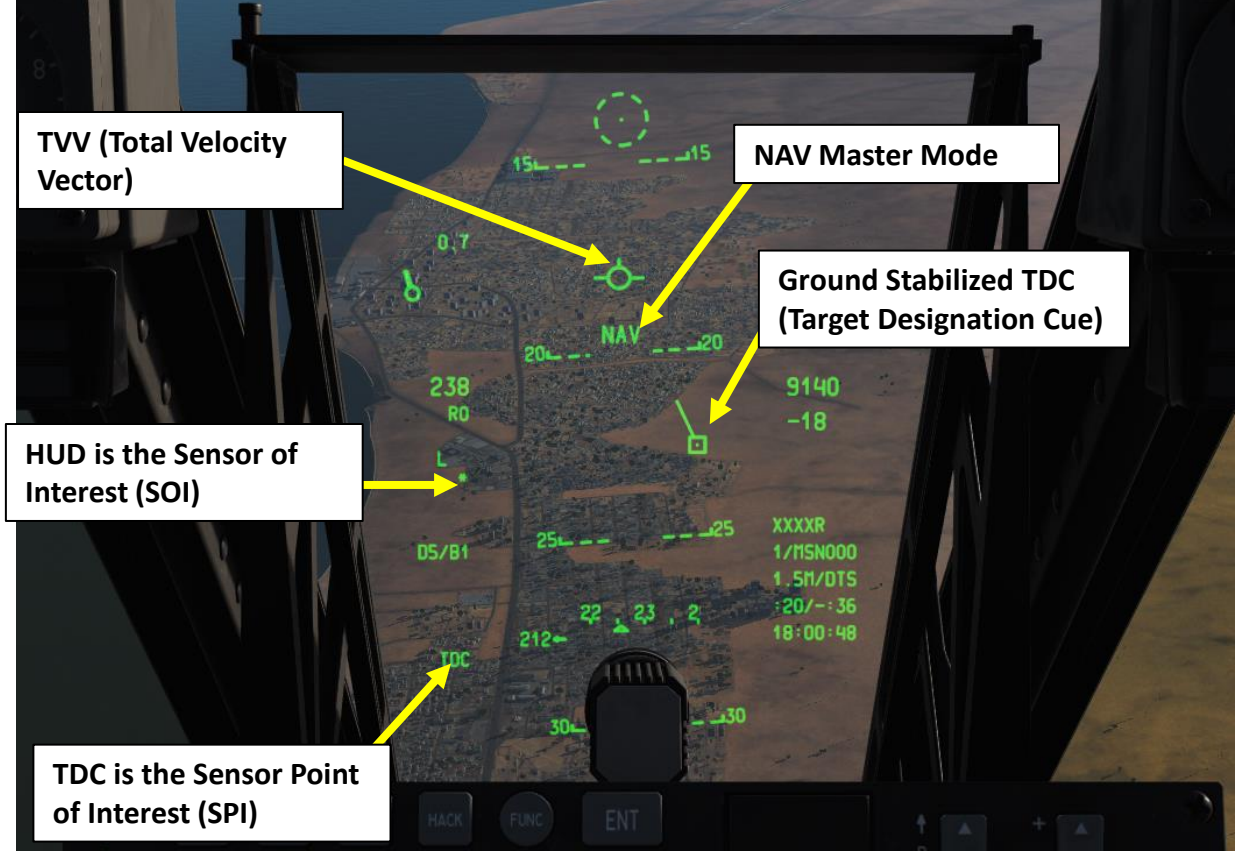
When the Heads-Up Display is in NAV mode (mode can be cycled with the Master Mode Switch) and the HUD is set as the Sensor of Interest (SOI) with the Coolie Hat Switch UP, you can use a TDC (Target Designation Cue) to designate a target.

The TDC is always displayed when the HUD is the Sensor of Interest (SOI).

Initially, the TDC will appear caged within the Total Velocity Vector (TVV). The TDC can then be slewed to any location within the HUD Field of View (FOV). When slew switch is released, the TDC will attempt to compute a position on the ground (latitude, longitude and elevation). If successful, the TDC will ground stabilize on that point. If unsuccessful (location > 13nm away), an "X" will be drawn over the TDC and the TDC will be HUD stabilized with an "X" indicating an invalid designation. In this condition, the TDC cannot become the Sensor Point of Interest (SPI).

Even if the HUD is not SOI, commanding slave to SPI will slave the TDC to the position of the current SPI. The TDC remains slaved until the SPI changes or until the HUD becomes SOI and the Slew Control switch is used to move the TDC.

When the position designated by a ground stabilized TDC is outside the HUD FOV, but within 60 degrees of the aircraft nose, the TDC symbol is clamped to the HUD FOV on the appropriate side of the HUD. If the position is outside the HUD FOV and outside of 60 degrees of the aircraft nose, the TDC is clamped to the HUD FOV and horizontally stabilized to the TVV.

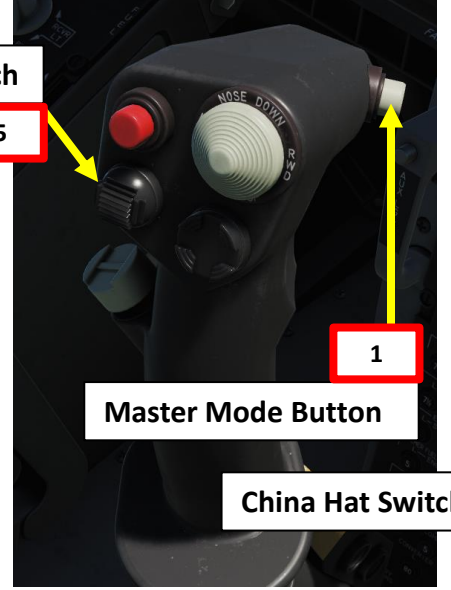


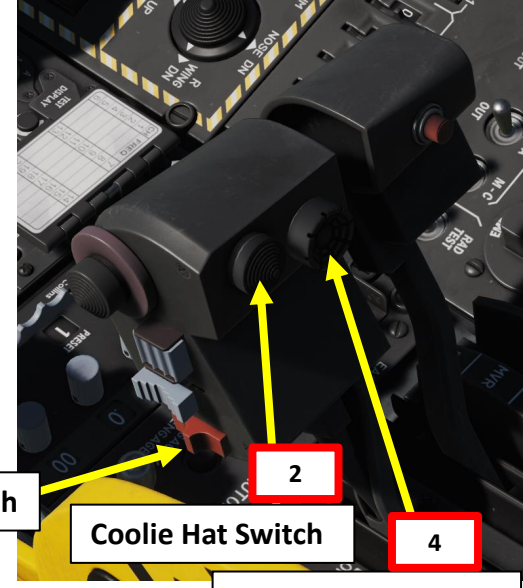
1 – SENSORS

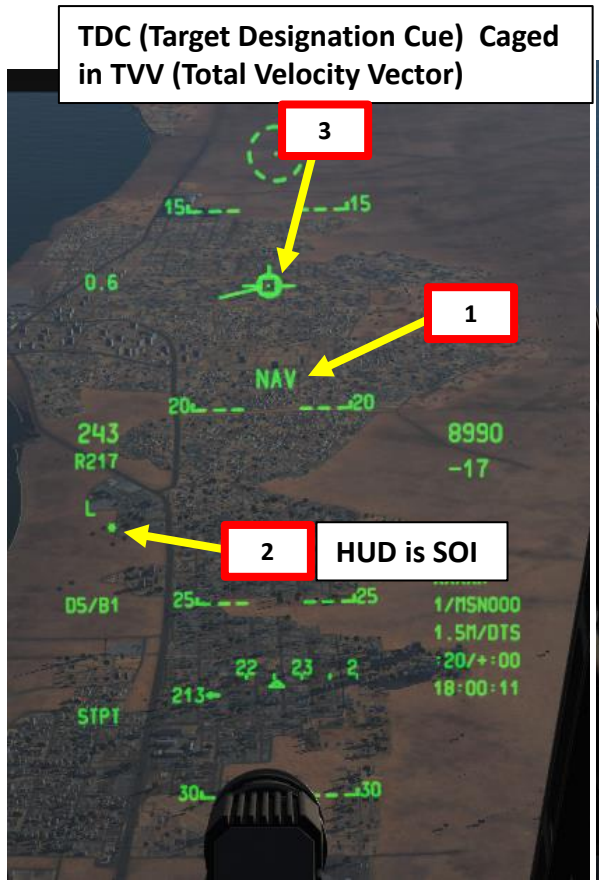
1.3 – HUD (HEADS-UP DISPLAY) & TDC

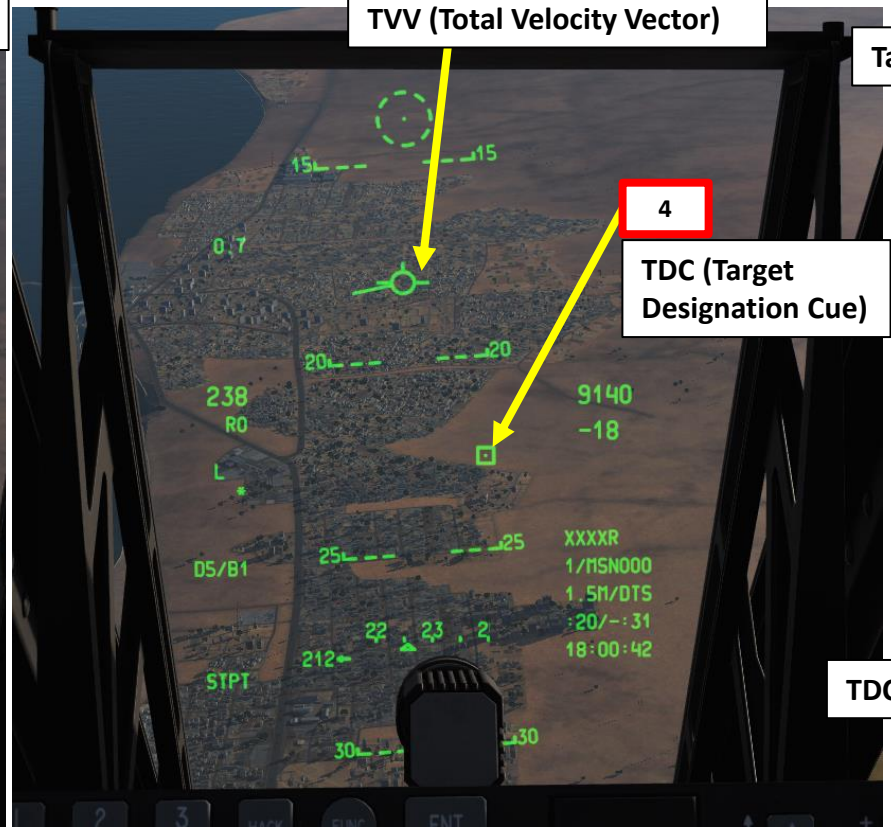
To designate a target with the HUD & TDC:

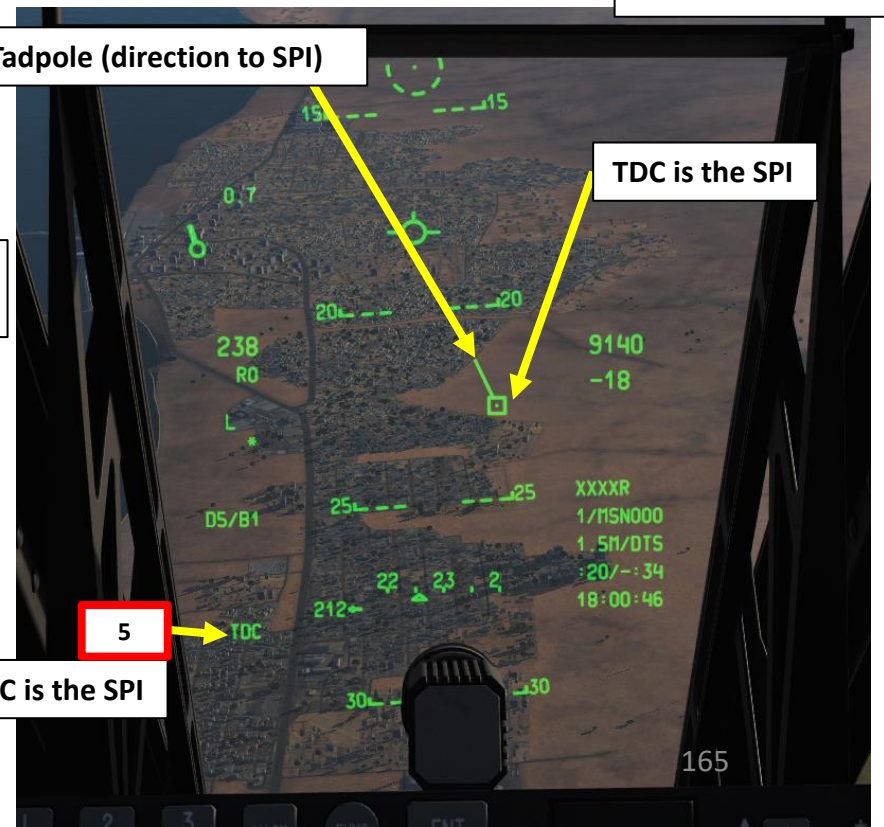
1. Press Master Mode Switch to toggle modes until NAV mode is selected.
2. Press Coolie Hat Switch UP to set Heads-Up Display as the SOI (Sensor of Interest)
3. By default, the TDC (Target Designation Cue) is caged on the Total Velocity Vector (TVV).
4. Use the Slew Control Switch to move the TDC to the desired target location.
5. Press the TMS (Target Management System) Switch FWD LONG to make the current TDC location the SPI (Sensor Point of Interest).
6. If you want to reset SPI, press the TMS Switch AFT LONG. Keep in mind that the TDC will remain ground stabilized at its current location.
7. If you want to recage the TDC to the TVV, press China Hat switch AFT SHORT.











1 – SENSORS
1.3 – HUD (HEADS-UP DISPLAY) & TDC

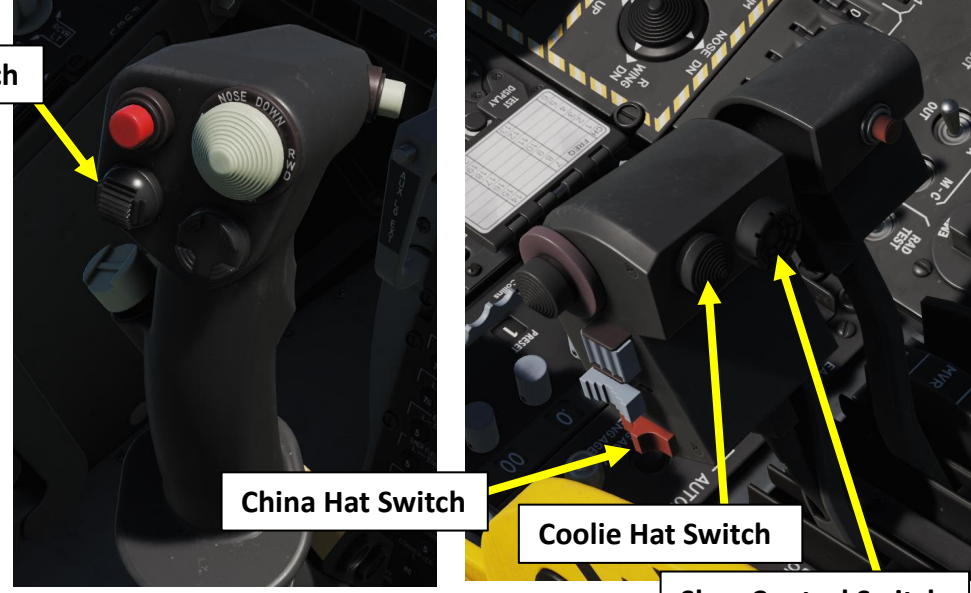
These controls work if the HUD is set as the SOI (Sensor of Interest) with the Coolie Hat Switch UP.

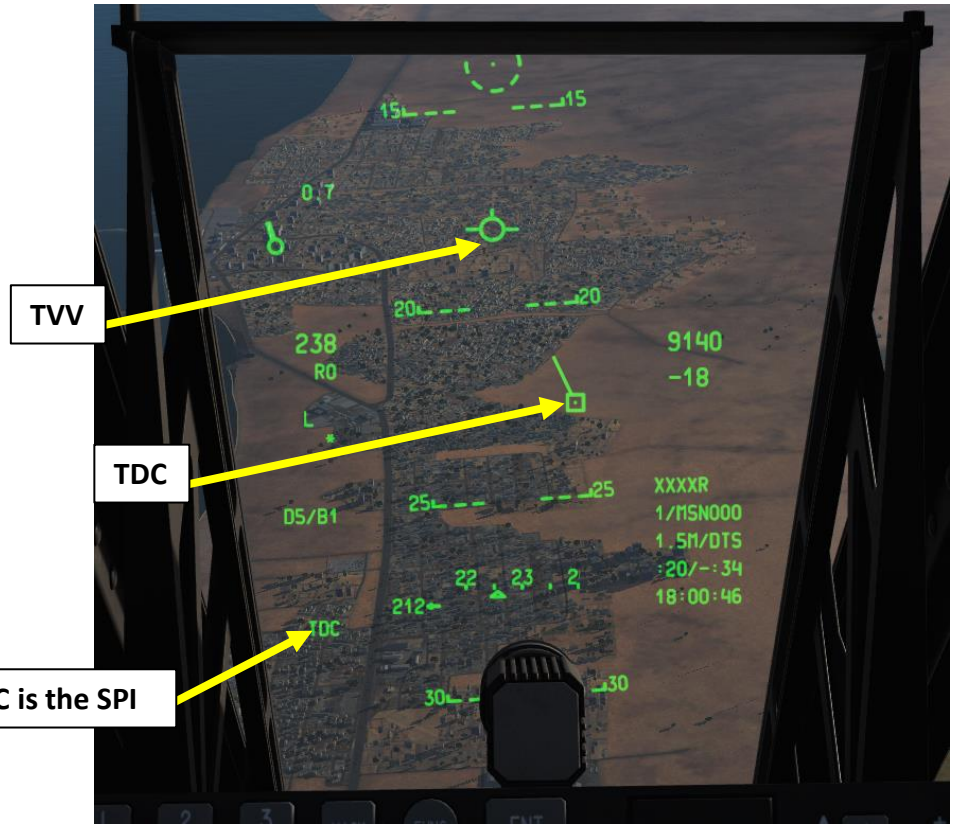
- **TMS SWITCH: Target Management System**
  - FWD SHORT: Commands TDC ground stabilize attempt
  - FWD LONG: Creates SPI (Sensor Point of Interest)
  - AFT LONG: SPI reset to Steerpoint location. TDC remains ground stabilized at its current location.
  - RIGHT: Sets Markpoint

- **SLEW CONTROL**
  - Used to control where your TDC is designating

- **COOLIE HAT**
  - UP: Selects HUD as SOI (Sensor of Interest)

- **CHINA HAT**
  - AFT SHORT: Recages TDC to the TVV (Total Velocity Vector)





1 – SENSORS

1.4 – TISL (TARGET IDENTIFICATION SET, LASER) / PAVE PENNY POD *(A-10C LEGACY ONLY)*

A-10C Legacy Only

The Target Identification Set, Laser (TISL) system detects and tracks reflected laser energy. TISL does NOT emit any laser energy; it is a passive-only system. The TISL can be used to locate targets being laser designated by another asset such as another aircraft or ground forces.

NOTE: This panel is **not functionally implemented in this simulation**. With the A-10C, all laser spot detection is done with the targeting pod in LSS/LST modes.

AAS-35 "Pave Penny" Laser Marked Target Receiver Pod

The Pave Penny laser sensor (marked target seeker) pod that allowed the pilot to detect laser energy for PID (Positive Identification) of an illuminated target. The Pave Penny is a passive seeker and cannot self-designate a target for a Laser Guided Bomb (LGB). Pave Penny control is done through the Target Identification Set, Laser (TISL) panel in the cockpit. Although Pave Penny functions have largely been replaced in modern A-10s by the targeting pod, the system and capability remain.

2 – AN/AAQ-28 LITENING Targeting Pod

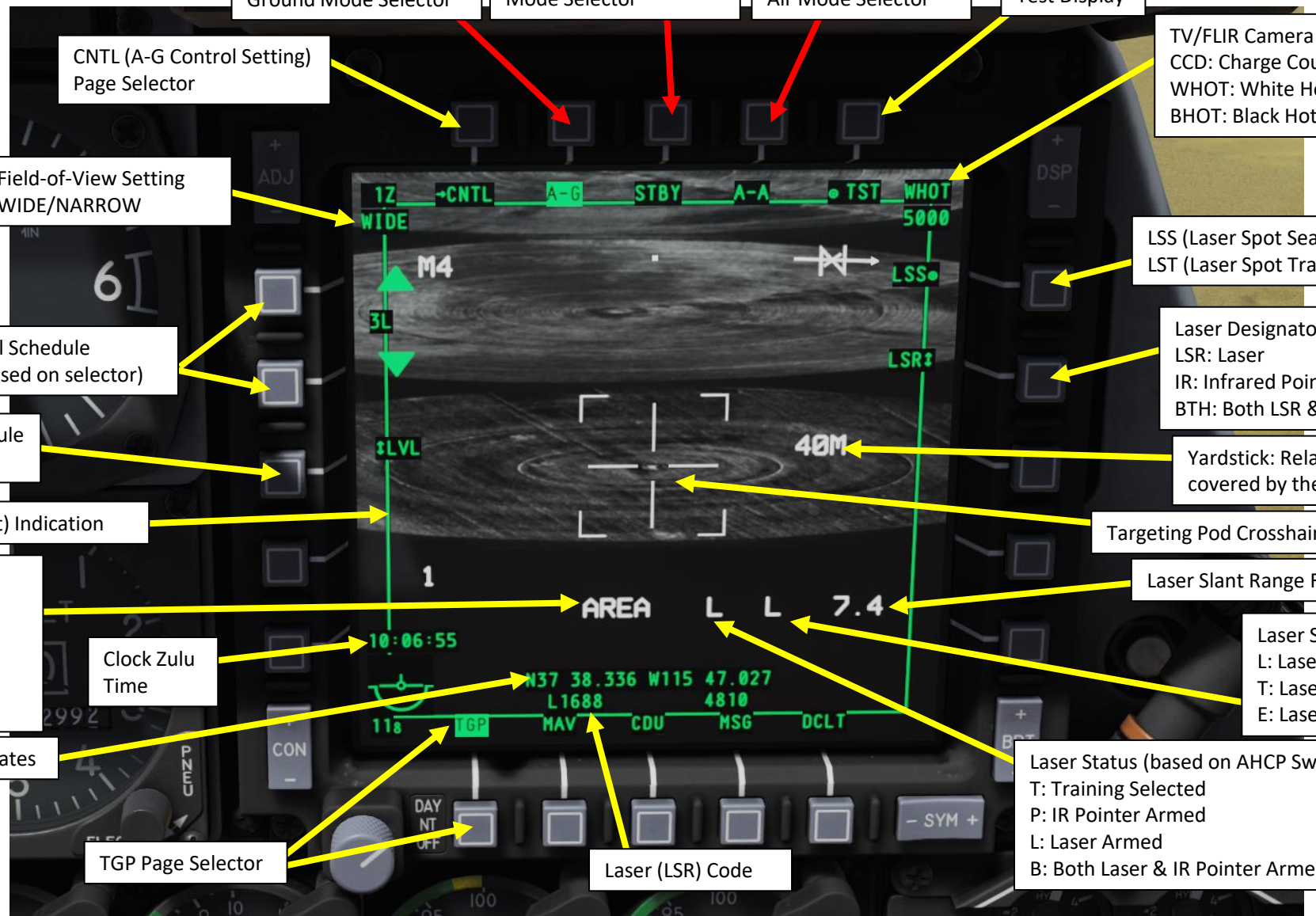
2.1 – INTRODUCTION

The AN/AAQ-28 LITENING system is a self-contained, multi-sensor targeting and surveillance system. The LITENING enables aircrews to detect, acquire, auto-track and identify targets at long ranges for weapon delivery or non-traditional intelligence, surveillance and reconnaissance missions. LITENING's FLIR, charge-coupled device (CCD), laser imaging sensors, advanced image processing and digital video output provide useful imagery of targets on the ground, allowing aircrews to identify and engage targets under a wide range of battlefield conditions.

2 – AN/AAQ-28 LITENING Targeting Pod

2.2 – DISPLAYS

The targeting pod feed can be displayed on either MFCD (Multi-Function Color Display). To display targeting pod feed, select TGP page and its desired mode (A-G in our case)



Targeting Pod Air-to-Ground Mode Selector

Targeting Pod Standby Mode Selector

Targeting Pod Air-to-Air Mode Selector

Test Display

CNTL (A-G Control Setting) Page Selector

TV/FLIR Camera Mode
CCD: Charge Coupled Device (TV)
WHOT: White Hot Infrared
BHOT: Black Hot Infrared

Field-of-View Setting WIDE/NARROW

LSS (Laser Spot Search) & LST (Laser Spot Track) Activation

Gain & Level Schedule Controls (based on selector)

Laser Designator Mode
LSR: Laser
IR: Infrared Pointer/Marker
BTH: Both LSR & IR simultaneously

Gain & Level Schedule Control Selector

Yardstick: Relative ground distance covered by the right half of the crosshair

TGP SOI (Sensor of Interest) Indication

Targeting Pod Crosshair/Reticle

Track Mode
AREA: Area Track
POINT: Point Track
INR-A: Inertial Area (masked)
INR-P: Inertial Point (masked)
INR: Inertial

Laser Slant Range Finder (nm)

Clock Zulu Time

Laser Source
L: Laser is Active
T: Laser is Tracking a Target
E: Laser is slewing

TGP Reticle Coordinates

Laser Status (based on AHCP Switches)
T: Training Selected
P: IR Pointer Armed
L: Laser Armed
B: Both Laser & IR Pointer Armed

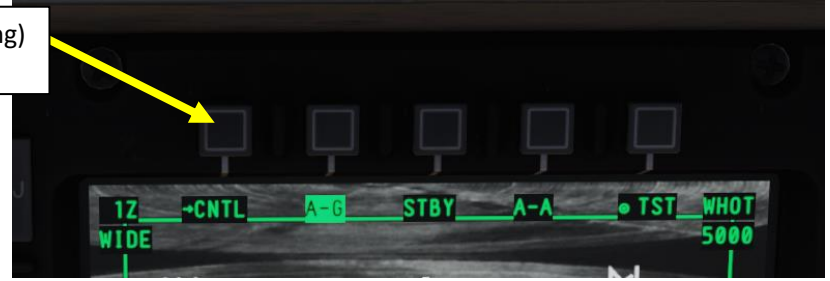
TGP Page Selector

Laser (LSR) Code

2 – AN/AAQ-28 LITENING Targeting Pod

2.2 – DISPLAYS

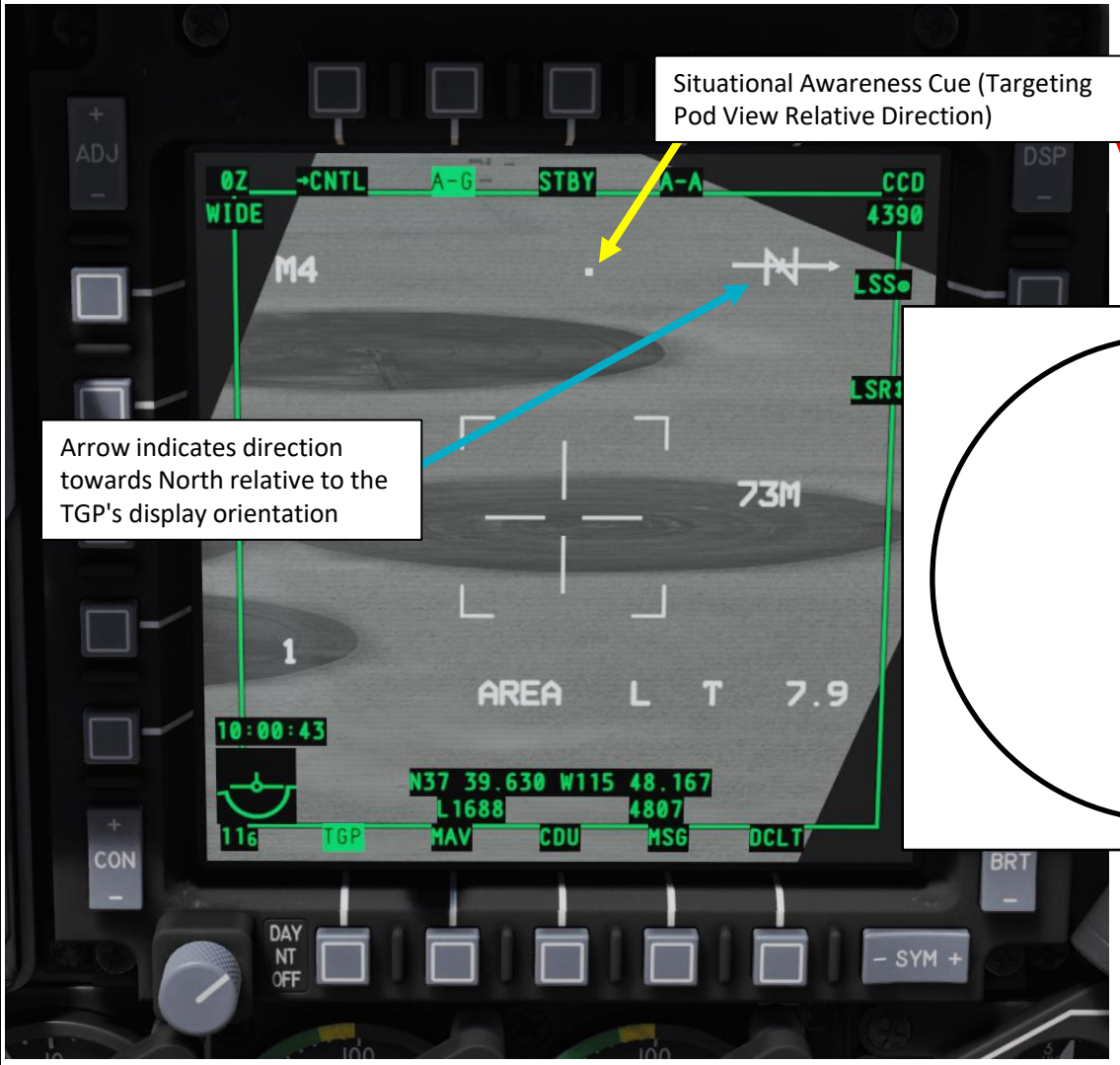
You can access the CNTL (Air-to-Ground Mode Control) page by pressing the OSB next to CNTL.

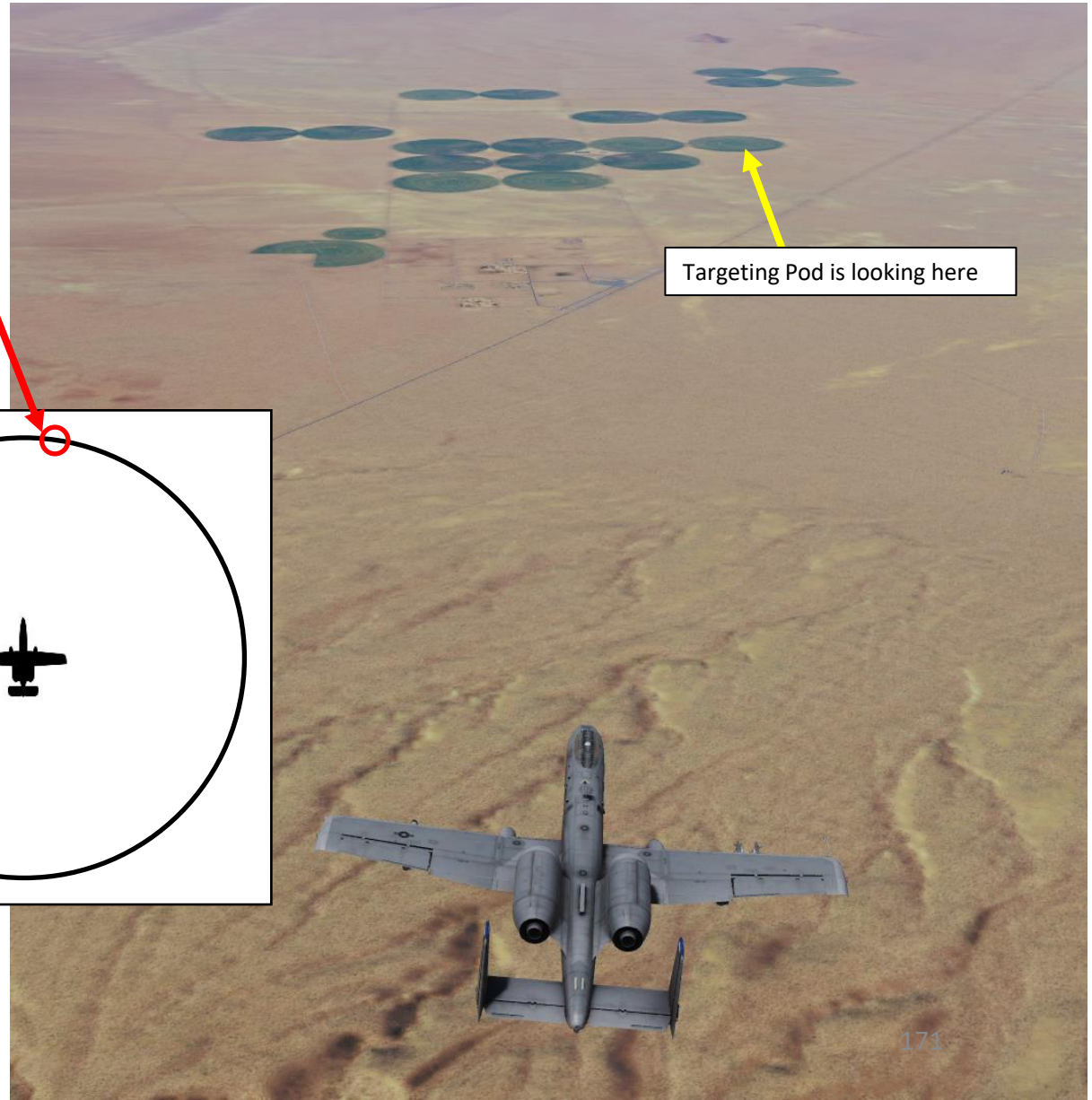


2 – AN/AAQ-28 LITENING Targeting Pod

2.2 – DISPLAYS

The Targeting Pod View Relative Direction symbol on the FLIR display can give you a good idea of where the pod is pointing in relationship to your aircraft. This view direction is represented in a top-down view.



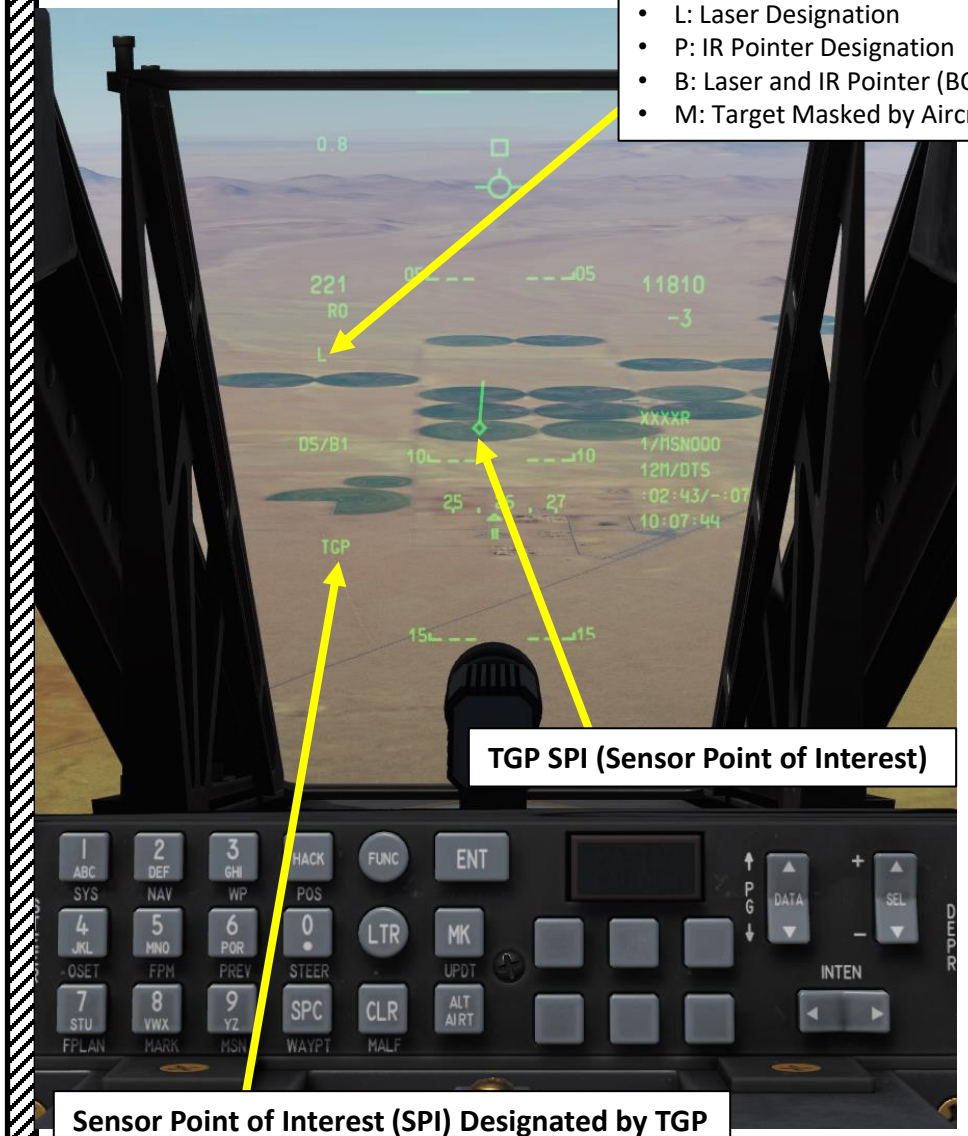


2 – AN/AAQ-28 LITENING Targeting Pod

2.2 – DISPLAYS

The Targeting Pod also displays data on the HUD (Heads-Up Display) and TAD (Tactical Awareness Display).

Laser Status
- L: Laser Designation
- P: IR Pointer Designation
- B: Laser and IR Pointer (BOTH) used simultaneously
- M: Target Masked by Aircraft



TAD TGP SPI Diamond (Sensors Not Slaved)

2 – AN/AAQ-28 LITENING Targeting Pod

2.2 – DISPLAYS

You can also access the A-A (Air-to-Air) Targeting Pod Mode to designate air targets.

2 – AN/AAQ-28 LITENING Targeting Pod

2.3 – CONTROLS (A-10C LEGACY)

These controls work if the TGP Page is set as the SOI (Sensor of Interest) with the Coolie Hat Switch.

- **TMS SWITCH: Target Management System**
  - FWD SHORT: Point Track/Area Track Toggle
  - FWD LONG: Creates SPI (Sensor Point of Interest)
  - AFT SHORT: INR Track
  - AFT LONG: SPI set to Steerpoint
  - LEFT: Reset WCN (Warning, Caution & Notes)
  - RIGHT: Sets Markpoint

- **DMS SWITCH: Data Management Switch**
  - FWD/AFT SHORT: Increases/Decreases Zoom Level
  - RIGHT SHORT: Laser Designator Toggle (LSR, IR, BOTH)
  - RIGHT LONG: LSS (Laser Spot Search) Toggle

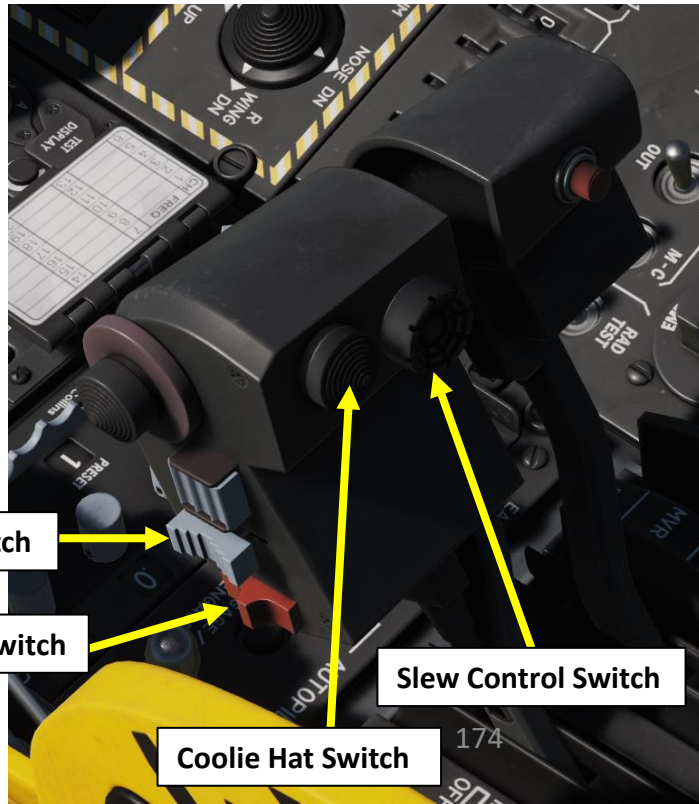
- **SLEW CONTROL**
  - Used to control where your Targeting Pod / Sensor of Interest (SOI) is looking

- **COOLIE HAT**
  - LEFT/RIGHT LONG: Selects MFCD as SOI (Sensor of Interest)

- **BOAT SWITCH**
  - Cycle through different TV or FLIR (forward looking infrared) camera modes
    - FWD: FLIR BHOT (Forward-Looking Infrared Black Hot)
    - MIDDLE: CCD (Charge Coupled Device/TV)
    - AFT: FLIR WHOT (Forward-Looking Infrared White Hot)

- **CHINA HAT**
  - FWD SHORT: Field-of-View Wide/Narrow Toggle
  - FWD LONG: Slaves all sensors to SPI (Sensor Point of Interest)
  - AFT SHORT: Boresight TGP
  - AFT LONG: Slaves TGP to Steerpoint

- **NOSEWHEEL STEERING BUTTON**
  - Used to fire laser



2 – AN/AAQ-28 LITENING Targeting Pod

2.3 – CONTROLS (A-10C II TANK KILLER)

These controls work if the TGP Page is set as the SOI (Sensor of Interest) with the Coolie Hat Switch.

- **TMS SWITCH: Target Management System**
  - FWD SHORT: Point Track/Area Track Toggle
  - FWD LONG: Creates SPI (Sensor Point of Interest)
  - **AFT SHORT: FLIR Autofocus**
  - AFT LONG: SPI set to Steerpoint
  - **LEFT SHORT: Reset WCN (Warning, Caution & Notes)**
  - **LEFT LONG: SPI Broadcast**
  - RIGHT SHORT: Sets Markpoint
  - **RIGHT LONG: Set Last Markpoint as the SPI**

- **DMS SWITCH: Data Management Switch**
  - FWD/AFT SHORT: Increases/Decreases Zoom Level
  - **LEFT SHORT: Right MFCD Video on HMIT (Helmet-Mounted Integrated Targeting)**
  - **LEFT LONG: HMD (Helmet-Mounted Display) ON/OFF**
  - RIGHT SHORT: Laser Designator Toggle (LSR, IR, BOTH)
  - **RIGHT LONG: Slave TGP (Targeting Pod) to HMIT Line-of-Sight**

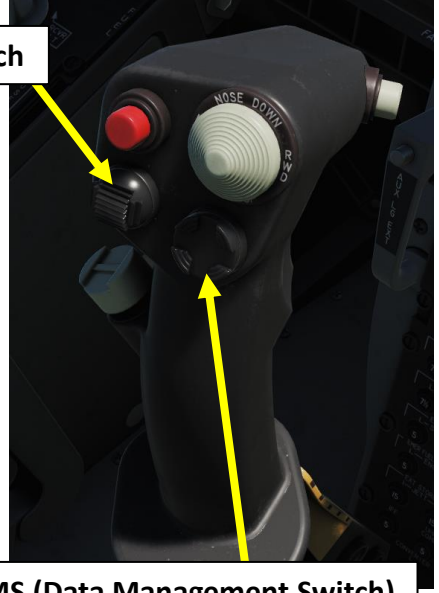
- **SLEW CONTROL**
  - Used to control where your Targeting Pod / Sensor of Interest (SOI) is looking

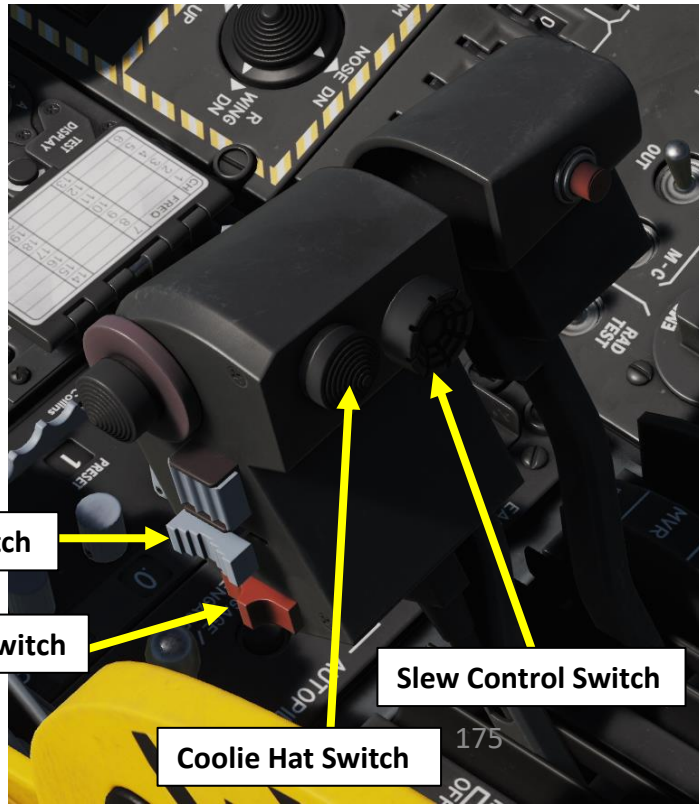
- **COOLIE HAT**
  - LEFT/RIGHT LONG: Selects MFCD as SOI (Sensor of Interest)

- **BOAT SWITCH**
  - Cycle through different TV or FLIR (forward looking infrared) camera modes
    - FWD: FLIR BHOT (Forward-Looking Infrared Black Hot)
    - MIDDLE: CCD (Charge Coupled Device/TV)
    - AFT: FLIR WHOT (Forward-Looking Infrared White Hot)

- **CHINA HAT**
  - FWD SHORT: Field-of-View Wide/Narrow Toggle
  - FWD LONG: Slaves all sensors to SPI (Sensor Point of Interest)
  - **AFT SHORT: LSS (Laser Spot Search) Toggle**
  - AFT LONG: Slaves TGP to Current Steerpoint

- **NOSEWHEEL STEERING BUTTON**
  - Used to fire laser

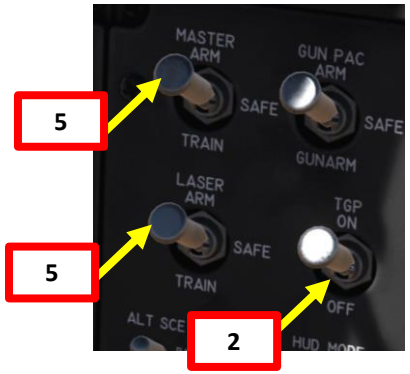




2 – AN/AAQ-28 LITENING Targeting Pod

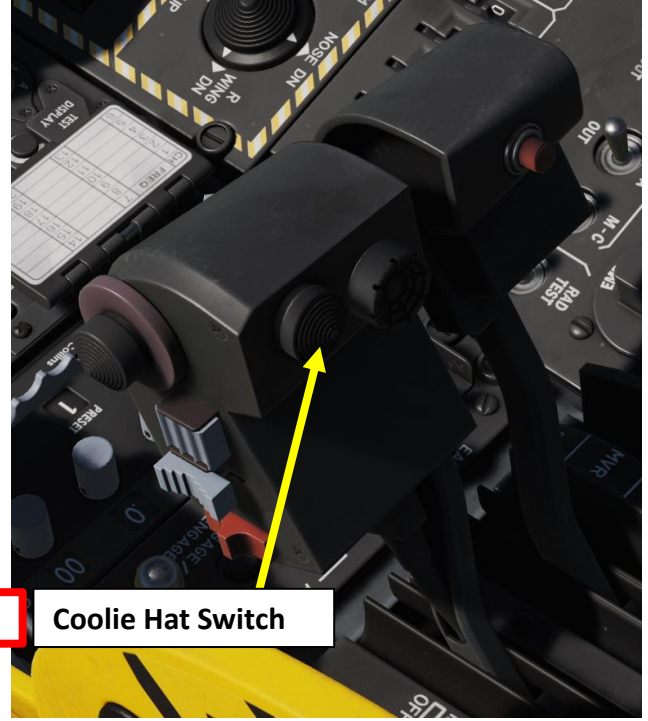
2.4 – START-UP & LASING PROCEDURE

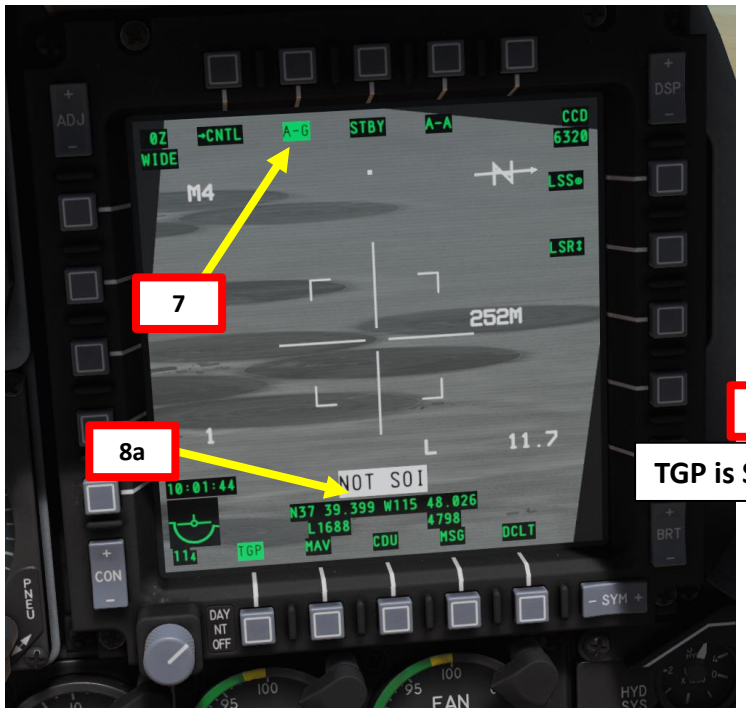
1. Press the OSB (Option Select Button) next to TGP (Targeting Pod) to display the TGP Feed Page.
2. On AHCP (Armament HUD Control Panel), set TGP switch ON (UP) to power up the targeting pod.
3. A 2-minute warm-up period is required. TGP Display will start from TGP OFF, then transition to NOT TIMED OUT during the warm-up process.
4. Once targeting pod warm-up sequence is complete, the NOT TIMED OUT indication will disappear.
5. Set MASTER ARM and LASER ARM switches to ARM.



2 – AN/AAQ-28 LITENING Targeting Pod
2.4 – START-UP & LASING PROCEDURE

6. Select AG (Air-to-Ground) TGP Mode by pressing the OSB next to AG.
7. When the TGP goes from STBY mode to AG mode, this will un-stow the camera. Confirm that Targeting Pod mode switches from STBY to AG.
8. Press the Coolie Hat Switch LONG in the direction of the MFCD that displays your TGP feed (RIGHT since we have the TGP page on the right MFCD). This will set the TGP as the SOI (Sensor of Interest).

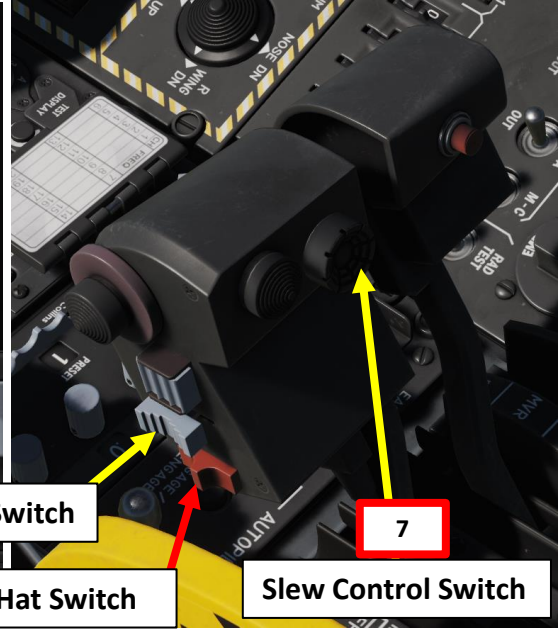


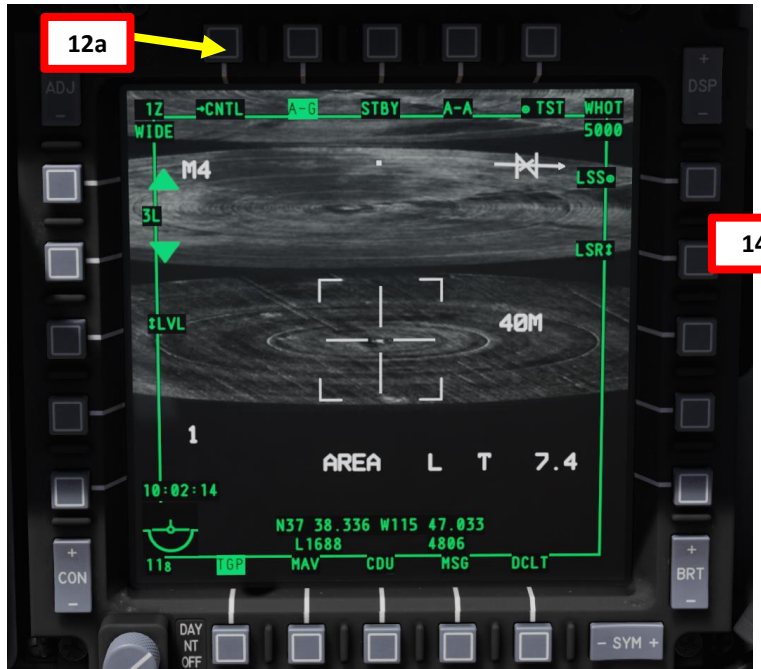


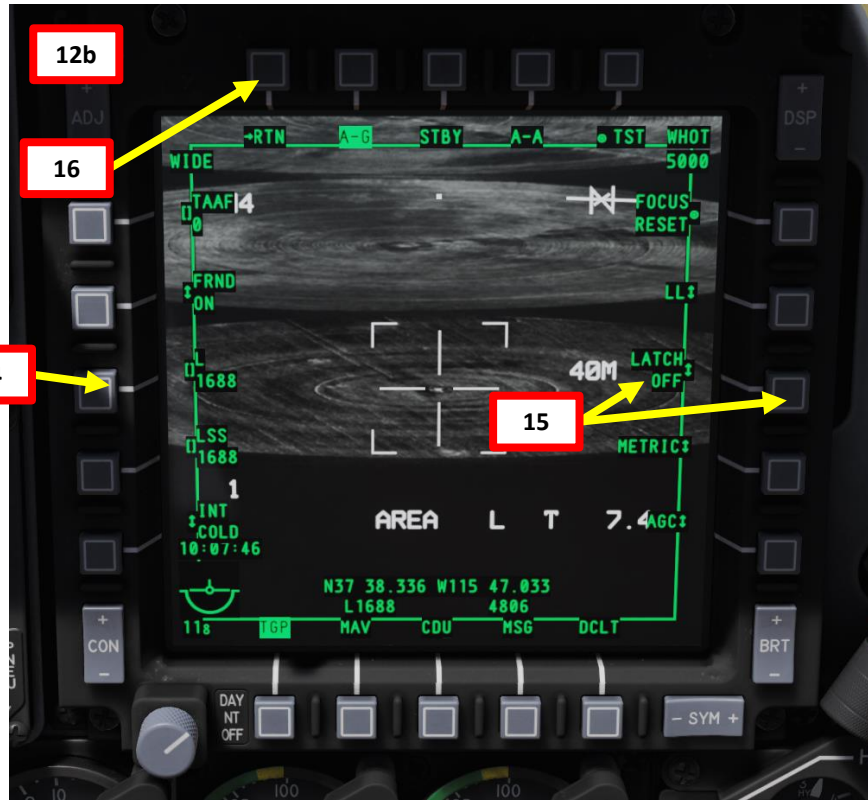
2 – AN/AAQ-28 LITENING Targeting Pod

2.4 – START-UP & LASING PROCEDURE

9. Select desired Video Mode with the Boat Switch
   - FWD: FLIR BHOT (Forward-Looking Infrared Black Hot)
   - MIDDLE: CCD (Charge Coupled Device/TV)
   - AFT: FLIR WHOT (Forward-Looking Infrared White Hot)
10. Select Field-of-View Mode with the China Hat Switch
   - FWD SHORT toggles between WIDE and NARROW
11. Select desired Laser Designator Mode (LSR) with OSB.
12. Press the OSB next to CNTL to enter the TGP AG Control Page.
13. Enter the desired Laser Code on the UFC Scratchpad. We will choose the default laser code 1688.
14. Press on the OSB next to “L” (Laser Designation Code) to enter laser code 1688.
15. Select desired LATCH mode with OSB (LATCH ON means the laser is latched once fired by pressing the Nosewheel Steering Button). We will choose LATCH OFF.
16. Press OSB next to RTN (Return) to go back to Main TGP page.

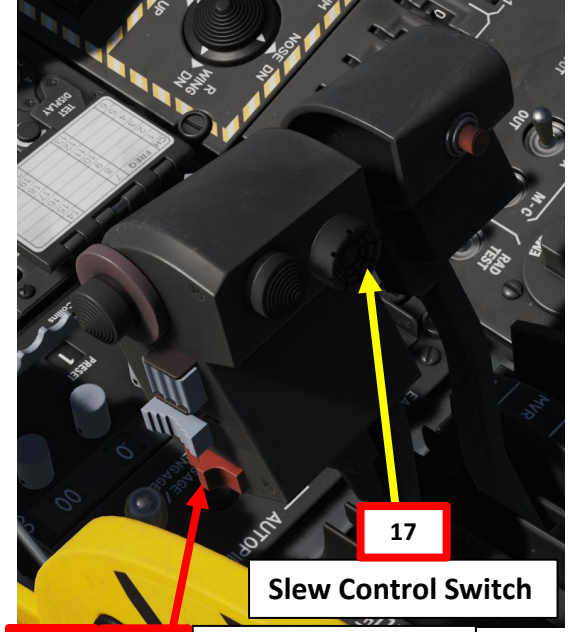


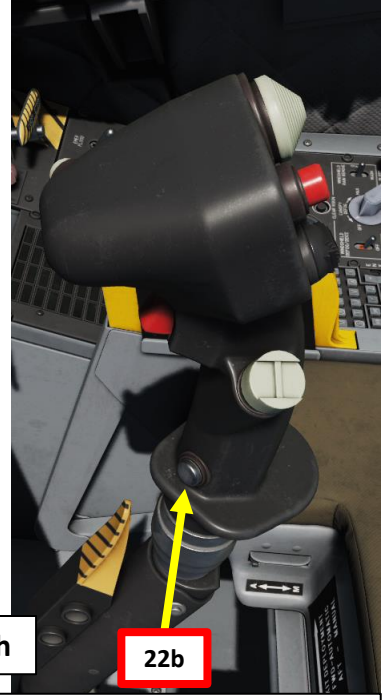


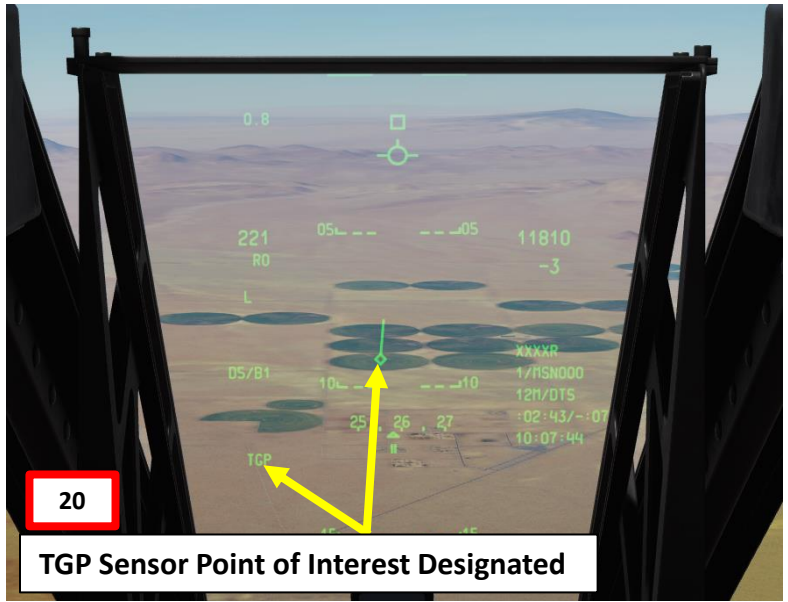


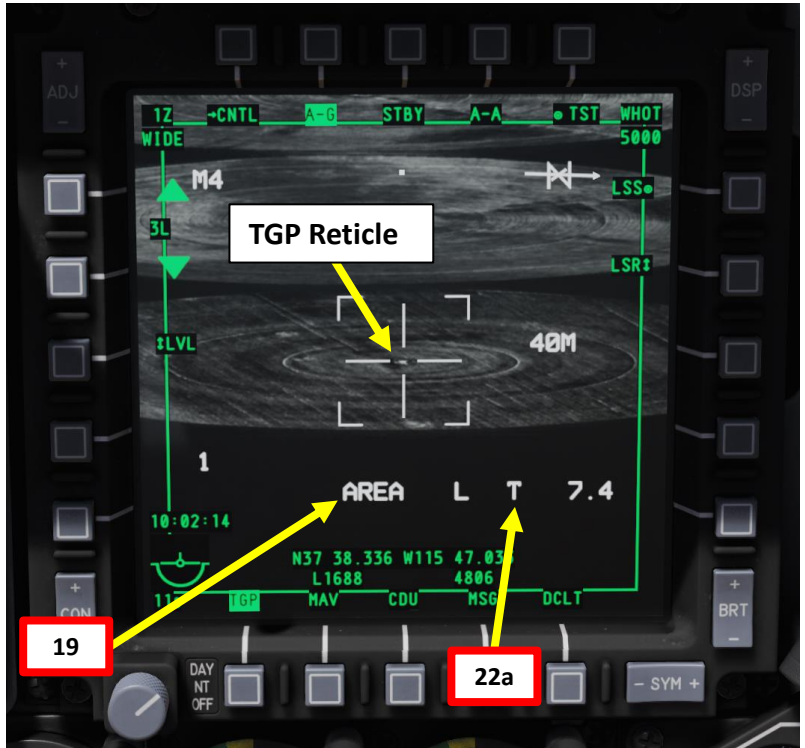
2 – AN/AAQ-28 LITENING Targeting Pod
2.4 – START-UP & LASING PROCEDURE

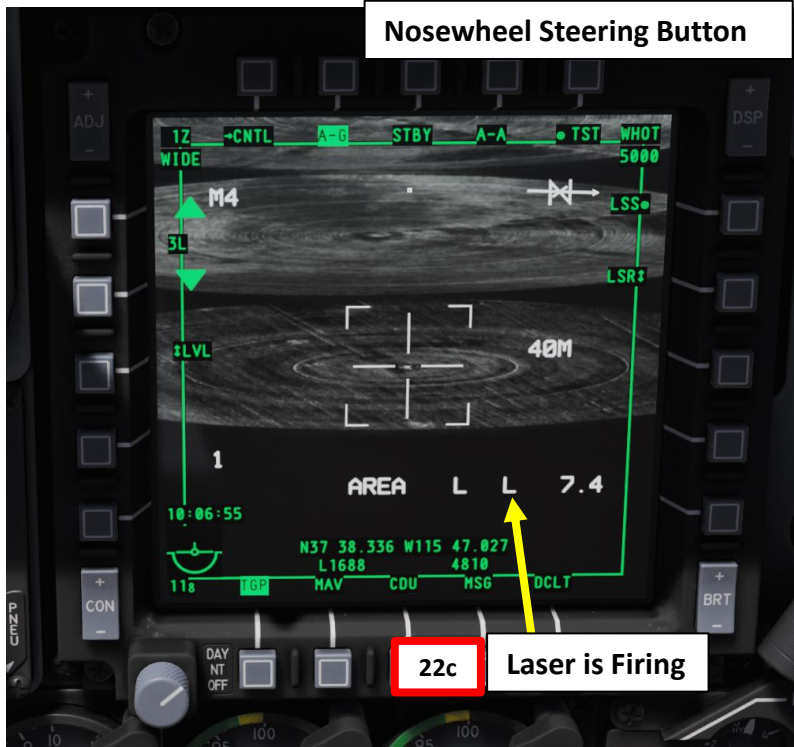
17. Use the Slew Control Switch UP/DOWN/LEFT/RIGHT to set the TGP reticle on the target.
    - *Note: If you want to reset the TGP in front of you (boresight):*
        - ***A-10C LEGACY:*** *Press the China Hat Switch AFT SHORT*
        - ***A-10C II TANK KILLER EXPANSION:*** *In the TGP page, press the OSB next to B-S (Boresight Function)*
18. Press on the DMS (Data Management Switch) FWD/AFT SHORT to adjust Zoom Level.
19. Press the TMS (Target Management System) switch FWD SHORT to track the target. This will toggle tracking modes between AREA TRACK (static target) and POINT TRACK (moving target).
20. Press the TMS (Target Management System) switch FWD LONG to designate the TGP Sensor Point of Interest (SPI).
21. Press the China Hat Switch FWD LONG to slave all sensors to the Sensor Point of Interest (SPI).
22. Press and hold Nosewheel Steering Button ("Insert" binding) to fire laser.









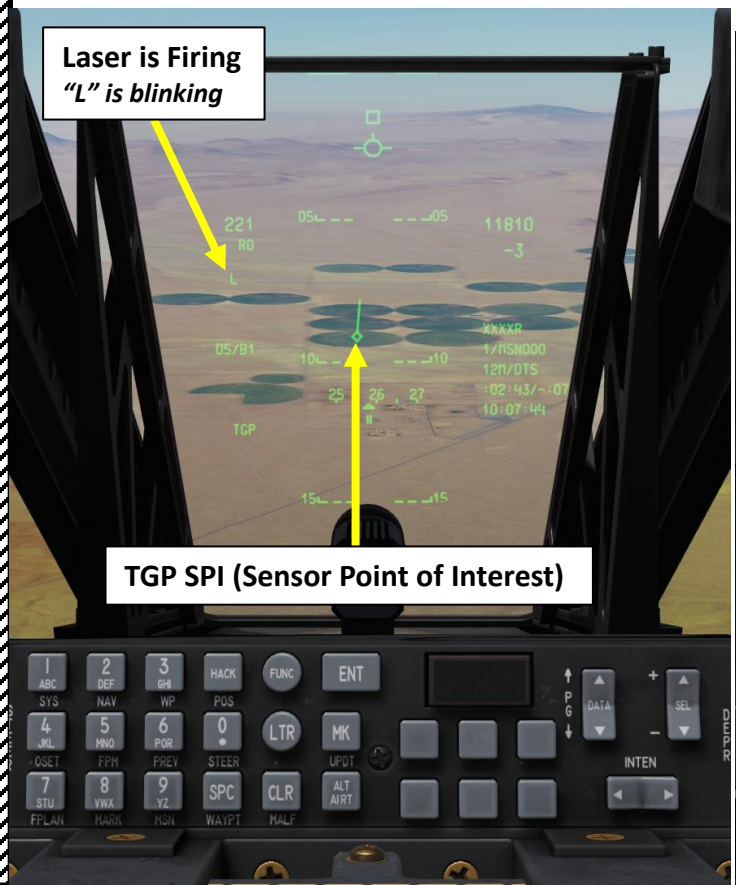


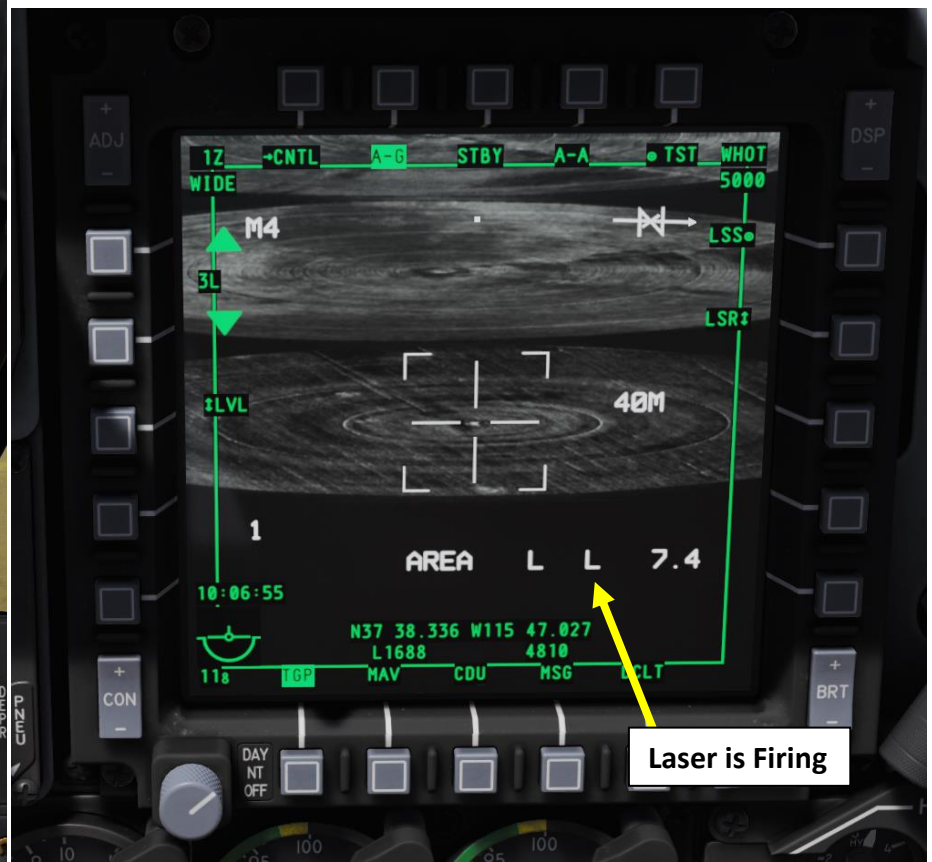
2 – AN/AAQ-28 LITENING Targeting Pod

2.4 – START-UP & LASING PROCEDURE

- Note: Once all sensors are slaved to the TGP Target Track, the Heads-Up Display and TAD (Tactical Awareness Display) will also display information about where the targeting pod is looking.

TAD TGP SPI Diamond (Sensors Not Slaved)

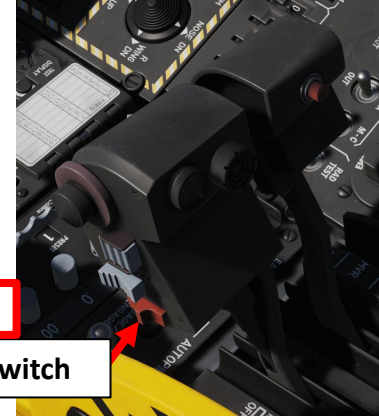


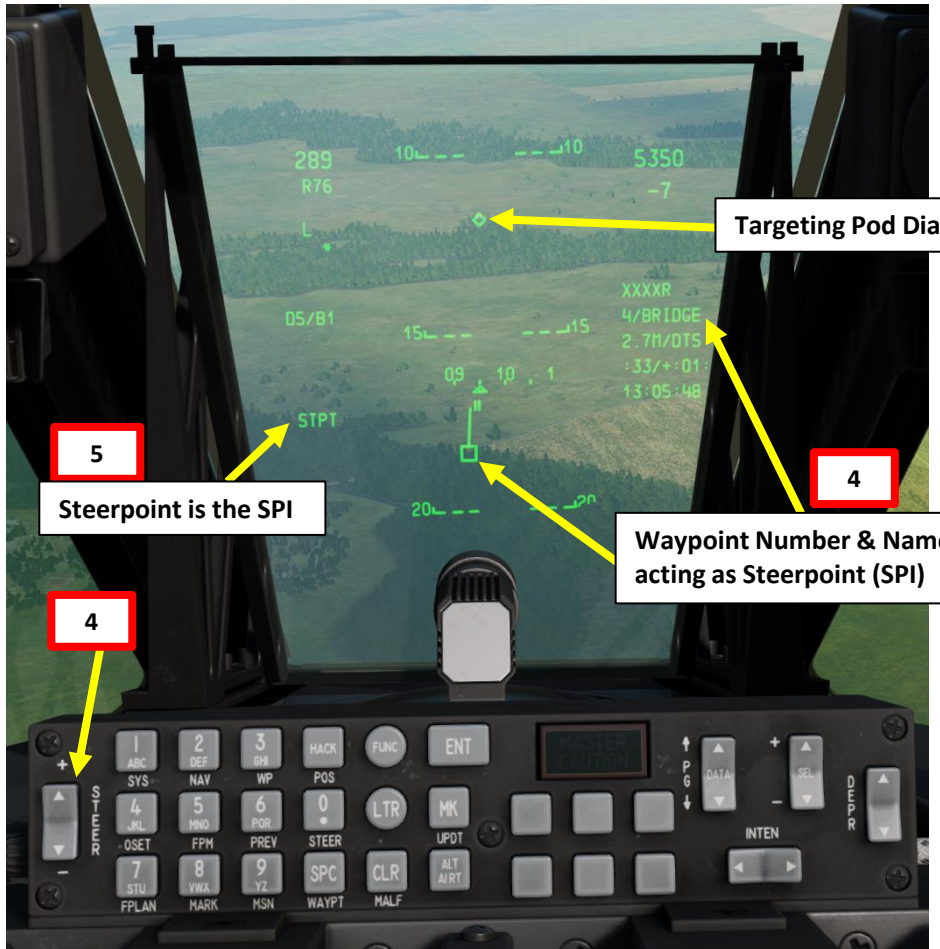


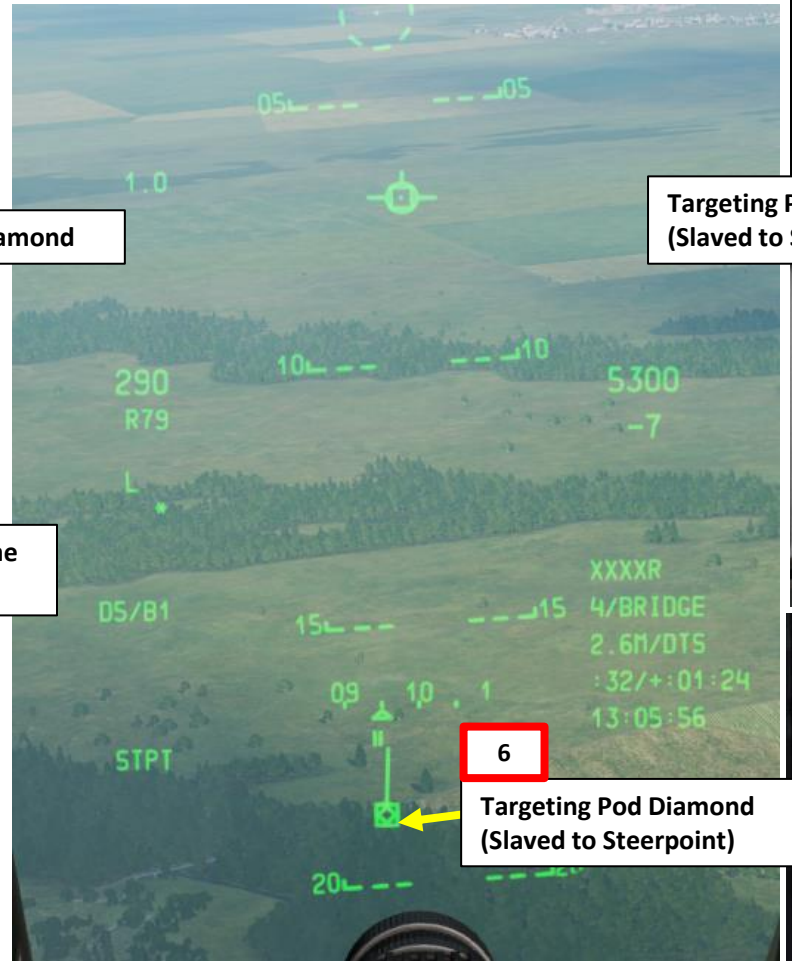
2 – AN/AAQ-28 LITENING Targeting Pod

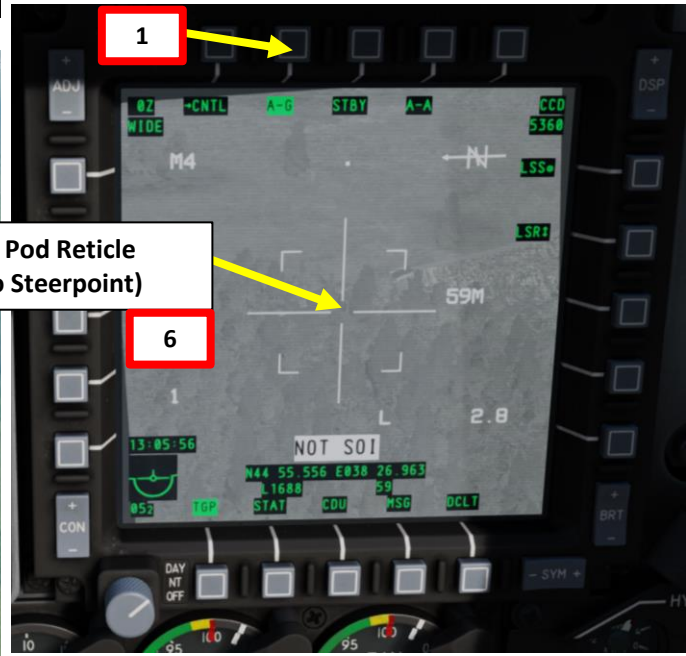
2.5 – SLAVING TGP TO A STEERPOINT

1. Verify that targeting pod (TGP) is powered and set to A-G mode.
2. Set Auxiliary Avionics Panel (AAP) Steerpoint Selector Knob to MISSION (you access all waypoints available for the current mission)
3. Set Auxiliary Avionics Panel (AAP) CDU (Control Display Unit) Selector Knob to STEER
4. On the UFC (Up Front Control), use the STEER rocker switch to select desired steerpoint (or any other method described in the NAVIGATION section).
5. Press TMS (Target Management System) Switch AFT LONG to set the selected Steerpoint as the SPI (Sensor Point of Interest).
6. Press China Hat AFT LONG to slave the TGP to the Steerpoint.



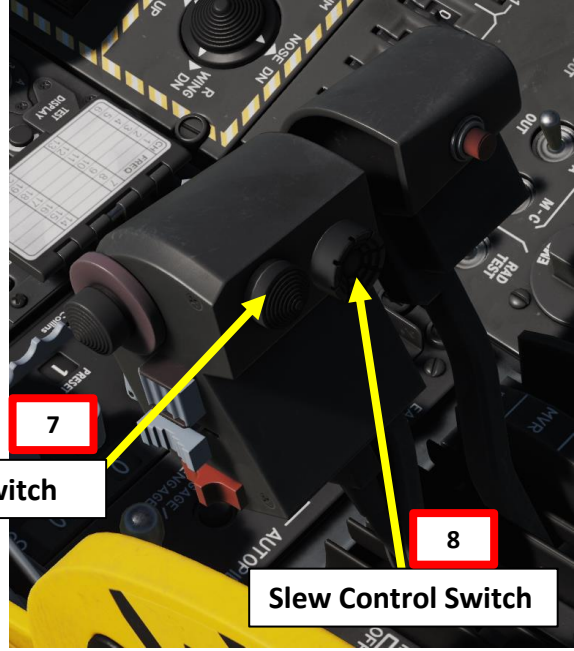


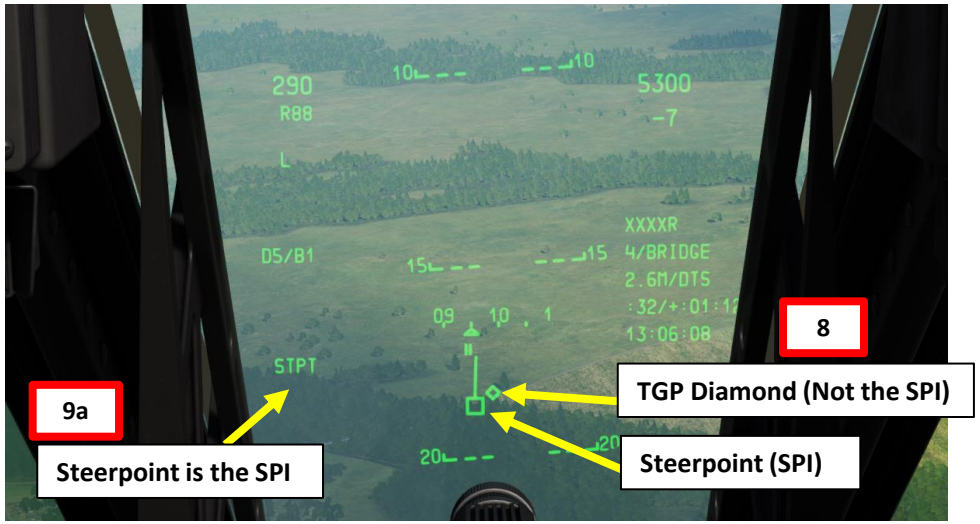


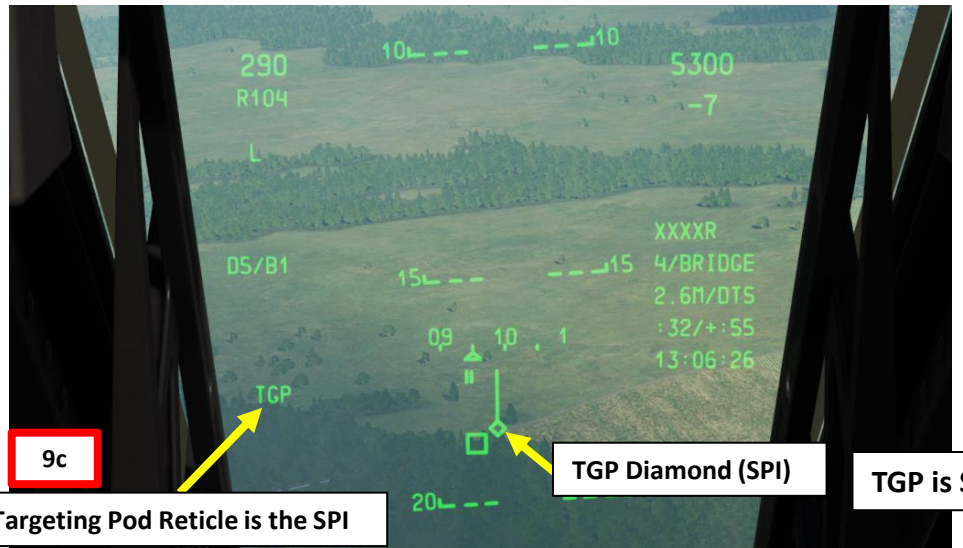


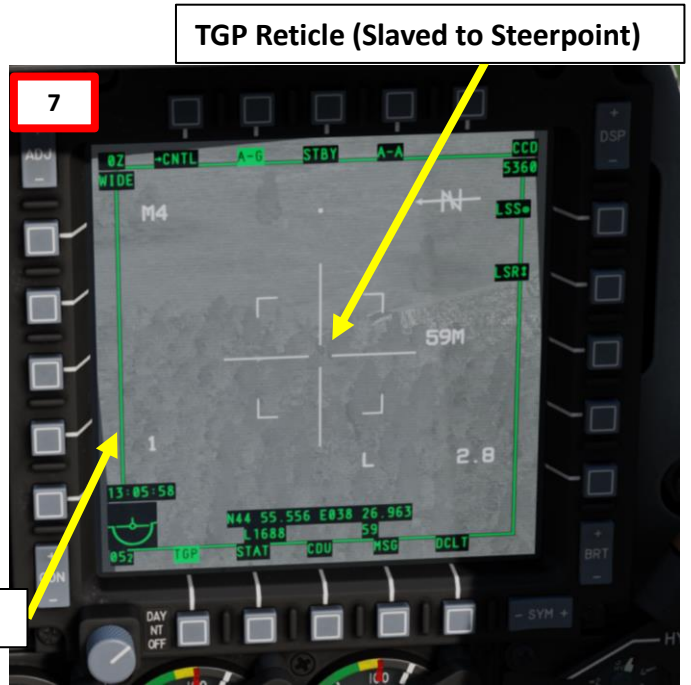
2 – AN/AAQ-28 LITENING Targeting Pod
2.5 – SLAVING TGP TO A STEERPOINT

7. Press the Coolie Hat Switch LONG in the direction of the MFCD that displays your TGP feed (RIGHT since we have the TGP page on the right MFCD). This will set the TGP as the SOI (Sensor of Interest).
8. Use the Slew Control Switch UP/DOWN/LEFT/RIGHT to set the TGP reticle on the target. The TGP designation procedure is the same as in the previous **START-UP & LASING PROCEDURE** section.
9. If you want to make the targeting pod's reticle the SPI (Sensor Point of Interest), press TMS (Target Management Switch) FWD LONG.







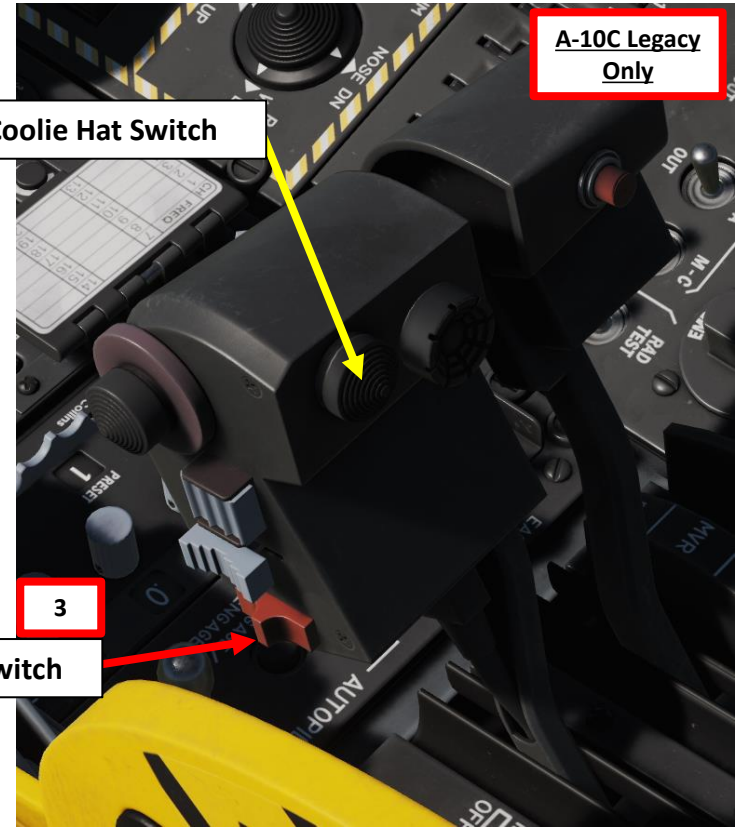


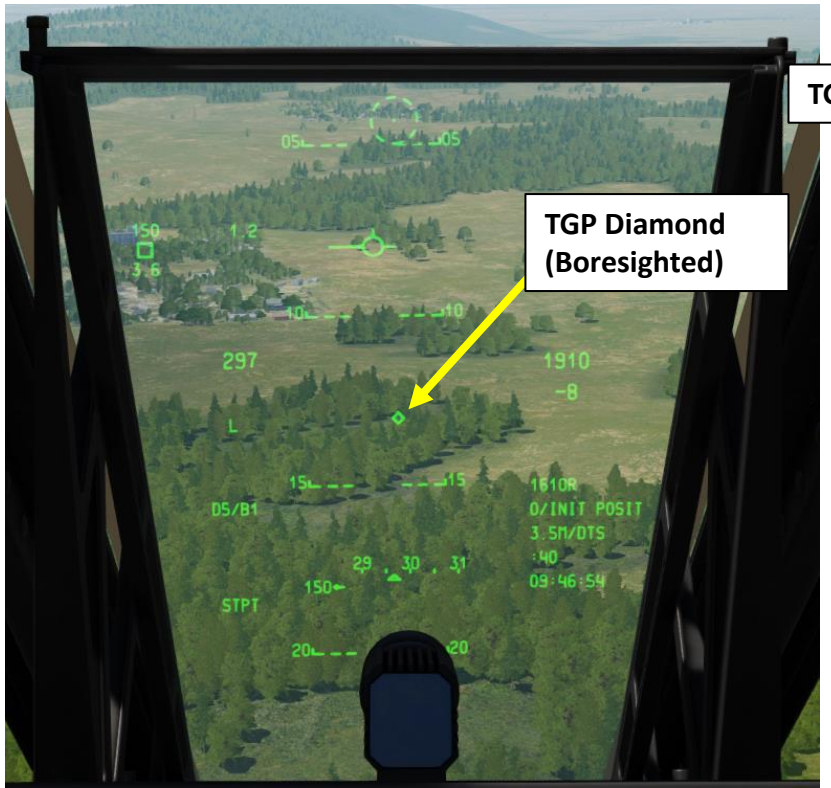
2 – AN/AAQ-28 LITENING Targeting Pod

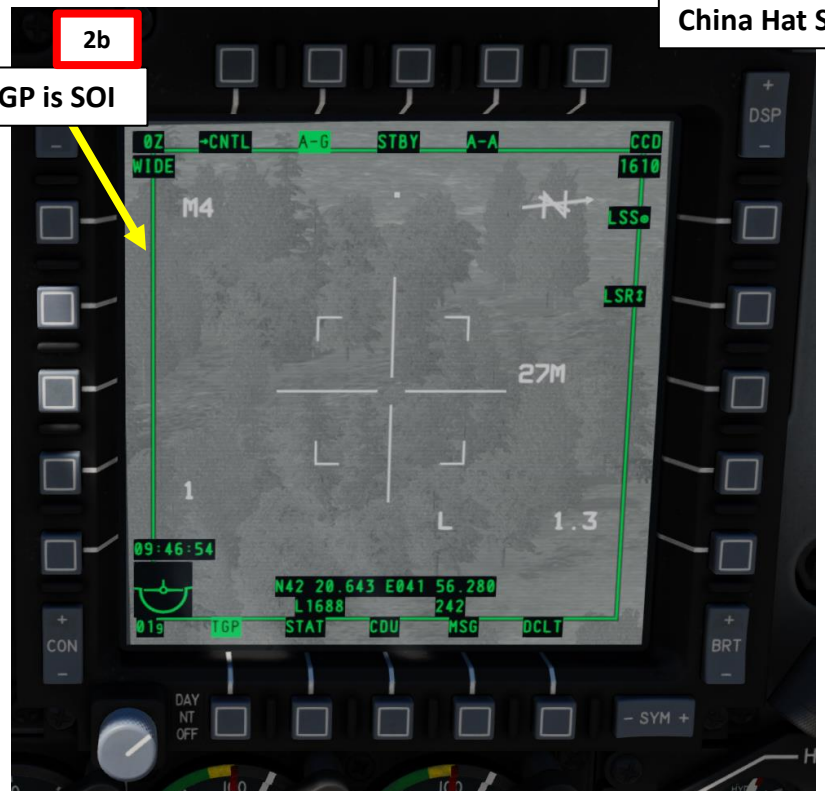
2.6 – BORESIGHT FUNCTION (A-10C LEGACY)

The Boresight function of the targeting pod is very useful if you find a target of opportunity and want to slew the TGP right in front of you.

1. Verify that targeting pod (TGP) is powered and set to A-G mode.
2. Press the Coolie Hat Switch LONG in the direction of the MFCD that displays your TGP feed (RIGHT since we have the TGP page on the right MFCD). This will set the TGP as the SOI (Sensor of Interest).
3. Press the China Hat Switch AFT SHORT
4. The targeting pod will boresight at 150 mils below the zero sight line of the aircraft, directly forward.







2 – AN/AAQ-28 LITENING Targeting Pod

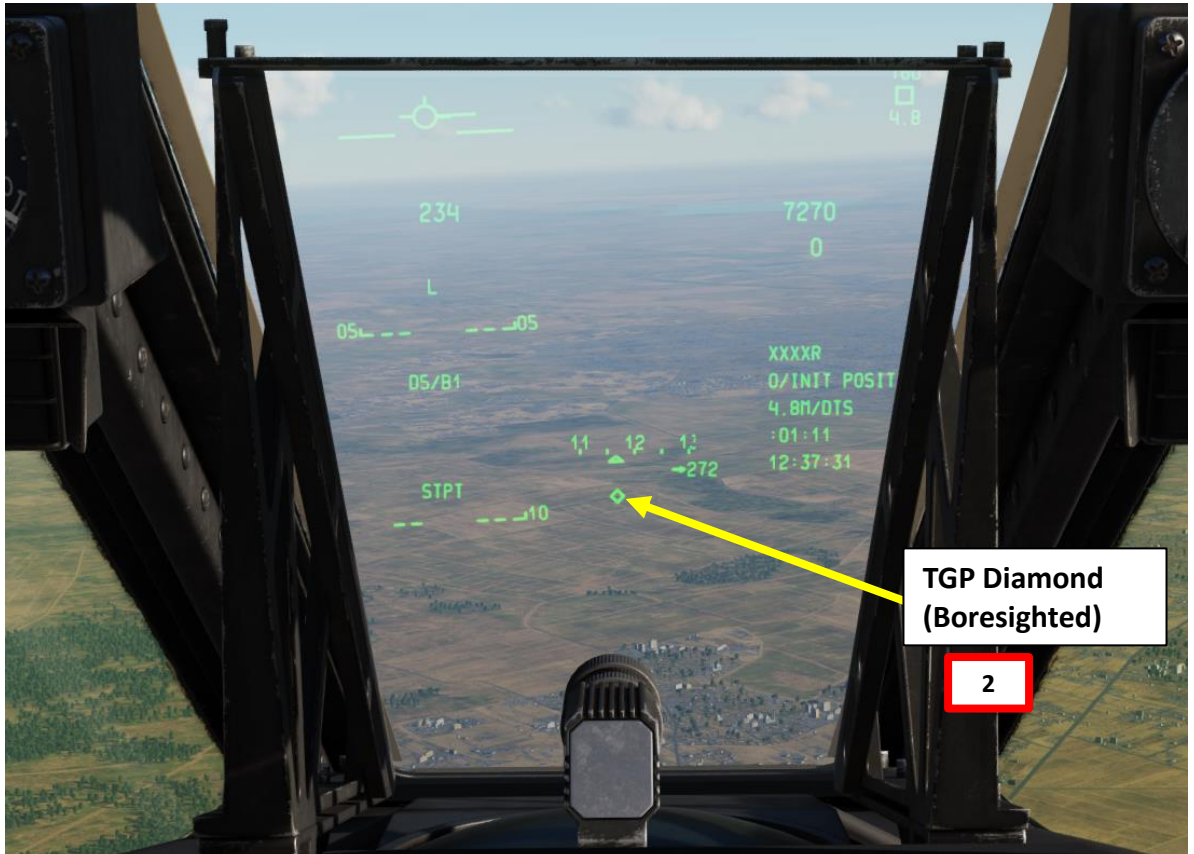
2.6 – BORESIGHT FUNCTION (A-10C II TANK KILLER EXPANSION)

The Boresight function of the targeting pod is very useful if you find a target of opportunity and want to slew the TGP right in front of you.

1. In the TGP page, press the OSB (Option Select Button) next to B-S (Boresight Function)
2. The targeting pod will boresight at 150 mils (default value) below the zero sight line of the aircraft, directly forward.

Note: you can customize the targeting pod's boresight depression angle. To do so:

a) Enter the desired depression in mils (we can take "250" as an example) on the UFC (Up-Front Control) scratchpad
b) In the TGP page, press the OSB (Option Select Button) next to B-S (Boresight Function)

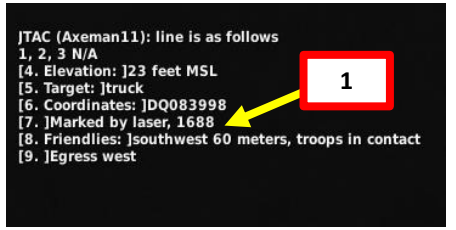


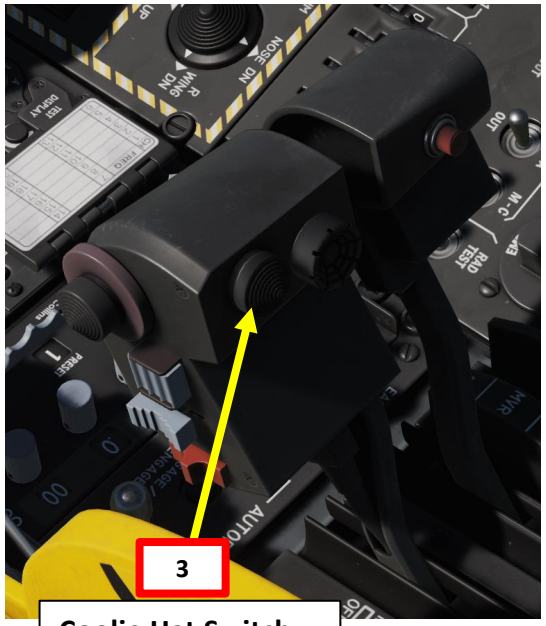
2 – AN/AAQ-28 LITENING Targeting Pod

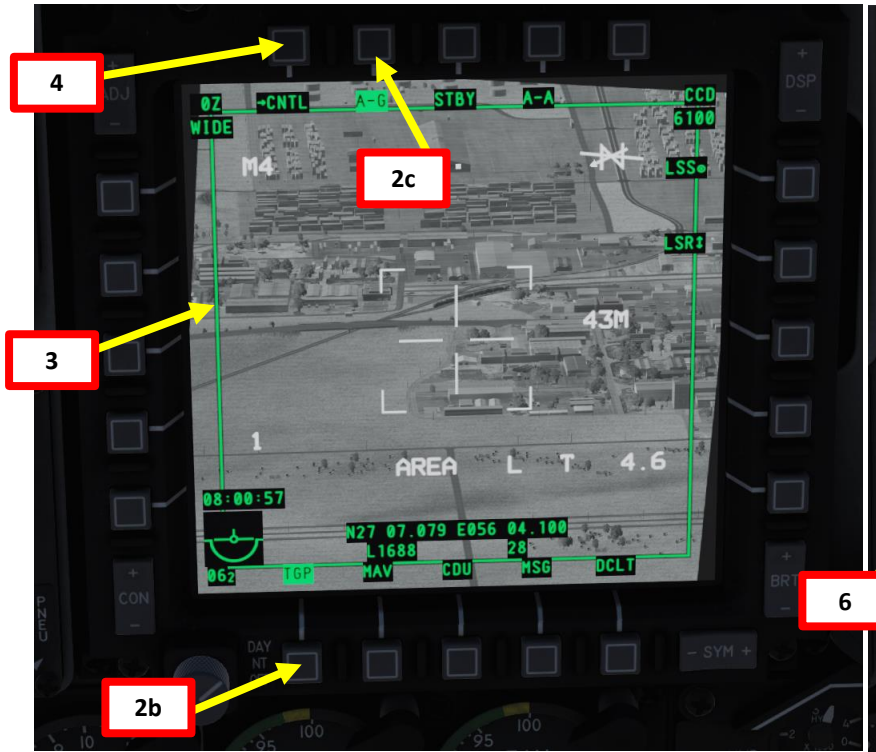
2.7 – LASER SPOT SEARCH (LSS) Mode

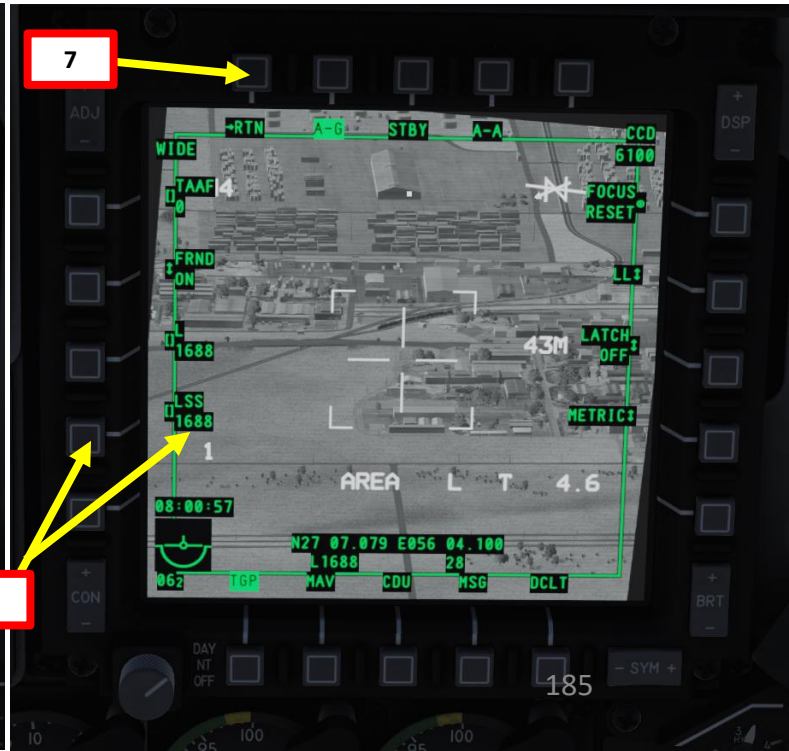
The targeting pod can also spot and track a laser from someone else (a friendly A-10 lasing his own target, or a JTAC, Joint Terminal Attack Controller, calling an air strike). To track another laser:

1. Find out what the laser code used by the friendly is (in our case, the friendly JTAC uses code 1688). Make sure the friendly asset is lasing the target before attempting to track it.
2. Power up the Targeting Pod, select TGP page and set A-G TGP Mode as per the previous Power-Up Procedure.
3. Press the Coolie Hat Switch LONG in the direction of the MFCD that displays your TGP feed (RIGHT since we have the TGP page on the right MFCD). This will set the TGP as the SOI (Sensor of Interest).
4. Press the OSB next to CNTL to enter the TGP AG Control Page.
5. Enter the desired Laser Code to be searched on the UFC Scratchpad. We will choose the default laser code 1688.
6. Press on the OSB next to “LSS” (Laser Spot Search Code) to enter LSS code 1688.
7. Press OSB next to RTN (Return) to go back to Main TGP page.



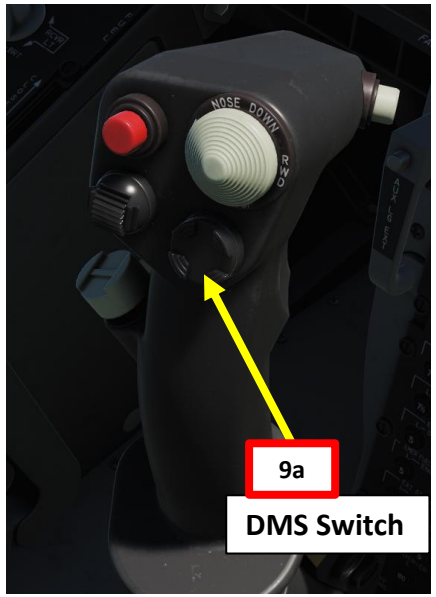


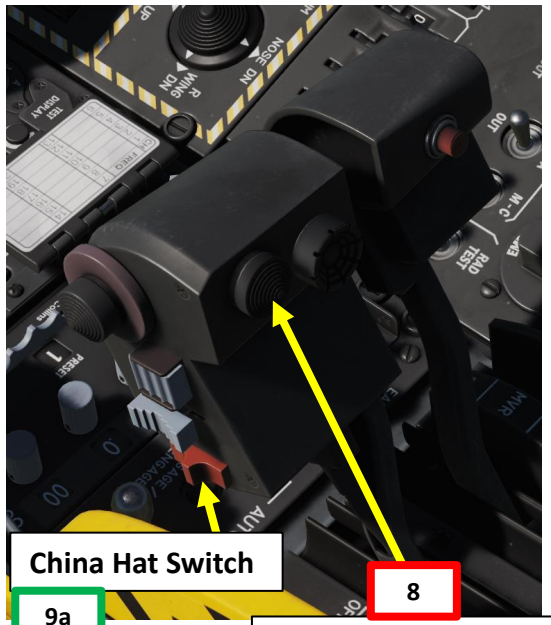


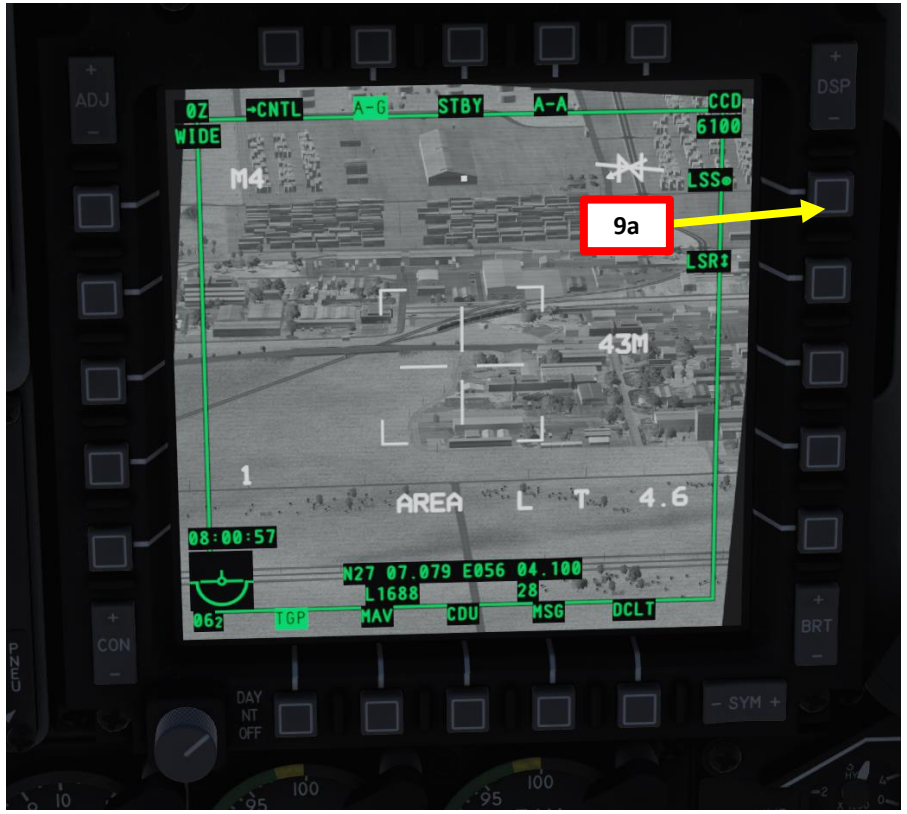


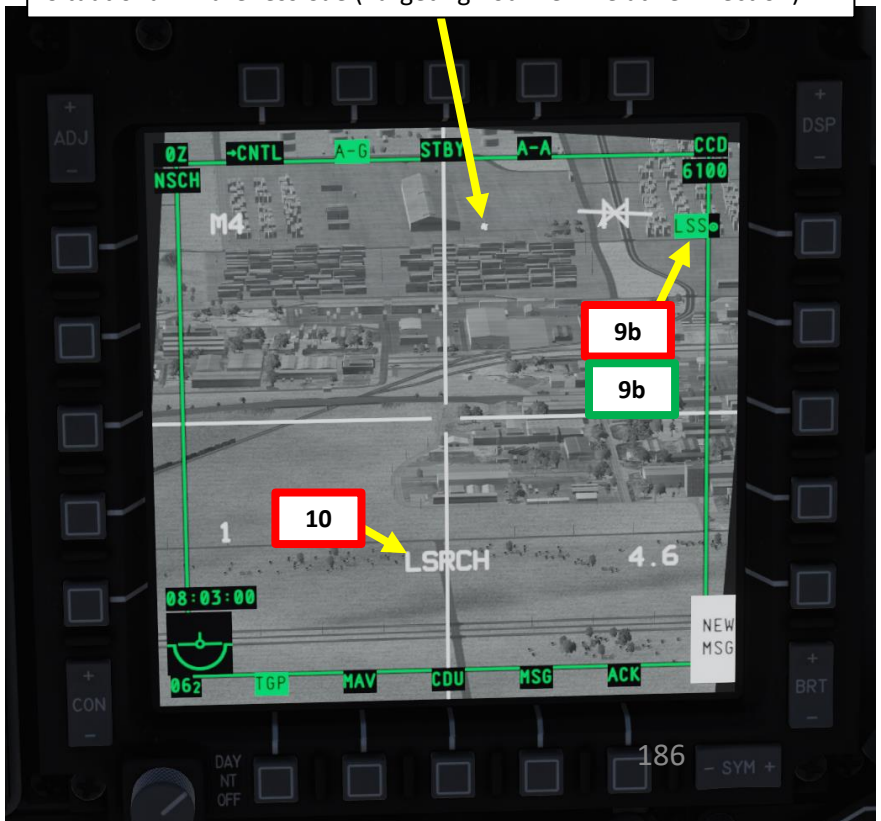
2 – AN/AAQ-28 LITENING Targeting Pod
2.7 – LASER SPOT SEARCH (LSS) Mode

8. Slew the targeting pod using the TDC Slew controls within the vicinity of the JTAC location. If the targeting pod is looking too far from the laser, it will not be able to find the laser.
9. Press the OSB next to "LSS" (Laser Spot Search).
    - Alternatively, you can also use a shortcut to start LSS operation:
        - **A-10C LEGACY:** use the DMS (Data Management Switch) RIGHT LONG.
        - **A-10C II TANK KILLER EXPANSION:** use the China Hat AFT SHORT
10. When the LSS operation starts, the TGP will be searching for a laser designation to track. "LSRCH" will be displayed in the lower center of the display. The Situational Awareness Cue will indicate where the pod is scanning.



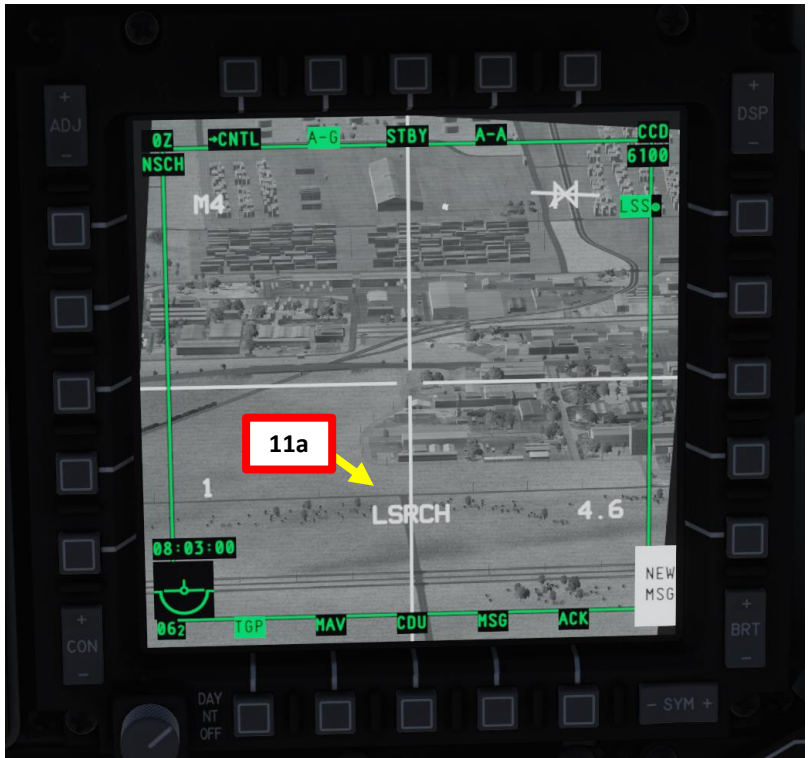


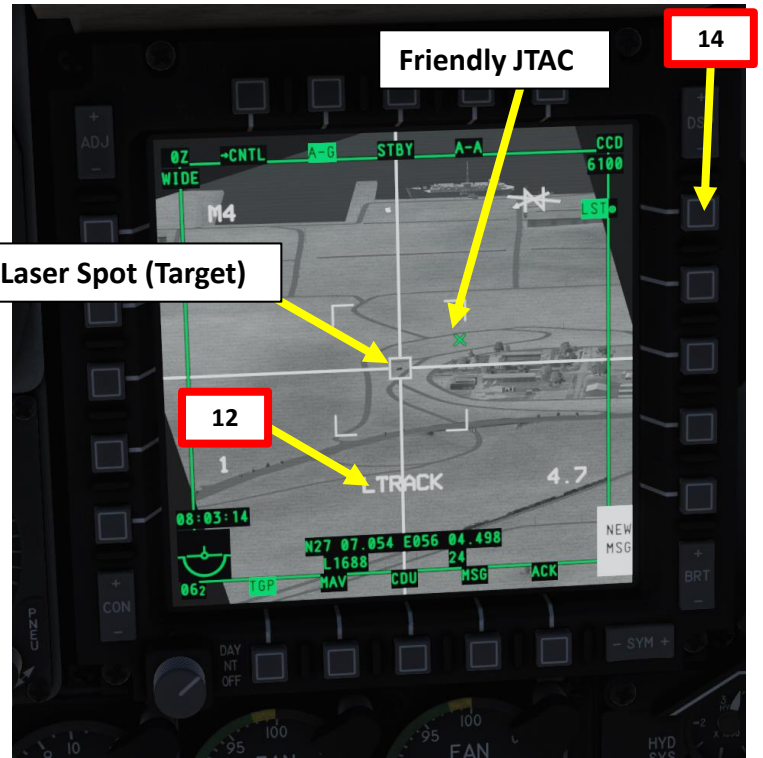




2 – AN/AAQ-28 LITENING Targeting Pod
2.7 – LASER SPOT SEARCH (LSS) Mode

11. When the TGP has detected a laser energy reflection, “DETECT” will replace “LSRCH” on the display, and the OSB label will change from “LSS” to “LST” to indicate Laser Spot Track. The TGP line of sight will then automatically slew to the detected laser reflection.
12. After 1 second, “DETECT” will be replaced with “LTRACK” and a box (container) measuring the size of the tracking gate will overlay the laser energy spot.
13. On the HUD, the TGP diamond will mark the position of the Laser Spot Track (LST). The TAD (Tactical Awareness Display) will also display the LST.
14. To exit LSS/LST mode, press OSB next to LSS.

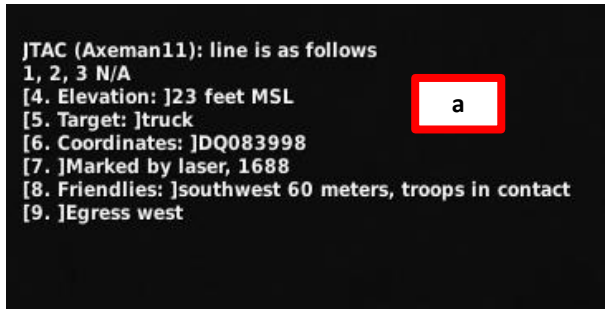


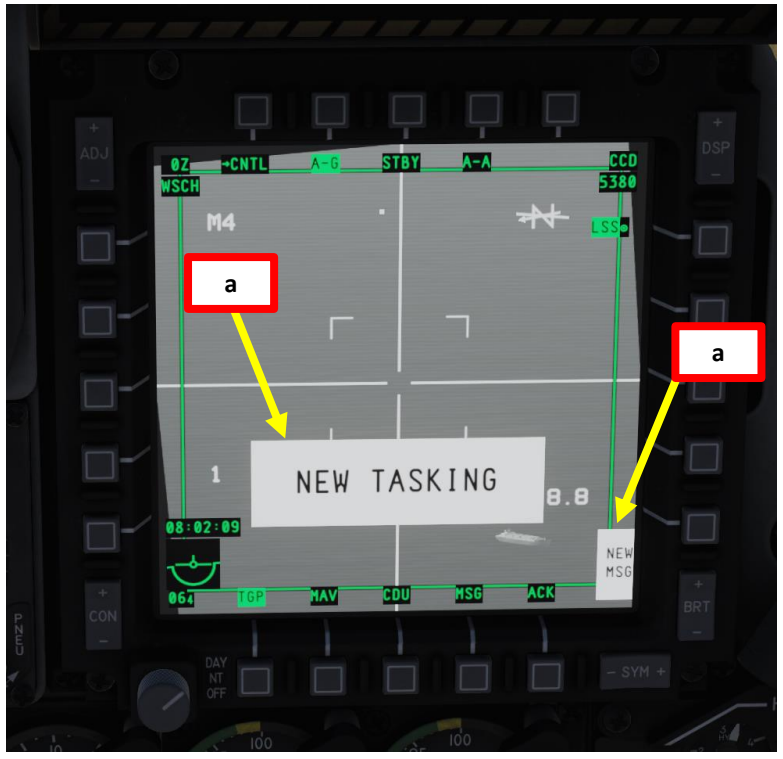


2 – AN/AAQ-28 LITENING Targeting Pod
2.7 – LASER SPOT SEARCH (LSS) Mode

When working with a JTAC (Joint Terminal Attack Controller), a "9-line" transmission is sent to you. Basically, it is a set of commands and information that is used to guide you to the target. You will likely see a "NEW TASKING" message sent to you.

a) NEW TASKING indication means a message has been sent to you from the JTAC.
b) To read 9-line message, select the MSG page.
c) Press OSB next to ACK (Acknowledge) to remove the white "NEW TASKING" message indication. Alternatively you can also clear the note with a TMS Left Short press.
d) You can return to the TGP page.



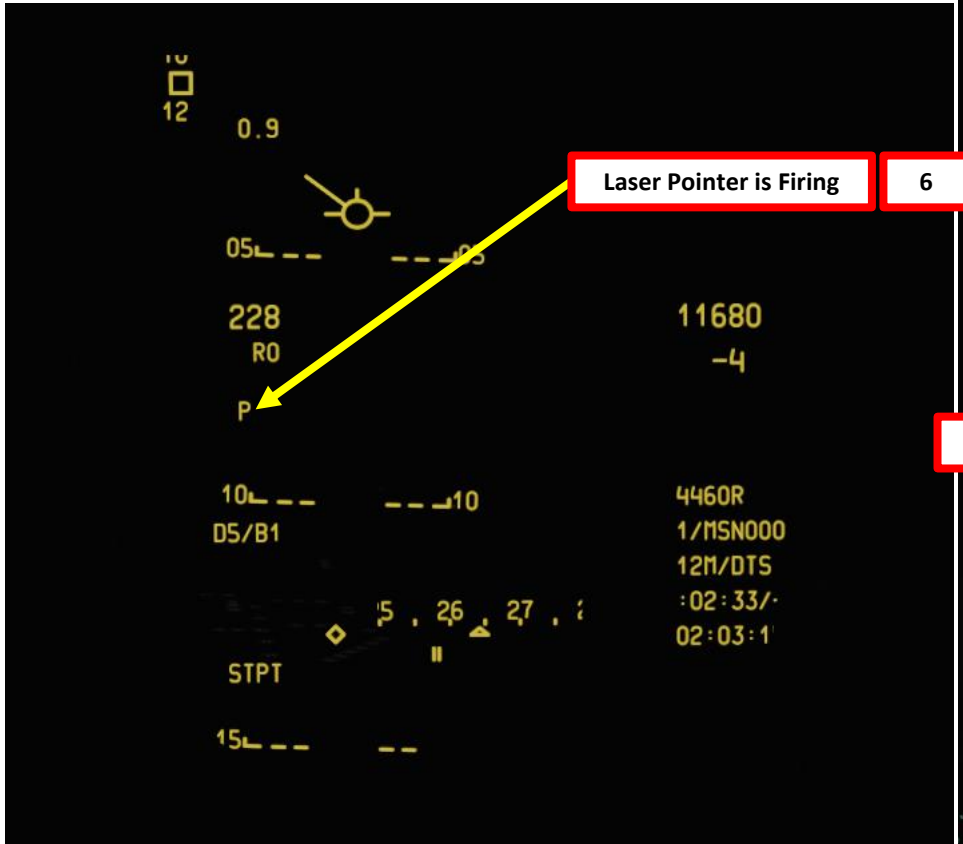


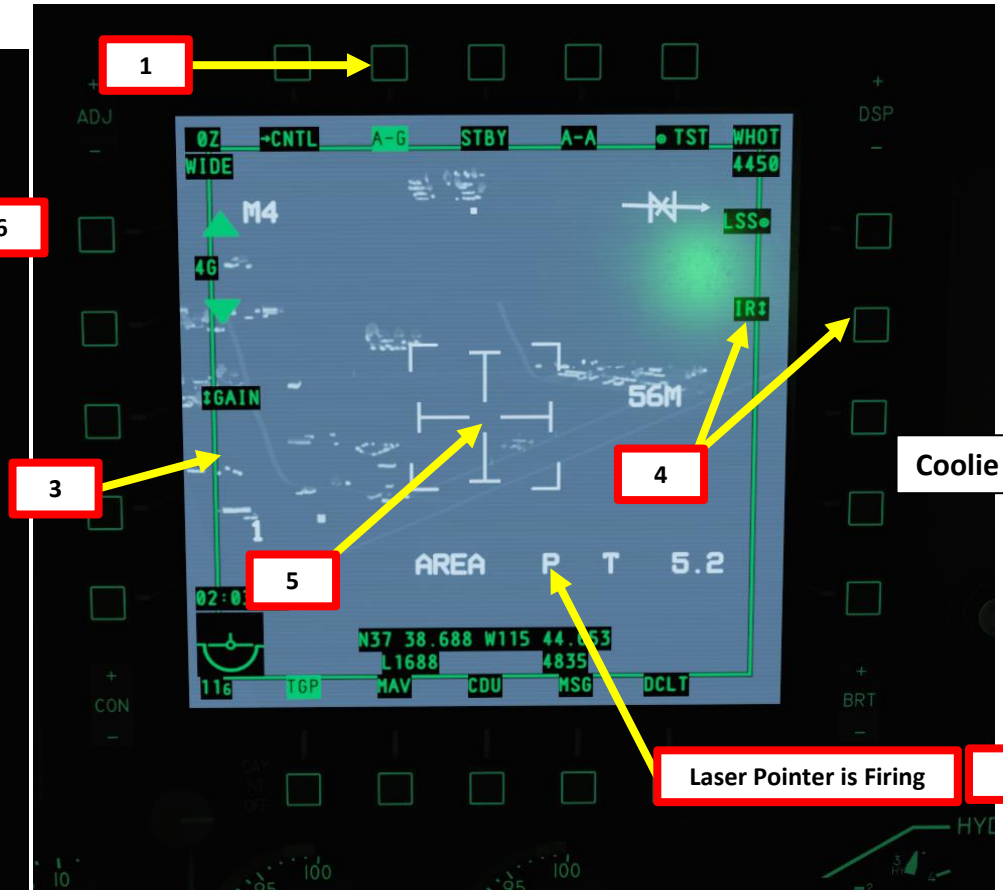
2 – AN/AAQ-28 LITENING Targeting Pod

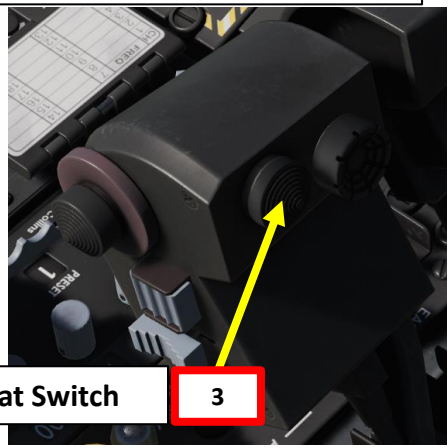
2.8 – LASER POINTER/MARKER

The targeting pod can also use a laser marker (the laser marker cannot be tracked by air-to-ground weapons), which is an infrared laser that can only be seen with night vision goggles (RSHIFT+H to toggle NVGs). This is used mainly to provide a visual reference to other aircraft on where a target is.

1. Power up the Targeting Pod and set A/G Mode as per the previous Power-Up Procedure.
2. Set Master ARM and LASER ARM switches to ARM.
3. Press the Coolie Hat Switch LONG in the direction of the MFCD that displays your TGP feed (RIGHT since we have the TGP page on the right MFCD). This will set the TGP as the SOI (Sensor of Interest).
4. Select Laser Designator Mode to IR (Infrared) with OSB.
5. Slew TGP reticle as shown previously on desired target.
6. Press and hold Nosewheel Steering Button ("Insert" binding) to fire laser. "P" (Infrared Pointer) indication will flash while pointer is firing.

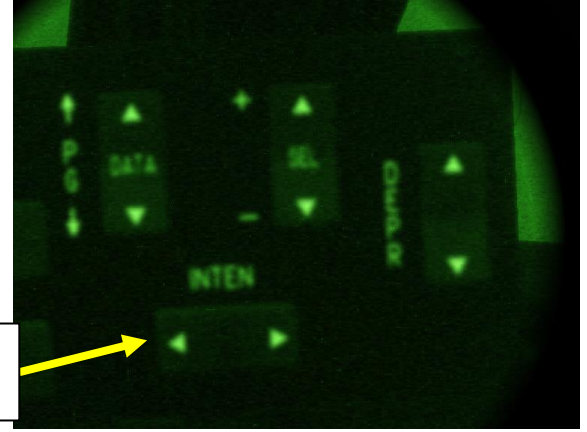


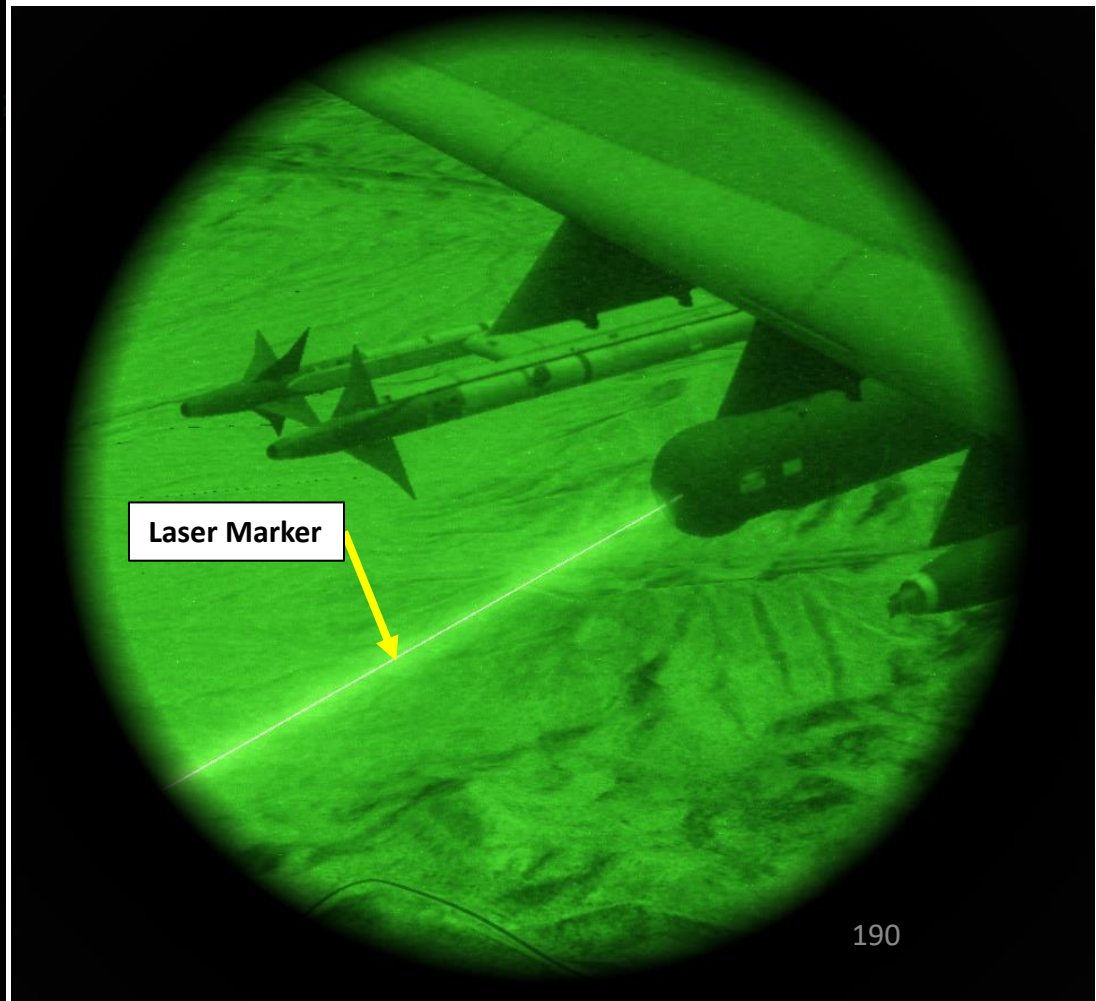




2 – AN/AAQ-28 LITENING Targeting Pod
2.8 – LASER POINTER/MARKER

I strongly suggest that you adjust your HUD Brightness with the INTEN rocker switch on the Up-Front Control if you want to be able to see the IR marking laser.

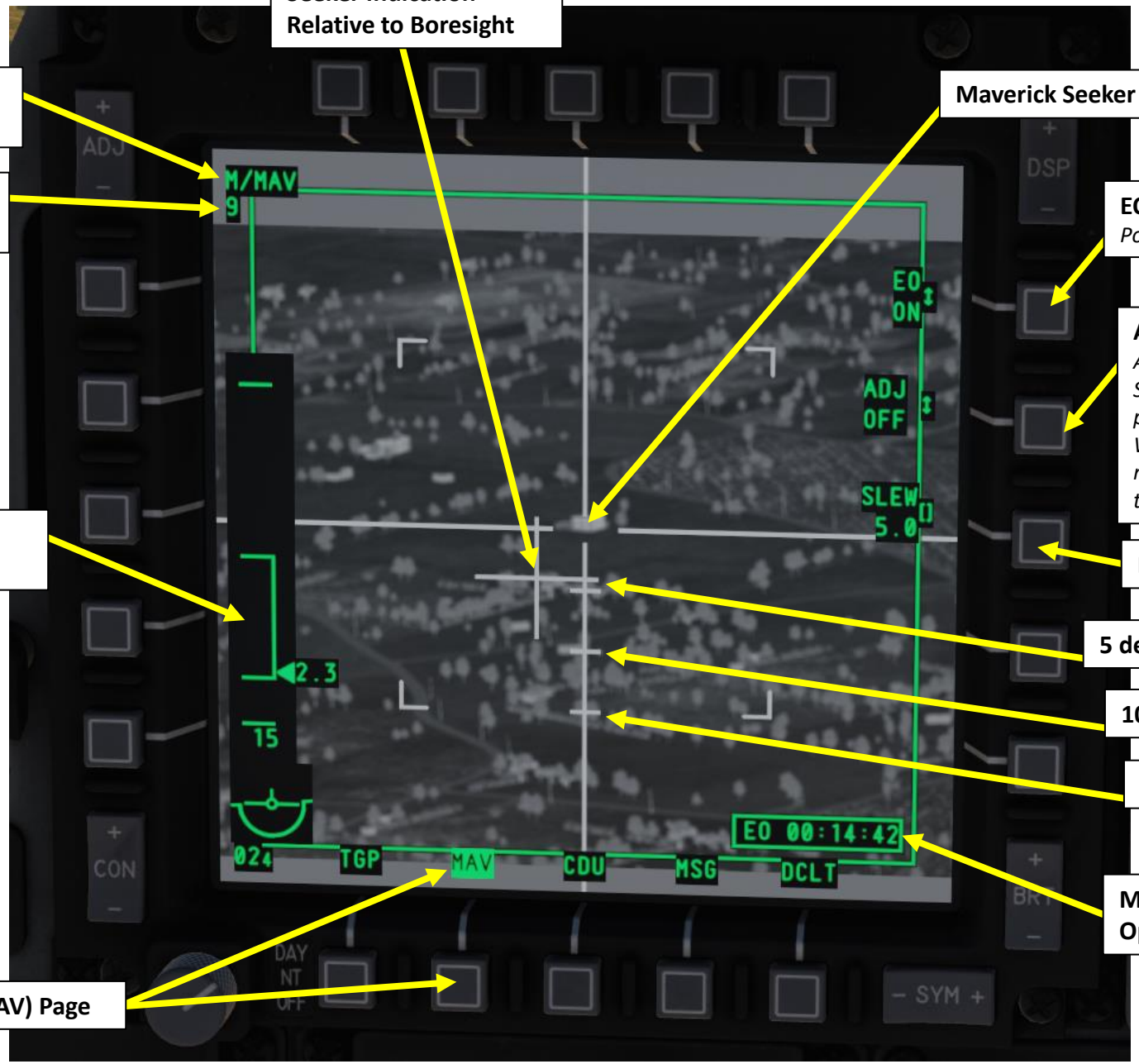




3 – AGM-65 Maverick Air-to-Ground Missile

3 – AGM-65 Maverick Air-to-Ground Missile

3.1 – DISPLAYS



Seeker Indication Relative to Boresight

Maverick Release Profile Name

Active Maverick Station Number

Maverick Seeker Center

EO (Electro-Optical) Function
Powers on Maverick missile station

Adjustment Boresight Function
Adjusts boresight position of the Maverick. Slew the Maverick to the desired boresight position, and press the OSB next to ADJ OFF. With ADJ ON, the next time you cage the missile to boresight, it will automatically cage to the set position.

Maverick Dynamic Launch Zone (DLZ)

Maverick Slew Rate Data Field

5 deg Maverick Depression Marker

10 deg Maverick Depression Marker

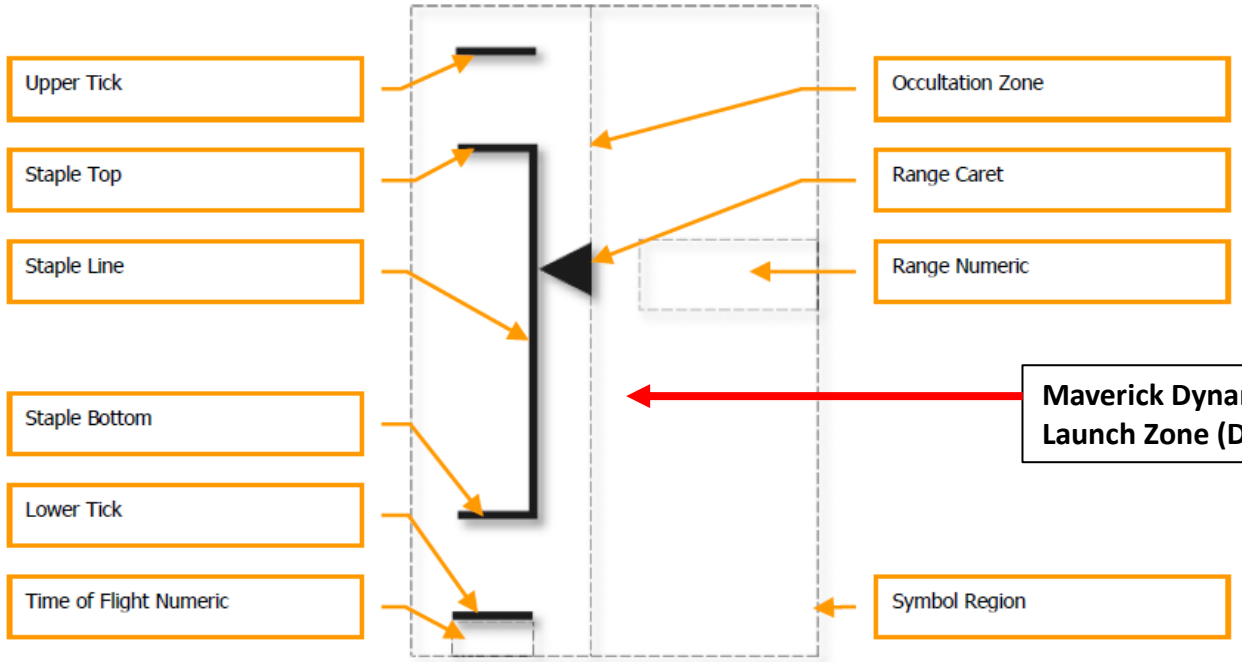
15 deg Maverick Depression Marker

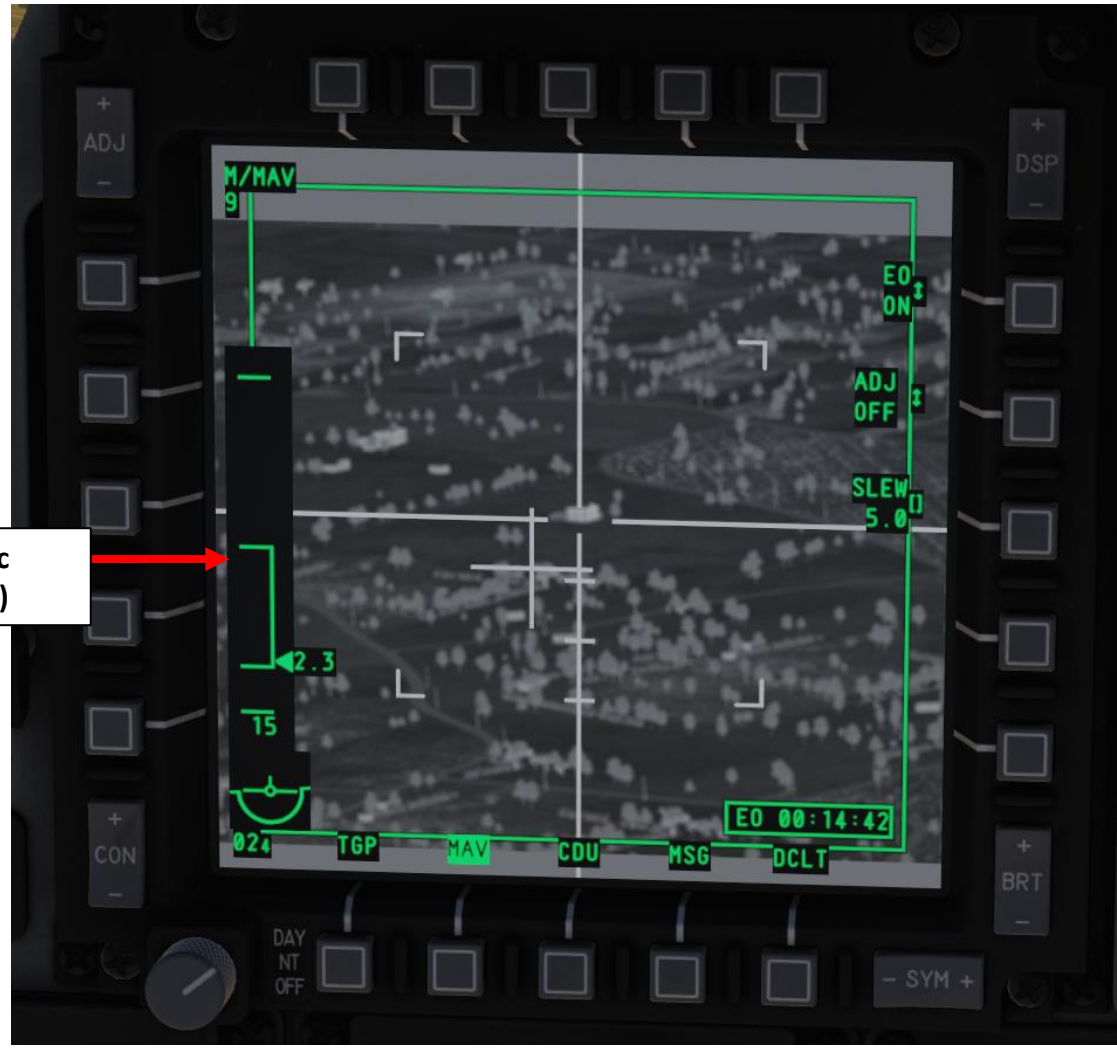
Maverick EO (Electro-Optical) Power Timer

Maverick (MAV) Page

3 – AGM-65 Maverick Air-to-Ground Missile

3.1 – DISPLAYS

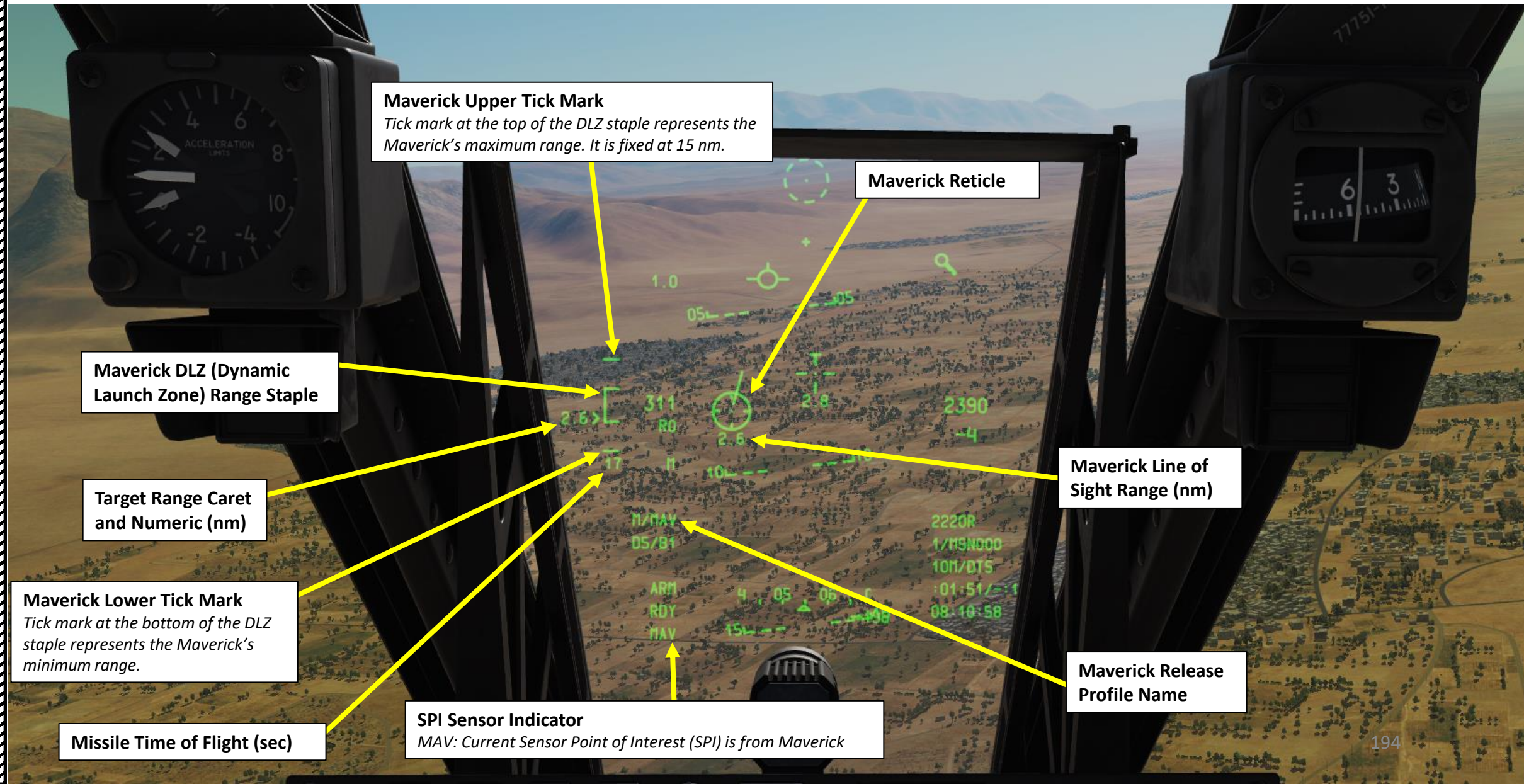




3 – AGM-65 Maverick Air-to-Ground Missile

3.1 – DISPLAYS

Maverick Data is also visible on the Heads-Up Display.



3 – AGM-65 Maverick Air-to-Ground Missile

3.2 – CONTROLS (A-10C LEGACY)

These controls work if the MAV Page is set as the SOI (Sensor of Interest) with the Coolie Hat Switch and the Maverick missile is selected from the DSMS (Digital Stores Management System) page.

- **TMS SWITCH: Target Management System**
  - FWD SHORT: Missile Track
  - FWD LONG: Creates SPI (Sensor Point of Interest)
  - AFT SHORT: Ground Stabilize
  - AFT LONG: SPI set to Steerpoint
  - LEFT SHORT: Reset WCN (Warning, Caution & Notes)
  - LEFT LONG: Space Stabilize
  - RIGHT: Sets Markpoint

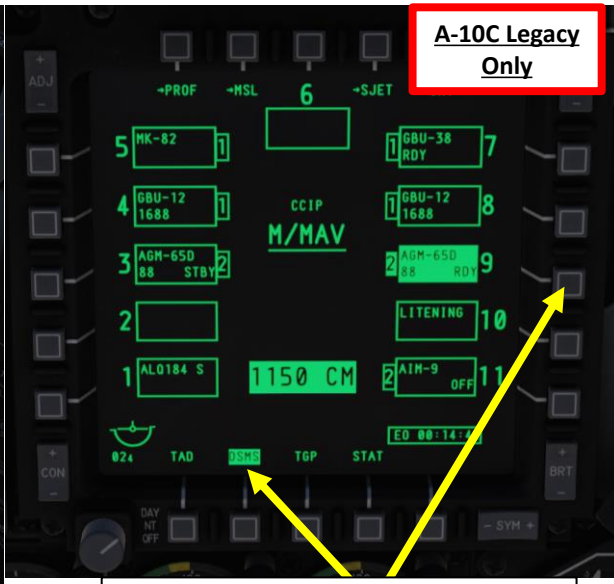
- **DMS SWITCH: Data Management Switch**
  - FWD/AFT/LEFT/RIGHT: Maverick Reticle UP/DOWN/LEFT/RIGHT

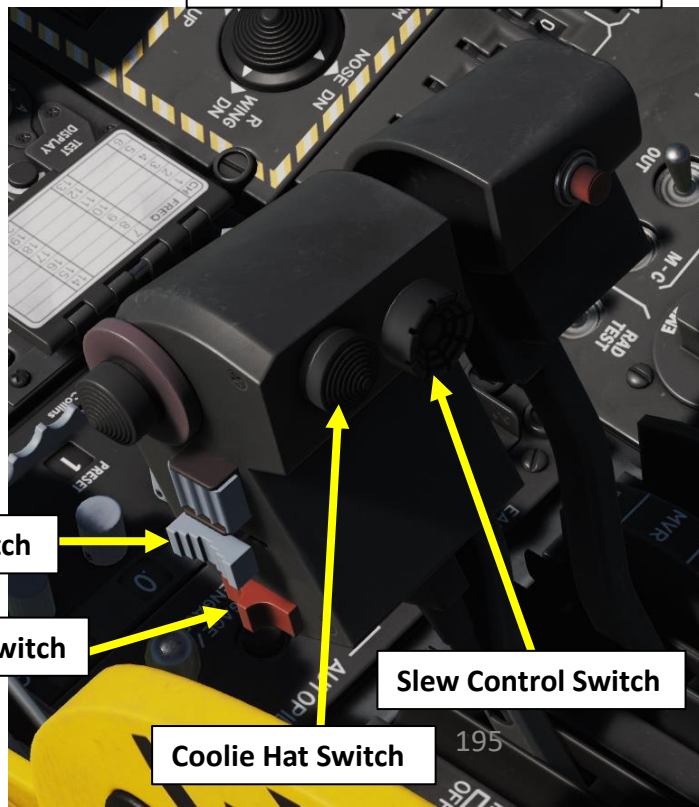
- **SLEW CONTROL**
  - Used to control where your Maverick / Sensor of Interest (SOI) is looking

- **COOLIE HAT**
  - LEFT/RIGHT LONG: Selects MFCD as SOI (Sensor of Interest)

- **BOAT SWITCH**
  - Cycle through different Maverick modes
    - FWD: Black Symbols
    - MIDDLE: Force Correlate / AUTO
    - AFT: White Symbols

- **CHINA HAT**
  - FWD SHORT: Field-of-View Wide/Narrow Toggle
  - FWD LONG: Slaves all sensors to SPI (Sensor Point of Interest)
  - AFT SHORT: Maverick Missile Step (selects other missile) / Resets missile to boresight position





3 – AGM-65 Maverick Air-to-Ground Missile

3.2 – CONTROLS (A-10C II TANK KILLER)

These controls work if the MAV Page is set as the SOI (Sensor of Interest) with the Coolie Hat Switch and the Maverick missile is selected from the DSMS (Digital Stores Management System) page.

- **TMS SWITCH: Target Management System**
  - FWD SHORT: Missile Track
  - FWD LONG: Creates SPI (Sensor Point of Interest)
  - AFT SHORT: Ground Stabilize
  - AFT LONG: SPI set to Steerpoint
  - LEFT SHORT: Reset WCN (Warning, Caution & Notes)
  - **LEFT LONG: SPI Broadcast**
  - RIGHT SHORT: Sets Markpoint
  - **RIGHT LONG: Set Last Markpoint as the SPI**

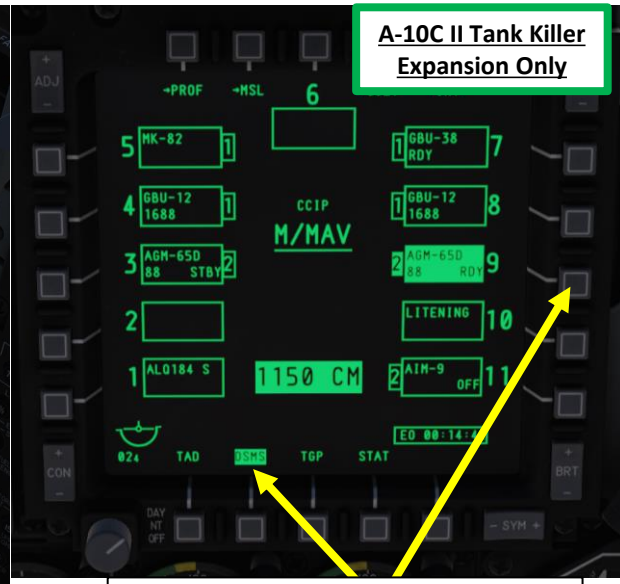
- **DMS SWITCH: Data Management Switch**
  - FWD/AFT/LEFT/RIGHT SHORT: Maverick Reticle UP/DOWN/LEFT/RIGHT
  - **FWD LONG: Gyro Stabilize**
  - **LEFT LONG: HMD (Helmet-Mounted Display) ON/OFF**
  - **RIGHT LONG: Slave Maverick to HMIT (Helmet-Mounted Integrated Targeting) Line-of-Sight**

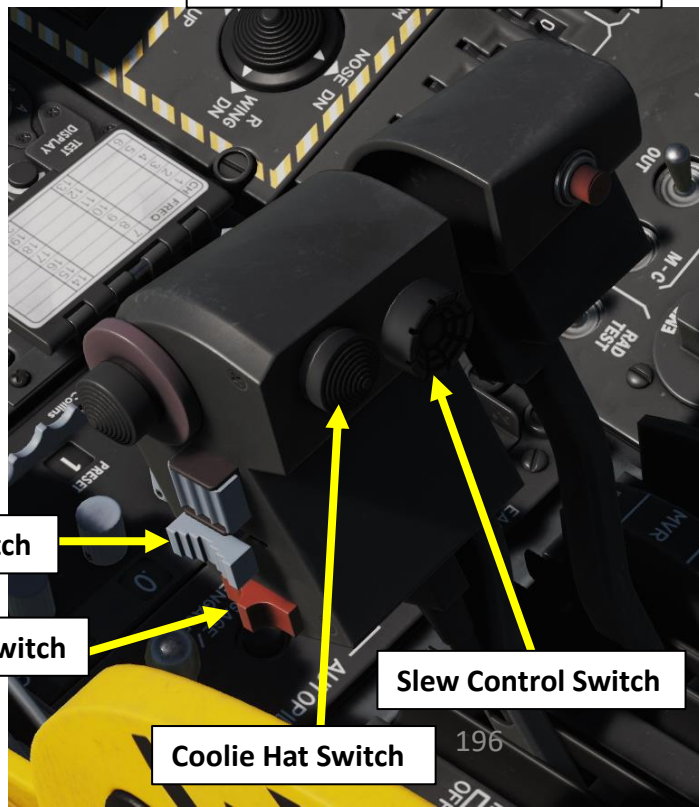
- **SLEW CONTROL**
  - Used to control where your Maverick / Sensor of Interest (SOI) is looking

- **COOLIE HAT**
  - LEFT/RIGHT LONG: Selects MFCD as SOI (Sensor of Interest)

- **BOAT SWITCH**
  - Cycle through different Maverick modes
    - FWD: Black Symbols
    - MIDDLE: Force Correlate / AUTO
    - AFT: White Symbols

- **CHINA HAT**
  - FWD SHORT: Field-of-View Wide/Narrow Toggle
  - FWD LONG: Slaves all sensors to SPI (Sensor Point of Interest)
  - **AFT SHORT: Resets missile to boresight position (recage seeker)**





4 – SCORPION HMCS (HELMET-MOUNTED CUEING SYSTEM)

A-10C II Tank Killer Expansion Only

4 – SCORPION HMCS (HELMET-MOUNTED CUEING SYSTEM)

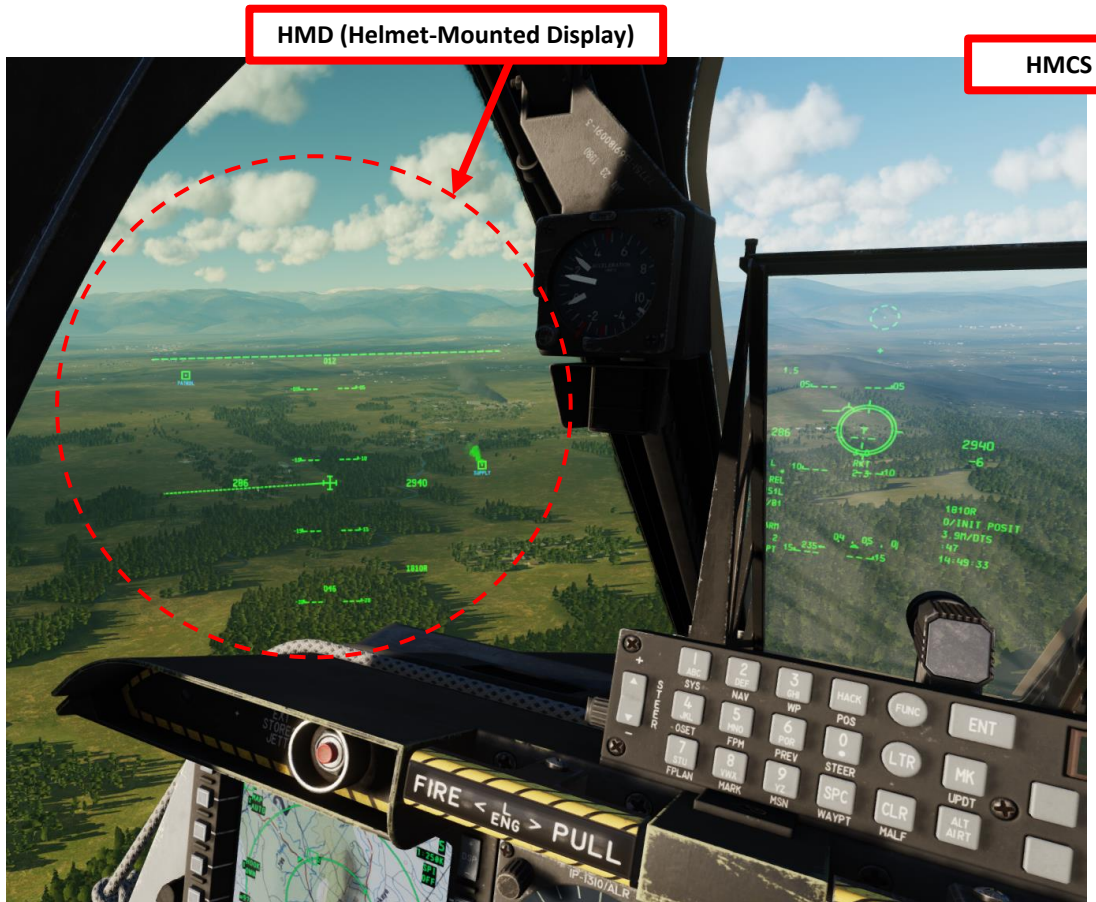
A-10C II Tank Killer Expansion Only

4.1 - Introduction

The Scorpion HMCS (Helmet-Mounted Cueing System) allows the pilot to command a sensor to the user line of sight and provides situational awareness via a Helmet Mounted Display (HMD).

The HMCS displays both HUD (Heads-Up Display) and TAD (Tactical Awareness Display) symbology on your helmet line-of-sight, which can be interacted with other sensors like the targeting pod. The situational awareness increase provided by the Scorpion is incredible and will make you feel like you're playing a video game inside a video game.

I highly recommend that you check out Redkite's HMCS tutorial: https://youtu.be/NJjHu_H1ImY



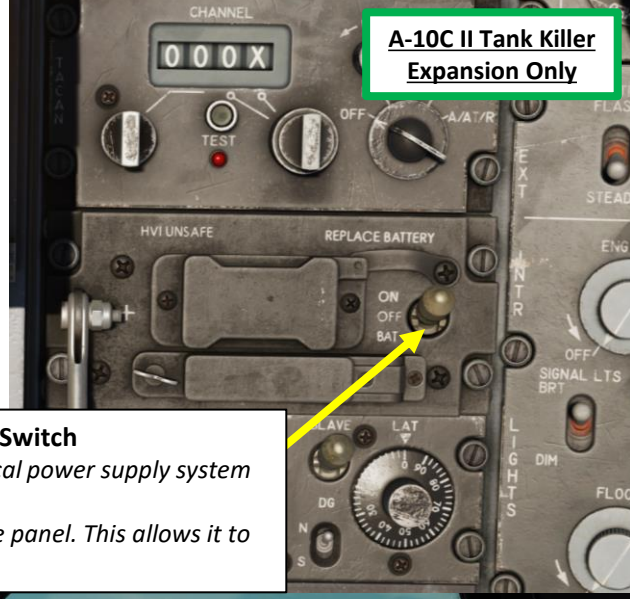
4 – SCORPION HMCS (HELMET-MOUNTED CUEING SYSTEM)

4.2 – HMCS Power-Up & Setup

To **power up the HMCS**:

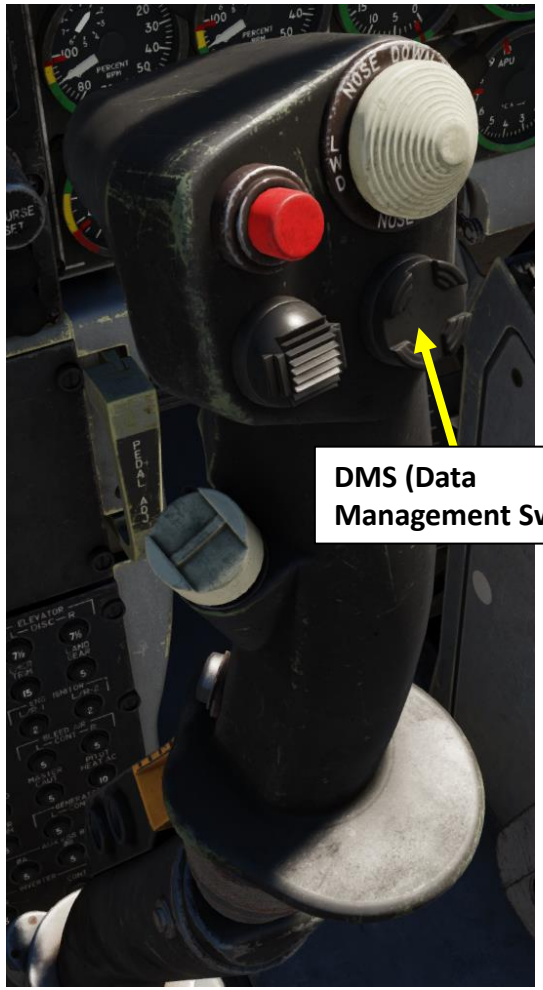
1. The HMCS is powered on with the **HMCS Power Switch set to ON**.
2. The default setting for the HMCS is that the HMD overlay will only be visible when looking away from the Heads-Up Display.
3. To toggle the HMD (Helmet-Mounted Display) overlay ON or OFF, press DMS (Data Management Switch) LEFT LONG.

A-10C II Tank Killer Expansion Only



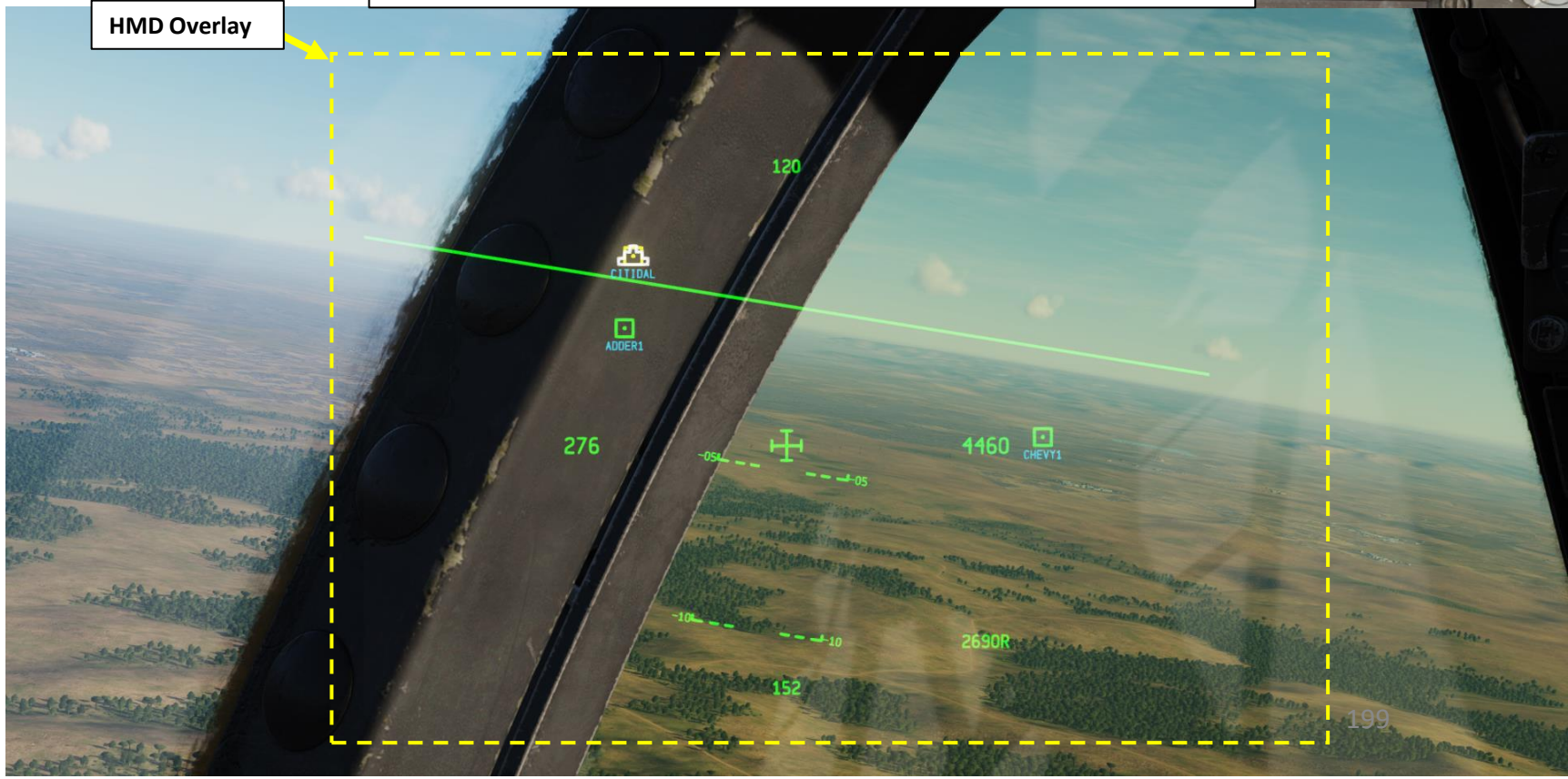
Scorpion HMCS (Helmet-Mounted Cueing System) Power Switch

- *ON (FWD): Power to the HMCS through the aircraft electrical power supply system*
- *OFF (MIDDLE): Power removed from the HMCS.*
- *BAT (AFT): Power to the HMCS using a battery stored in the panel. This allows it to be tested without need of aircraft electrical power.*



DMS (Data Management Switch)

HMD Overlay



4 – SCORPION HMCS (HELMET-MOUNTED CUEING SYSTEM)

4.2 – HMCS Power-Up & Setup

A-10C II Tank Killer Expansion Only

The HMCS contains three preset profiles, which can be modified at will using the STAT page's HMCS sub-menu. Editing a profile will let you choose:

- What symbols are displayed on the HMD regardless of helmet orientation (**ON**),
- What symbols are hidden (**OFF**),
- What symbols are hidden when the helmet's line of sight is lined up with the aircraft's Heads-Up Display (OCLD for "**Occludable**").
- A display cutoff range (symbols will only appear when they are within the specified range in nautical miles)

Note: the HORIZON LINE symbol is an exception and can be set to OFF, NORM (Normal) and GHST (Ghost) .

4 – SCORPION HMCS (HELMET-MOUNTED CUEING SYSTEM)

4.2 – HMCS Power-Up & Setup

A-10C II Tank Killer Expansion Only

Here is a summary of all different HMCS Symbology page options:

CROSSHAIR	Gives indication of HMD line of sight.
OWN SPI	Ownship SPI
SPI INDICATOR	Line connecting center of crosshair to ownship SPI when SPI outside of HMD FoV.
HORIZON LINE	Solid or dashed line indicating the horizon.
HDC	HMCS Helmet Designation Cursor (HDC).
HOOKSHIP	The HMCS Hookship symbol.
TGP DIAMOND	Indicates TGP line of sight.
TGP FOV	Dashed box indicating the TGP FoV.
FLIGHT MEMBERS	Own flight members.
FLIGHT MEMBER SPI	A flight member SPI symbol.
DONOR AIR PPLI	Donor Air PPLI.
DONOR SPI	A non-flight member SPI symbol.
AIR ENVIR	All non-FM and donor air objects.
AIR VMF FRIEND	No function
AIR PPLI (NON-DONOR)	Air PPLI except flight members and donors.
AIR TRK FRIEND	No function
AIR NEUTRAL	No function
AIR SUSPECT	No function

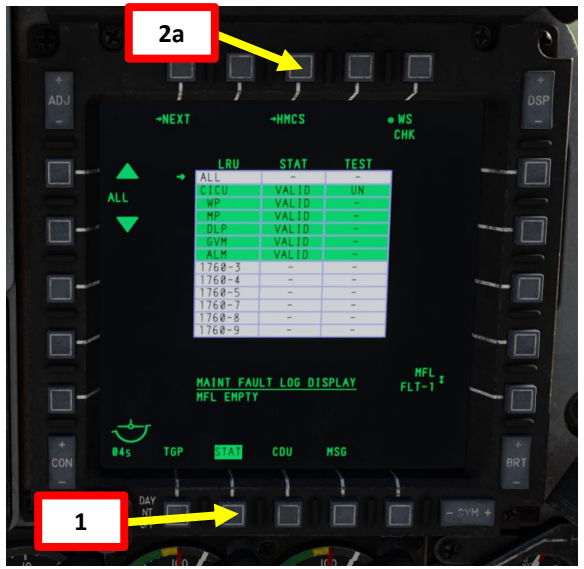
AIR HOSTILE	No function
AIR OTHER	No function
GND ENVIR	All land and surface objects.
GND VMF FRIEND	All ground VMFs.
GND PPLI	No function
GND TRK FRIEND	No function
GND NEUTRAL	No function
GND SUSPECT	No function
GND HOSTILE	No function
GND OTHER	No function
EMER PONIT	No function
STEERPOINT	Current steerpoint.
MSN/MARKPOINTS	Mission points and mark points based on steerpoint switch setting.
MSN/MARK LABELS	Mission points and mark points text labels.
AIRSPEED	Indicated Air Speed (IAS)
RADAR ALTITUDE	Above Ground Level (AGL) altitude.
BARO ALTITUDE	Barometric altitude (MSL).
A/C HEADING	Heading of aircraft.
HELMET HEADING	Heading of HMCS line of sight.
HMD ELEV LINES	HMCS HMD elevation pitch lines.

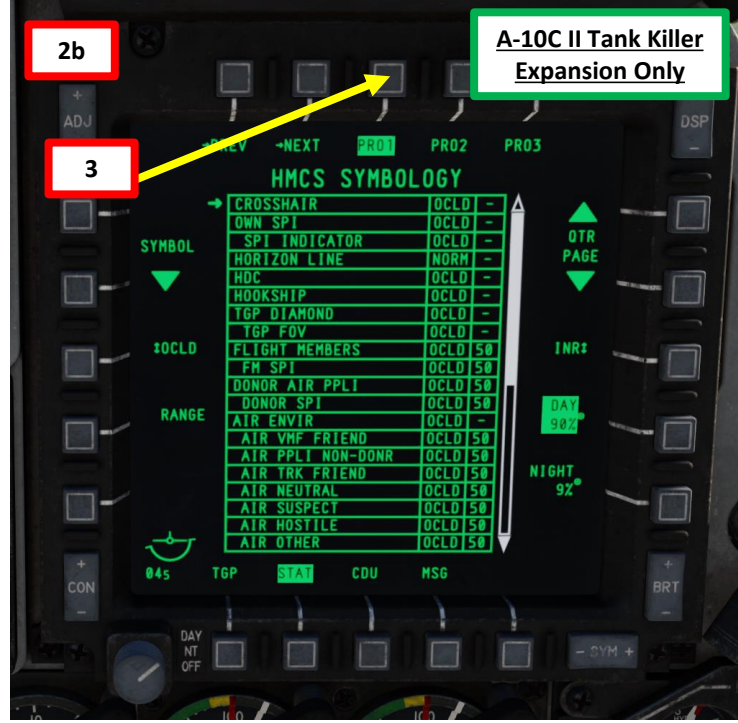
4 – SCORPION HMCS (HELMET-MOUNTED CUEING SYSTEM)

4.2 – HMCS Power-Up & Setup

To **modify an existing HMCS profile**:

1. Select STAT (Status) page by pressing OSB (Option Select Button) Next to STAT.
2. Select HMCS Symbology page by pressing OSB next to HMCS
3. Select the HMCS profile you wish to change by using the OSB next to either PRO1, PRO2 or PRO3.
4. Press OSBs next to SYMBOL arrows to increment/decrement selection arrow to the HMCS symbology option you want to change. OSBs next to OTR PAGE (Other Page) can scroll further down the list as well.
5. Press OSB next to OCLD/ON/OFF to toggle between visibility options.
6. OPTIONAL: To modify the selected symbol's cutoff range, enter the desired cutoff range (in nm) on the UFC Scratchpad. We will choose 25 nm. Then, press OSB next to "RANGE".





4 – SCORPION HMCS (HELMET-MOUNTED CUEING SYSTEM)

4.2 – HMCS Power-Up & Setup

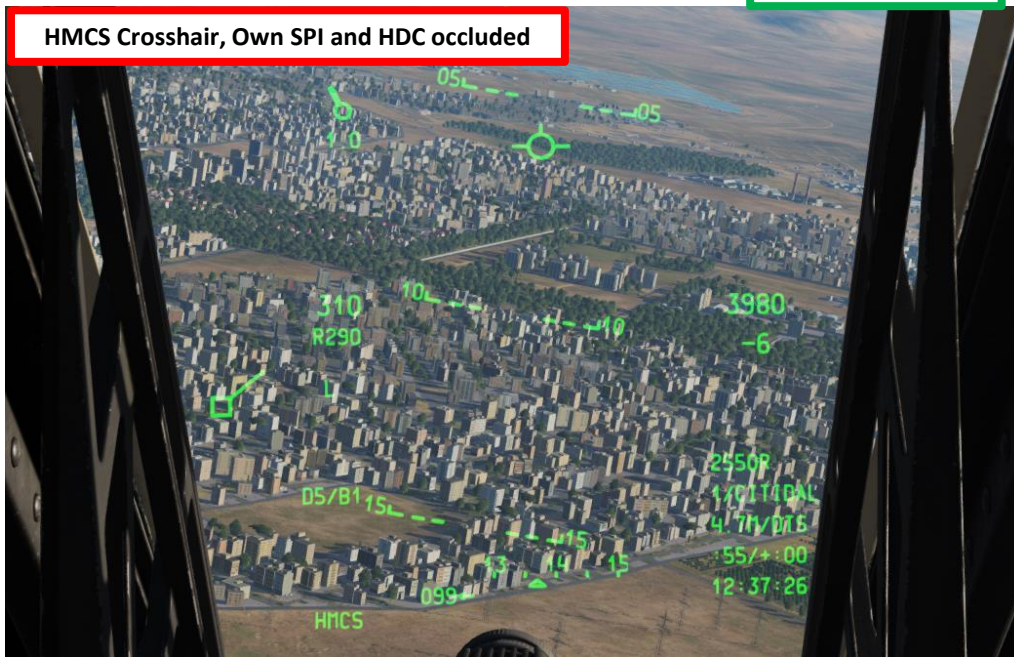
A-10C II Tank Killer Expansion Only

Profile Recommendation

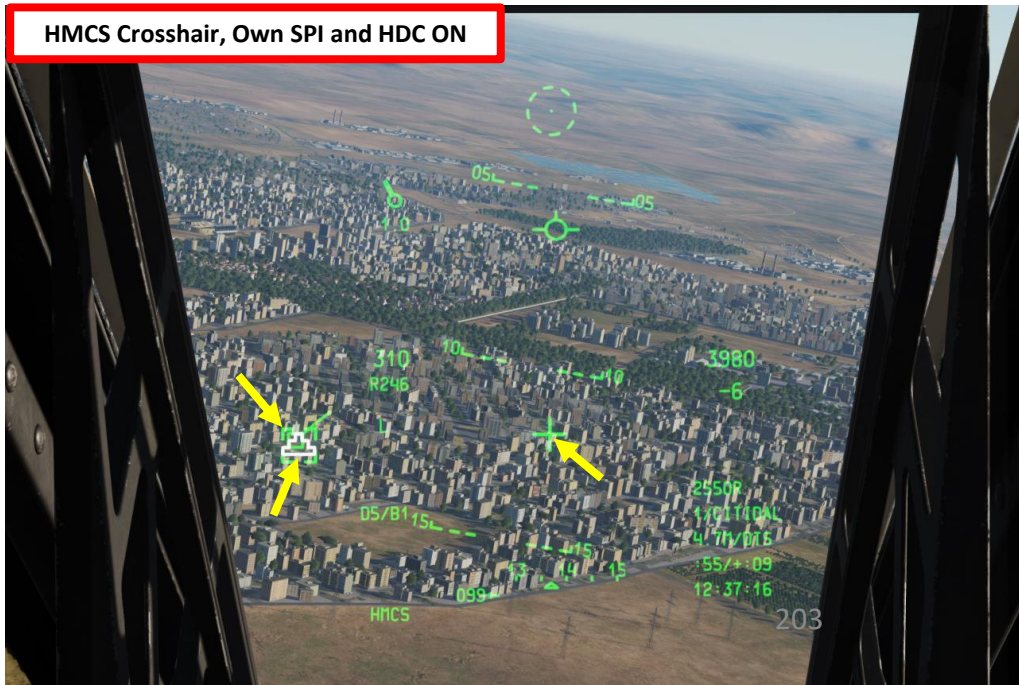
While occluding most of the HMCS symbology is recommended in order to avoid cluttering your HUD, I would recommend using these few particular HMCS settings in order to see them through the HUD while doing an attack run.

- CROSSHAIR – ON
- OWN SPI – ON
- HDC – ON

HMCS Crosshair, Own SPI and HDC occluded



HMCS Crosshair, Own SPI and HDC ON



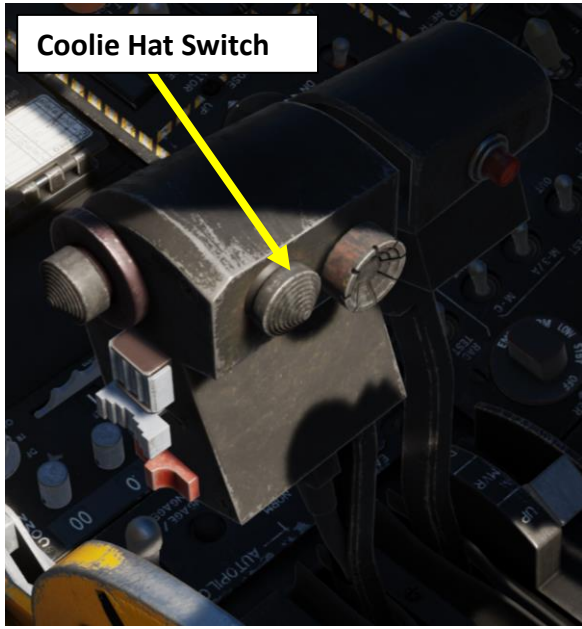
4 – SCORPION HMCS (HELMET-MOUNTED CUEING SYSTEM)

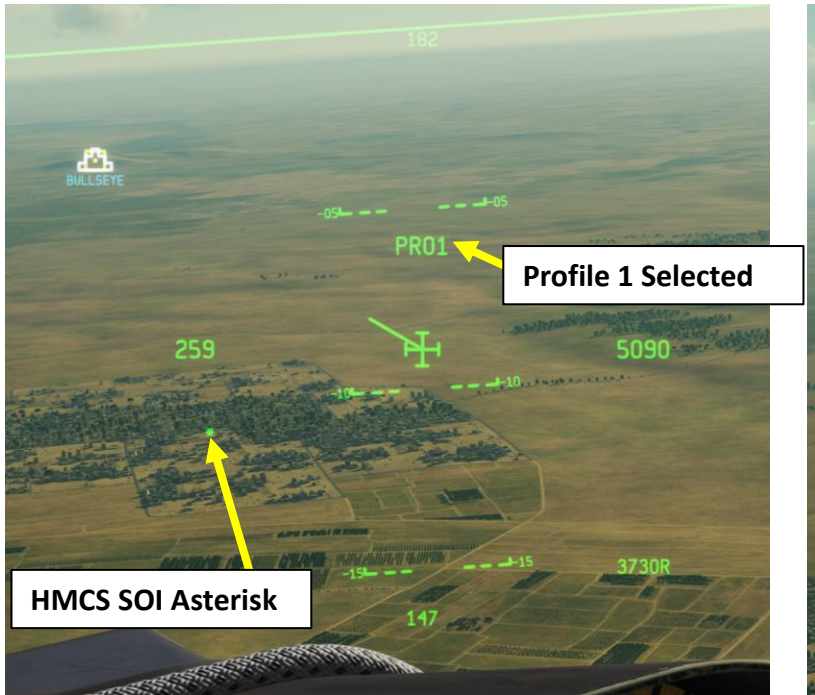
4.2 – HMCS Power-Up & Setup

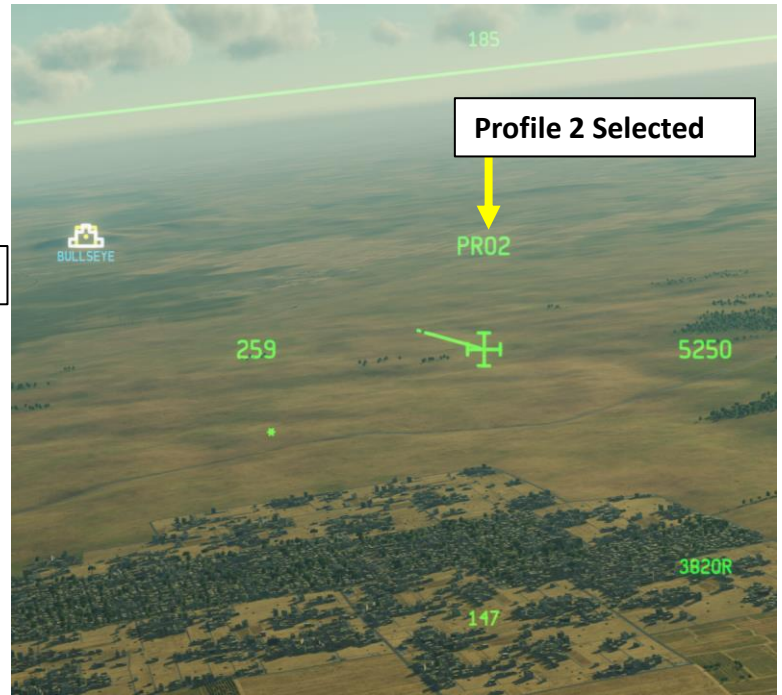
A-10C II Tank Killer Expansion Only

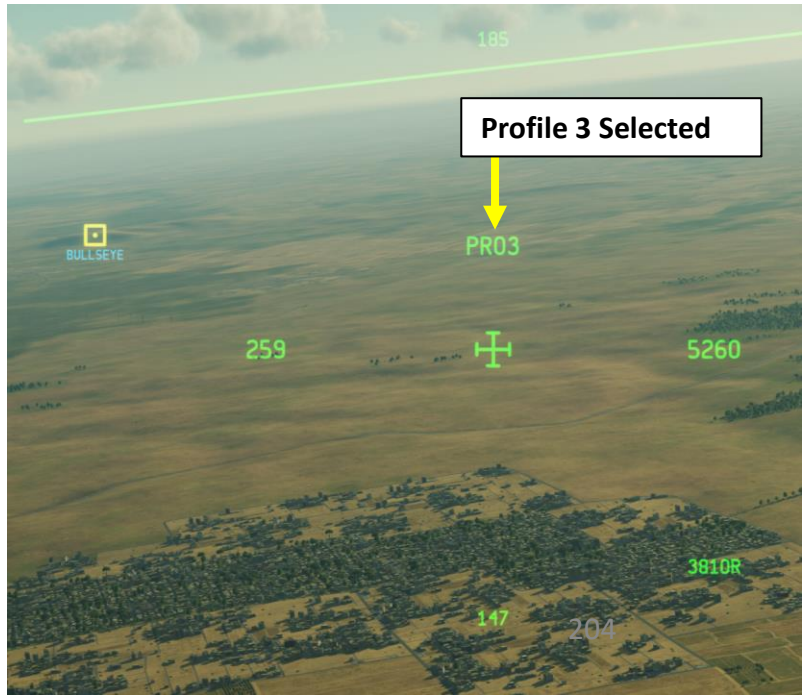
To **cycle between HMCS profiles**:

1. Set the HMD (Helmet-Mounted Display) as the SOI (Sensor of Interest) by pressing the Coolie Hat Switch DOWN. The asterisk on the HMD overlay will indicate the HMCS is SOI.
2. Press DMS (Data Management Switch) RIGHT SHORT to cycle between the three profiles. Alternatively, you can also go in the HMCS Symbology page and select the profile via the Profile Selector OSBs.









4 – SCORPION HMCS (HELMET-MOUNTED CUEING SYSTEM)

4.3 – HMCS Symbology

Since a lot of information can be displayed at once on the HMD, we will break down the HMCS components in the following categories:

- Basic HMD Symbology (basic aircraft and HMCS data)
- Navigation HMD Symbology (Markpoints, Steerpoints, etc.)
- Unit HMD Symbology (nearby unit symbols that you would typically find on the TAD (Tactical Awareness Display) page obtained from Datalink)
- Designation HMD Symbology (when you "hook" a symbol with the helmet or targeting pod data)

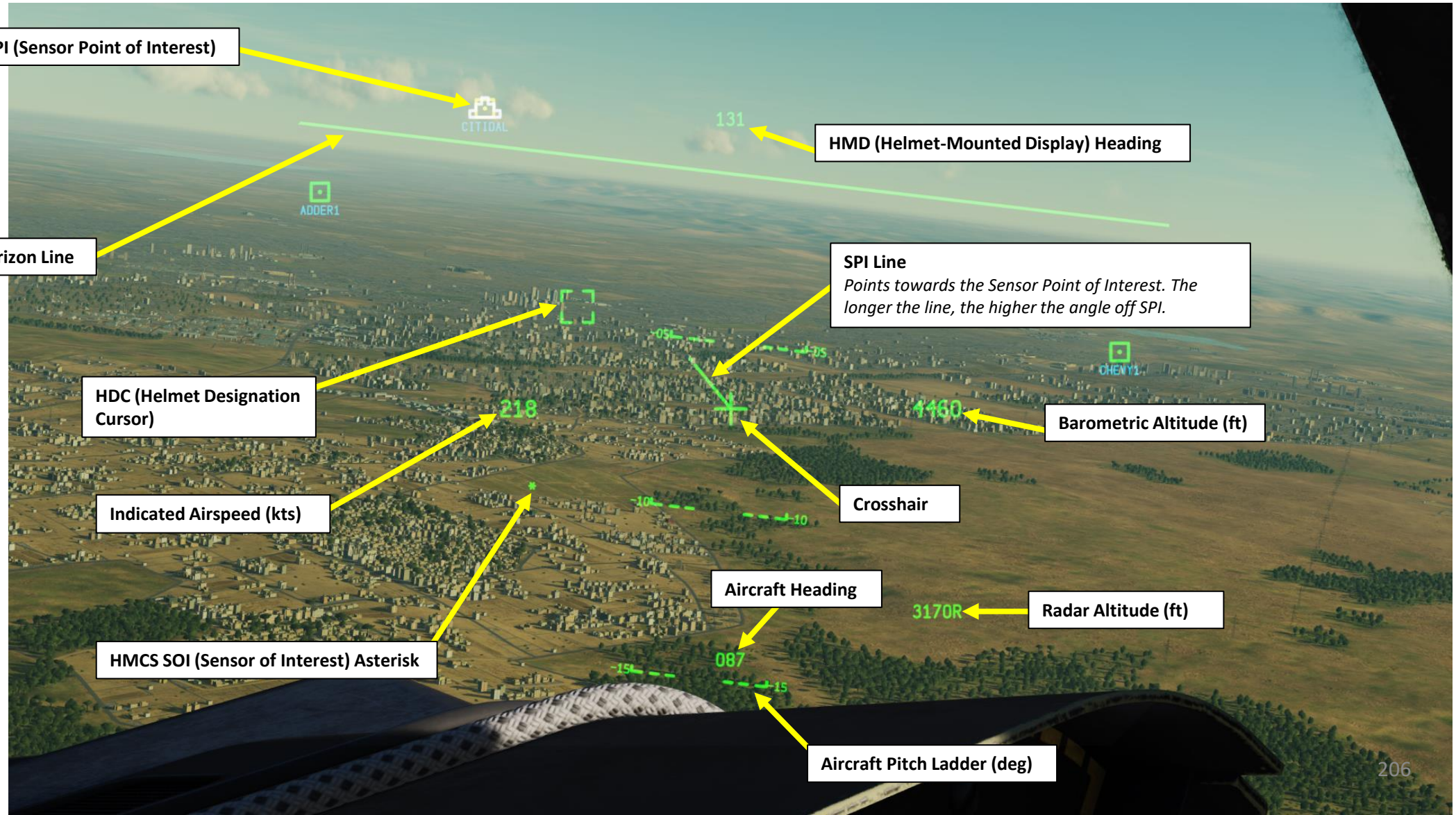
4 – SCORPION HMCS (HELMET-MOUNTED CUEING SYSTEM)

4.3 – HMCS Symbology

4.3.1 – Basic HMD Symbology

A-10C II Tank Killer Expansion Only

Basic symbology refers mainly to aircraft flight parameters.



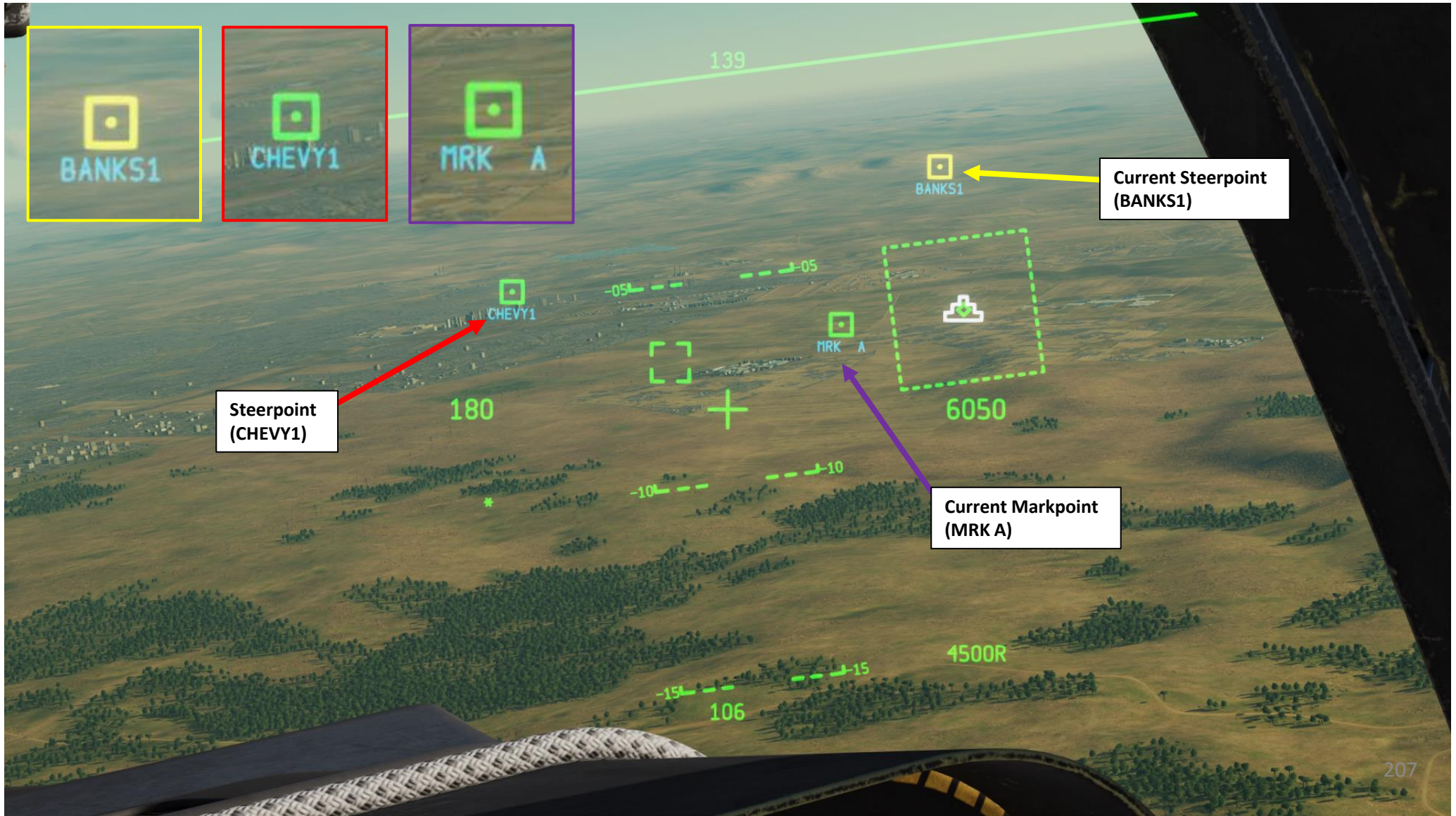
4 – SCORPION HMCS (HELMET-MOUNTED CUEING SYSTEM)

4.3 – HMCS Symbology

4.3.2 – Navigation HMD Symbology

A-10C II Tank Killer Expansion Only

The navigation symbols include all steerpoints in the navigation database and markpoints.



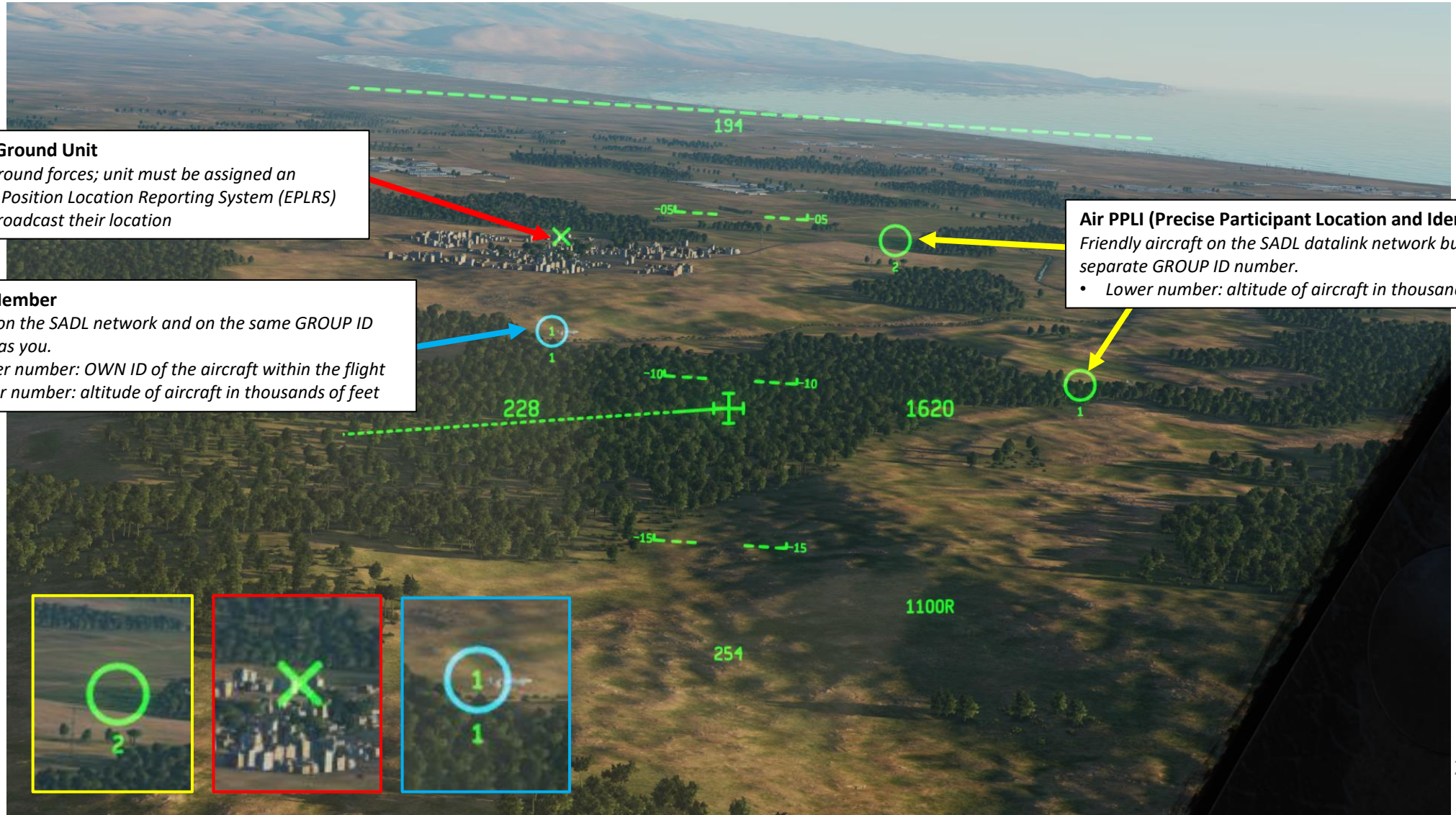
4 – SCORPION HMCS (HELMET-MOUNTED CUEING SYSTEM)

4.3 – HMCS Symbology

4.3.3 – Unit HMD Symbology

A-10C II Tank Killer Expansion Only

Various units that are within the same datalink network are visible on the HMCS, such as friendly ground units equipped with EPLRS, members of your own flight and friendly aircraft within the same datalink network.



Friendly Ground Unit
Friendly ground forces; unit must be assigned an Enhanced Position Location Reporting System (EPLRS) radio to broadcast their location

Flight Member
Aircraft on the SADL network and on the same GROUP ID number as you.
- *Center number: OWN ID of the aircraft within the flight*
- *Lower number: altitude of aircraft in thousands of feet*

Air PPLI (Precise Participant Location and Identification)
Friendly aircraft on the SADL datalink network but on a separate GROUP ID number.
- *Lower number: altitude of aircraft in thousands of feet*

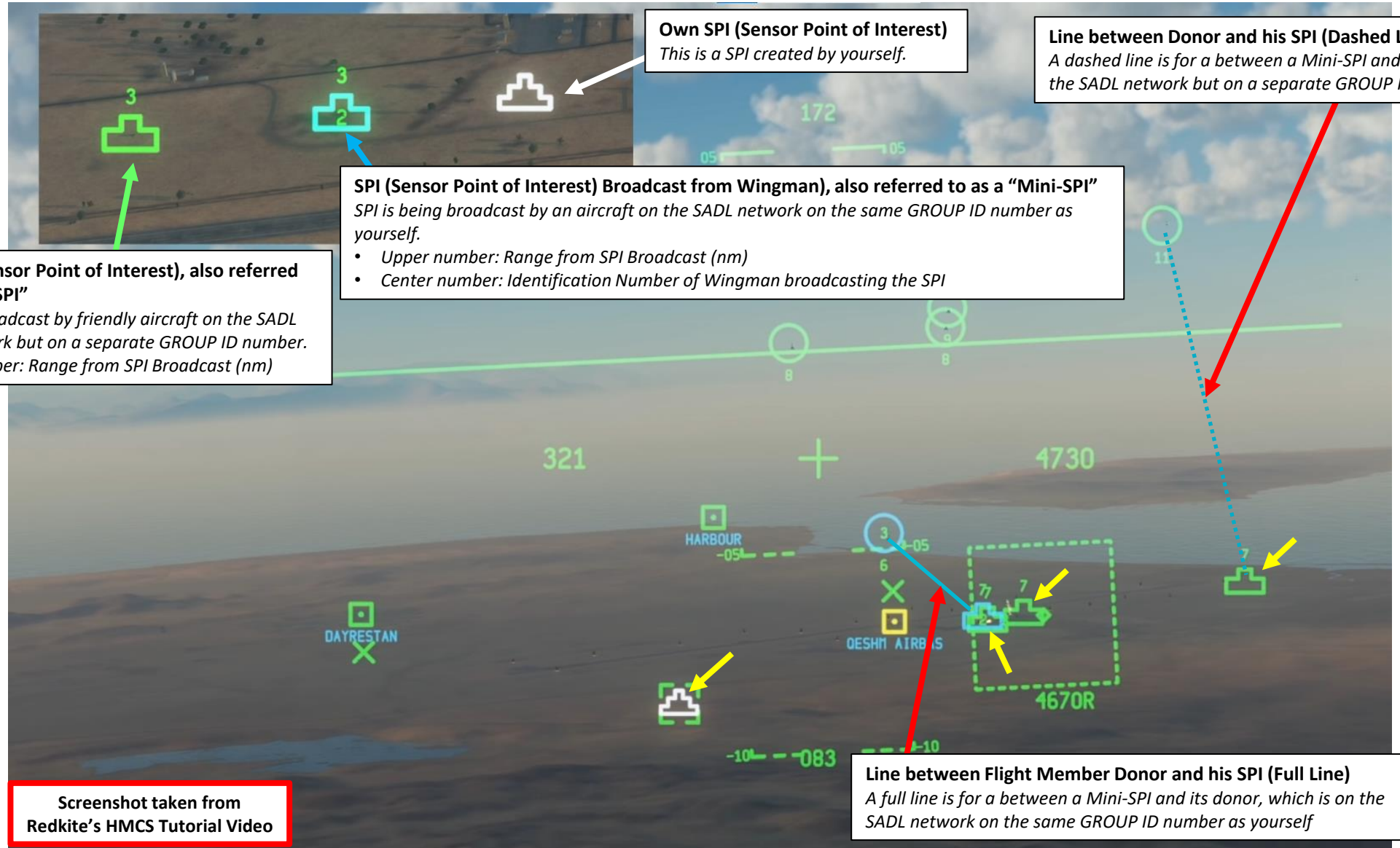
4 – SCORPION HMCS (HELMET-MOUNTED CUEING SYSTEM)

4.3 – HMCS Symbology

4.3.4 – Designation HMD Symbology

A-10C II Tank Killer Expansion Only

When designating a target, a SPI (Sensor Point of Interest) is created. SPI symbols are displayed on the TAD (Tactical Awareness Display), but also on the HMCS display.



Own SPI (Sensor Point of Interest)
This is a SPI created by yourself.

Line between Donor and his SPI (Dashed Line)
A dashed line is for a between a Mini-SPI and its donor, which is on the SADL network but on a separate GROUP ID number as yourself

SPI (Sensor Point of Interest) Broadcast from Wingman), also referred to as a "Mini-SPI"
SPI is being broadcast by an aircraft on the SADL network on the same GROUP ID number as yourself.
- *Upper number: Range from SPI Broadcast (nm)*
- *Center number: Identification Number of Wingman broadcasting the SPI*

Donor SPI (Sensor Point of Interest), also referred to as a "Mini-SPI"
SPI is being broadcast by friendly aircraft on the SADL datalink network but on a separate GROUP ID number.
- *Upper number: Range from SPI Broadcast (nm)*

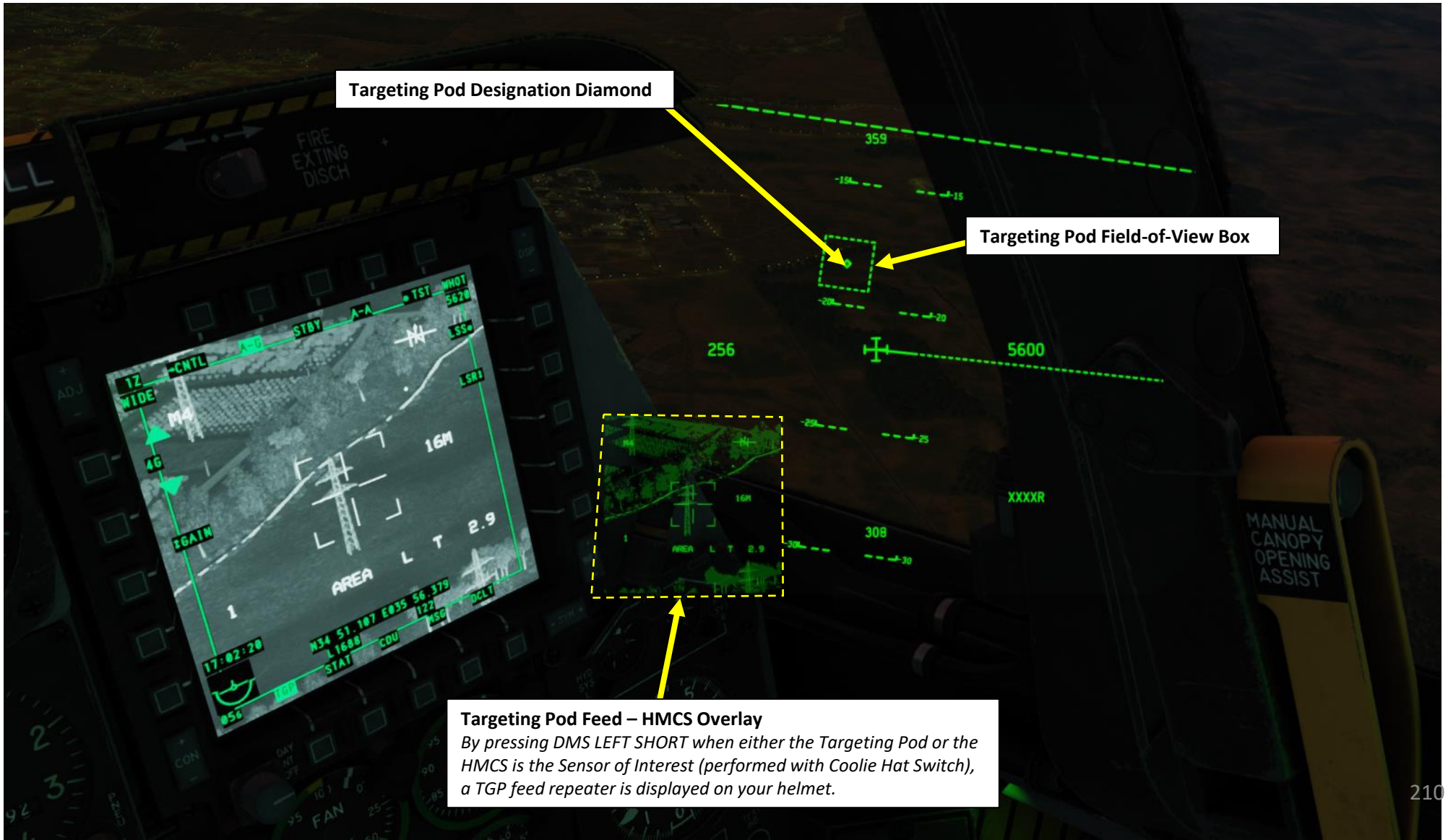
Line between Flight Member Donor and his SPI (Full Line)
A full line is for a between a Mini-SPI and its donor, which is on the SADL network on the same GROUP ID number as yourself

Screenshot taken from Redkite's HMCS Tutorial Video

4 – SCORPION HMCS (HELMET-MOUNTED CUEING SYSTEM)
4.3 – HMCS Symbology
4.3.5 – Targeting Pod HMD Symbology

A-10C II Tank Killer Expansion Only

The targeting pod symbology is visible on the HMCS.



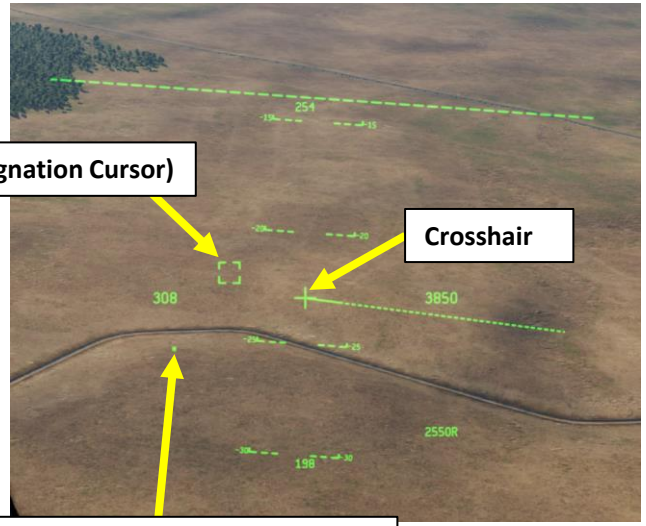
4 – SCORPION HMCS (HELMET-MOUNTED CUEING SYSTEM)

4.4 – HMCS Controls

A-10C II Tank Killer Expansion Only

These controls work if the HMCS is set as the SOI (Sensor of Interest) with the Coolie Hat Switch is pressed DOWN and the SOI Asterisk is visible on your **HMD (Helmet-Mounted Display)**.

- **TMS SWITCH: Target Management System**
  - FWD SHORT: Hook Symbol under Crosshair
  - FWD LONG: Make Hooked Object or HDC (Helmet Designation Cursor) the SPI (Sensor Point of Interest)
  - AFT SHORT: Un-Hook Symbol
  - AFT LONG: Reset SPI to Steerpoint
  - LEFT SHORT: Reset WCN (Warning, Caution & Notes)
  - LEFT LONG: Broadcast SPI
  - RIGHT SHORT: Create Mark Point at HDC
  - RIGHT LONG: Set Last Markpoint as the SPI



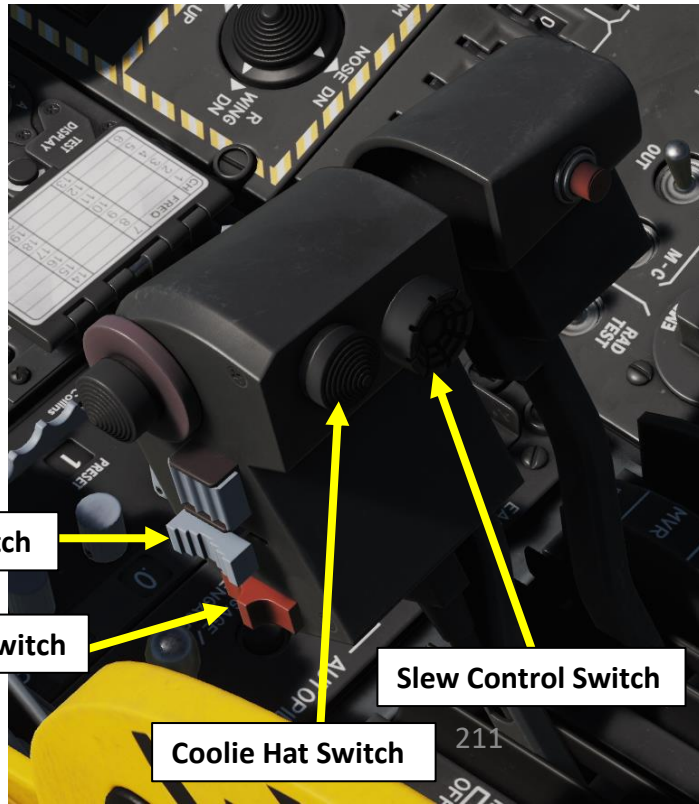
- **DMS SWITCH: Data Management Switch**
  - FWD SHORT/LONG: Increase HMD Brightness
  - AFT SHORT/LONG: Decrease HMD Brightness
  - LEFT SHORT: Display Right MFCD TGP (Targeting Pod) Video on HMD
  - LEFT LONG: **HMD (Helmet-Mounted Display) ON/OFF** Toggle
  - RIGHT SHORT: Cycle HMCS Profiles
  - RIGHT LONG: Slave Targeting Pod to HMCS Line-of-Sight (LOS)

- **SLEW CONTROL**
  - Used to control your HDC (Helmet Designation Cursor)

- **COOLIE HAT**
  - UP: Selects HUD as SOI (Sensor of Interest)
  - DOWN: **Selects HMCS as SOI (Sensor of Interest)**

- **BOAT SWITCH**
  - Targeting Pod Functions: Cycle through different TV or FLIR (forward looking infrared) camera modes
    - FWD: FLIR BHOT (Forward-Looking Infrared Black Hot)
    - MIDDLE: CCD (Charge Coupled Device/TV)
    - AFT: FLIR WHOT (Forward-Looking Infrared White Hot)

- **CHINA HAT**
  - FWD SHORT: Targeting Pod Field-of-View Wide/Narrow Toggle
  - AFT SHORT: Recage HDC to Crosshair



4 – SCORPION HMCS (HELMET-MOUNTED CUEING SYSTEM)

4.5 – HMCS Functions

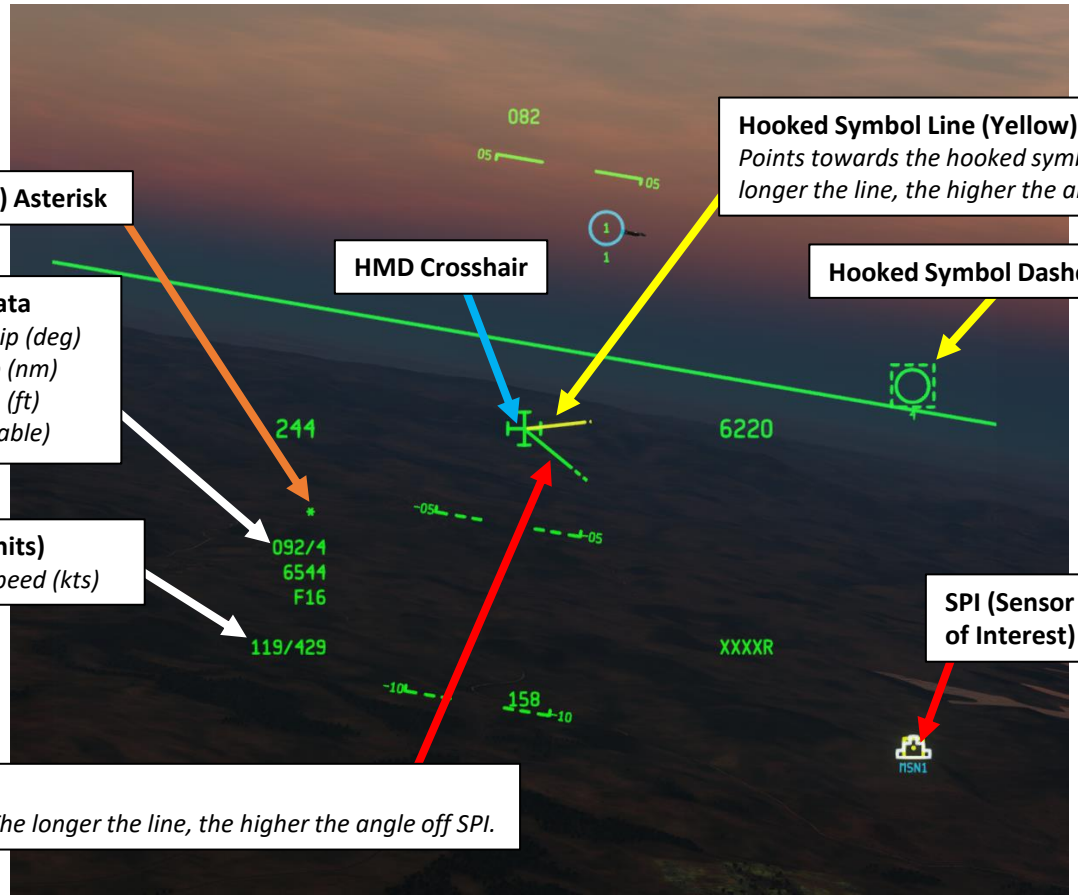
4.5.1 – Hooking HMD Symbols

A-10C II Tank Killer Expansion Only

TMS (Target Management System) Switch

Similarly to the TAD (Tactical Awareness Display), if you want to have a bearing, distance and elevation information on a specific HMCS symbol, you can "hook" a symbol when the HMCS is the SOI (Sensor of Interest).

1. Set the HMCS as the SOI: press the Coolie Hat Switch DOWN. Make sure the HMCS SOI Asterisk is visible.
2. Move your helmet to place the HMD crosshair over the desired HMD symbol you want to hook.
3. Once HMD crosshair is over the symbol, press TMS (Target Management System) FWD SHORT to hook the symbol.
4. Hooked Symbol Data will be displayed on the lower left of the HMD.
5. A dashed box will appear over the hooked symbol and a yellow line will be drawn between the hooked symbol and the HMD crosshair.
6. To Un-Hook a symbol, press the TMS (Target Management System) AFT SHORT.



HMCS SOI (Sensor of Interest) Asterisk

Hooked Symbol Line (Yellow)
Points towards the hooked symbol. The longer the line, the higher the angle off.

HMD Crosshair

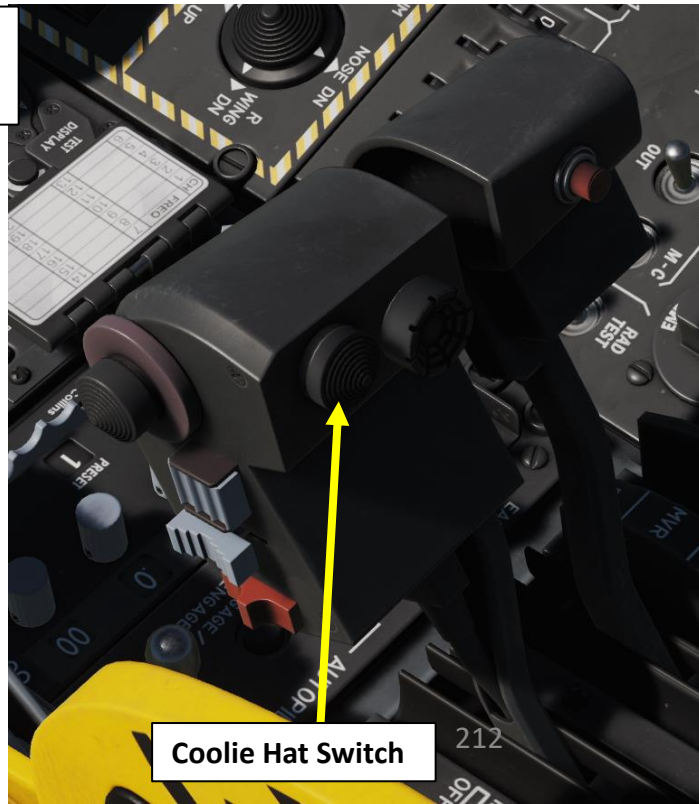
Hooked Symbol Dashed Box

Hooked Symbol (F-16) Data
- *092: Bearing To Ownship (deg)*
- *4: Distance To Ownship (nm)*
- *6544: Symbol Elevation (ft)*
- *F 16: Unit Type (if available)*

Hooked Symbol Data (for air units)
- *Aircraft Heading/Aircraft Airspeed (kts)*

SPI (Sensor Point of Interest)

SPI Line (Green)
Points towards the Sensor Point of Interest. The longer the line, the higher the angle off SPI.



Coolie Hat Switch

4 – SCORPION HMCS (HELMET-MOUNTED CUEING SYSTEM)

4.5 – HMCS Functions

4.5.2 – Creating a SPI via HMCS

A-10C II Tank Killer Expansion Only

TMS (Target Management System) Switch

3 5 6

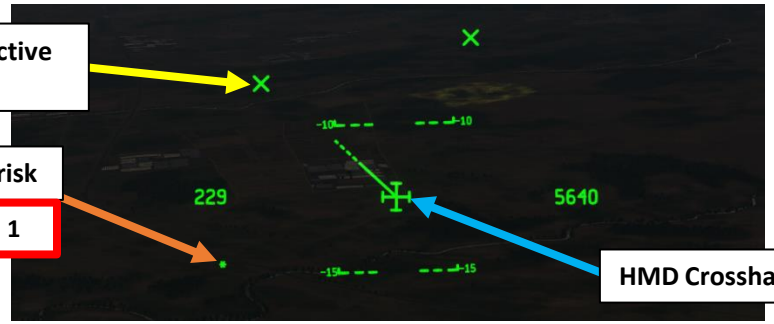
METHOD 1: Create a SPI on a hooked symbol

1. Set the HMCS as the SOI: press the Coolie Hat Switch DOWN. Make sure the HMCS SOI Asterisk is visible.
2. Move your helmet to place the HMD crosshair over the desired HMD symbol you want to hook.
3. Once HMD crosshair is over the symbol, press TMS (Target Management System) FWD SHORT to hook the symbol.
4. A dashed box will appear over the hooked symbol and a yellow line will be drawn between the hooked symbol and the HMD crosshair.
5. Press TMS FWD LONG to create a SPI (Sensor Point of Interest) on the hooked symbol.
6. To Un-Hook a symbol, press the TMS (Target Management System) AFT SHORT. To reset the SPI to the selected steerpoint without un-hooking the symbol, press TMS AFT LONG.

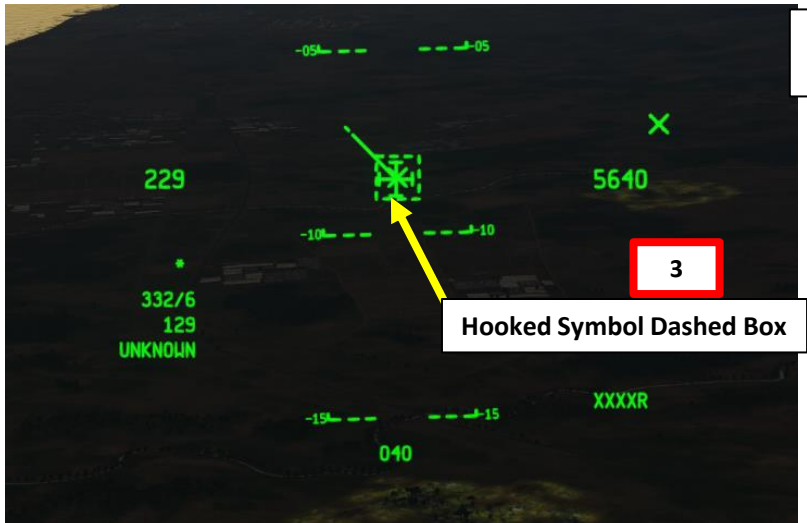
Friendly Ground Unit with EPLRS active
Symbol we want to designate as SPI

HMCS SOI (Sensor of Interest) Asterisk

1



HMD Crosshair 2

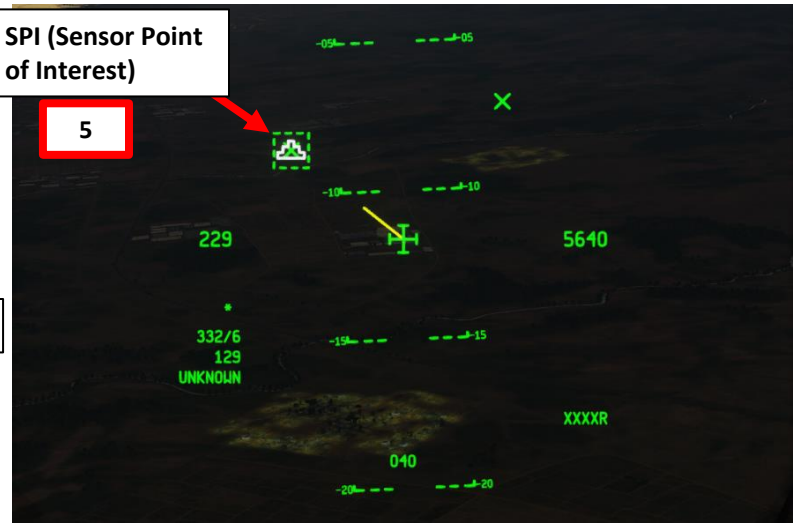


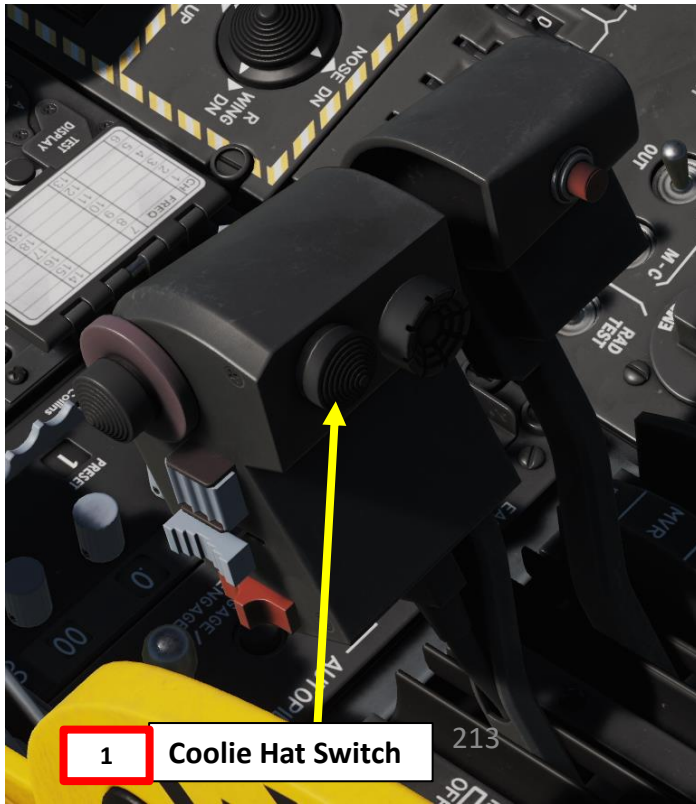
3

Hooked Symbol Dashed Box

SPI (Sensor Point of Interest)

5





1 Coolie Hat Switch

4 – SCORPION HMCS (HELMET-MOUNTED CUEING SYSTEM)

4.5 – HMCS Functions

4.5.2 – Creating a SPI via HMCS

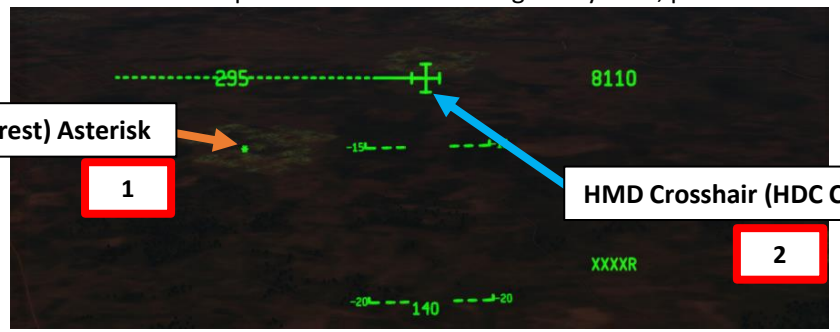
A-10C II Tank Killer Expansion Only

METHOD 2: Create a SPI with the HDC (Helmet Designation Cursor)

1. Set the HMCS as the SOI: press the Coolie Hat Switch DOWN. Make sure the HMCS SOI Asterisk is visible.
2. Press China Hat AFT SHORT to recage the HDC (Helmet Designation Cursor) to the HMD Crosshair
3. Move your helmet to place the HMD crosshair near the desired target you want to designate and create a SPI (Sensor Point of Interest) over.
4. Use the Slew Control Switch to move the ground-stabilized HDC over the target you want to designate as a SPI.
5. Once HDC is over the desired target, press TMS (Target Management System) FWD LONG to create a SPI on the HDC.
6. To reset the SPI to the selected steerpoint without un-hooking the symbol, press TMS AFT LONG.

TMS (Target Management System) Switch

5 6

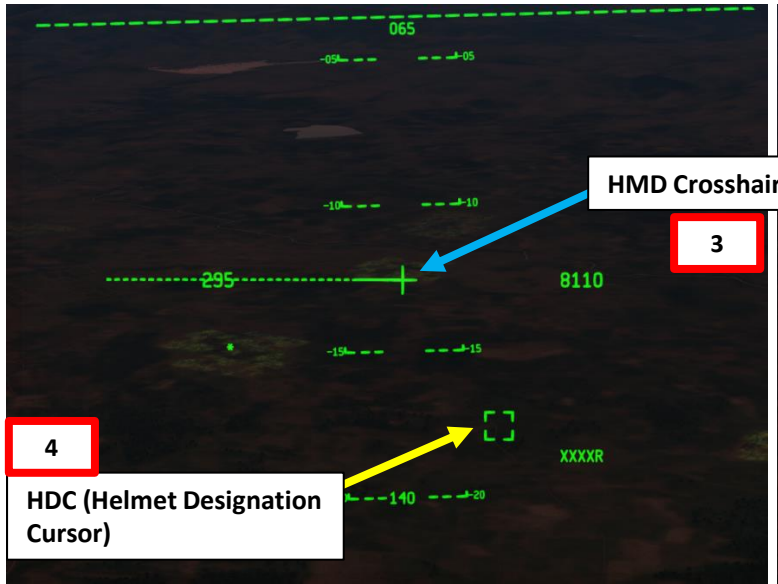


HMCS SOI (Sensor of Interest) Asterisk

1

HMD Crosshair (HDC Caged)

2

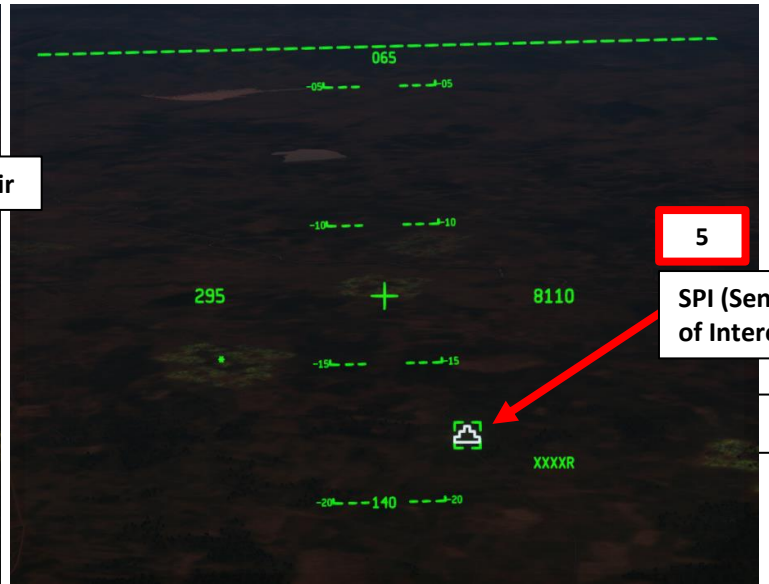


HMD Crosshair

3

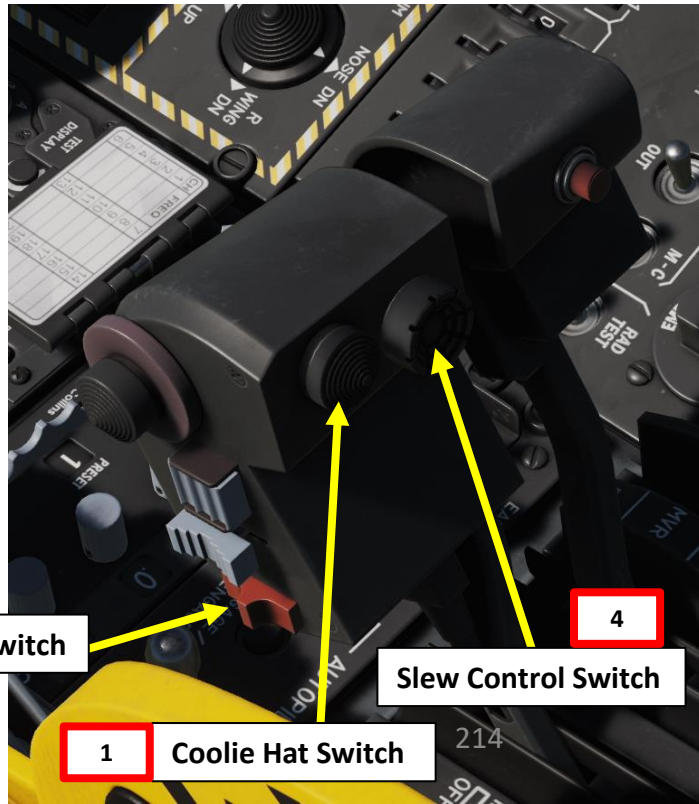
4

HDC (Helmet Designation Cursor)



5

SPI (Sensor Point of Interest)



China Hat Switch

2

4

Slew Control Switch

1

Coolie Hat Switch

4 – SCORPION HMCS (HELMET-MOUNTED CUEING SYSTEM)

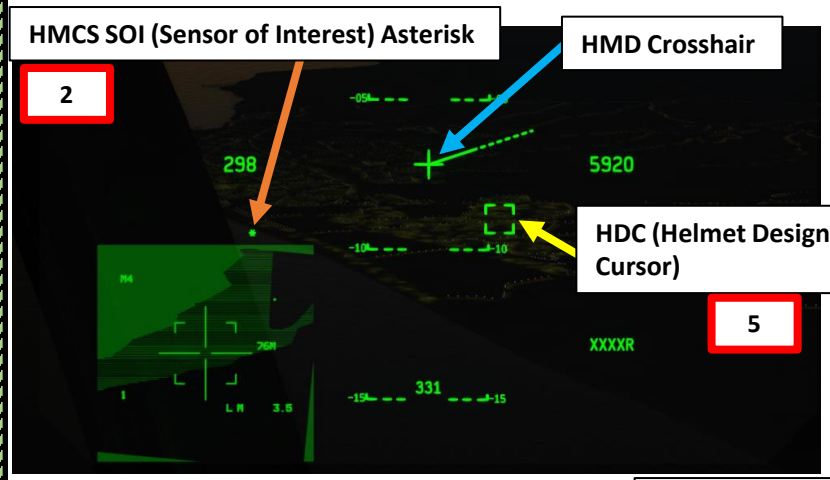
4.5 – HMCS Functions

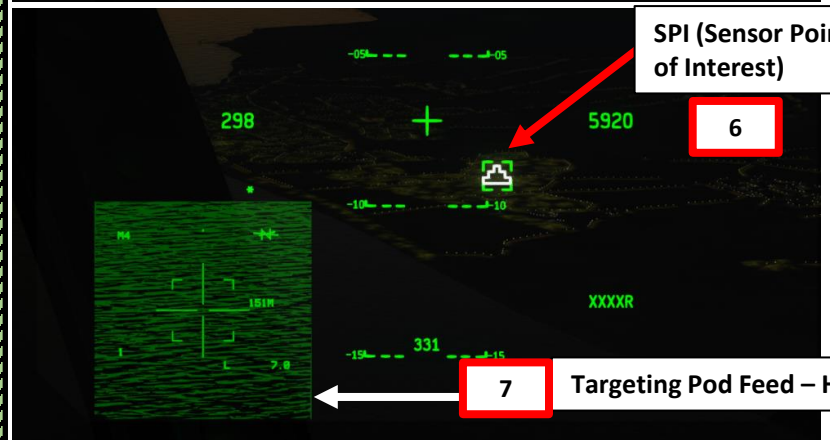
4.5.3 – Targeting Pod Slaving to LOS via HMCS

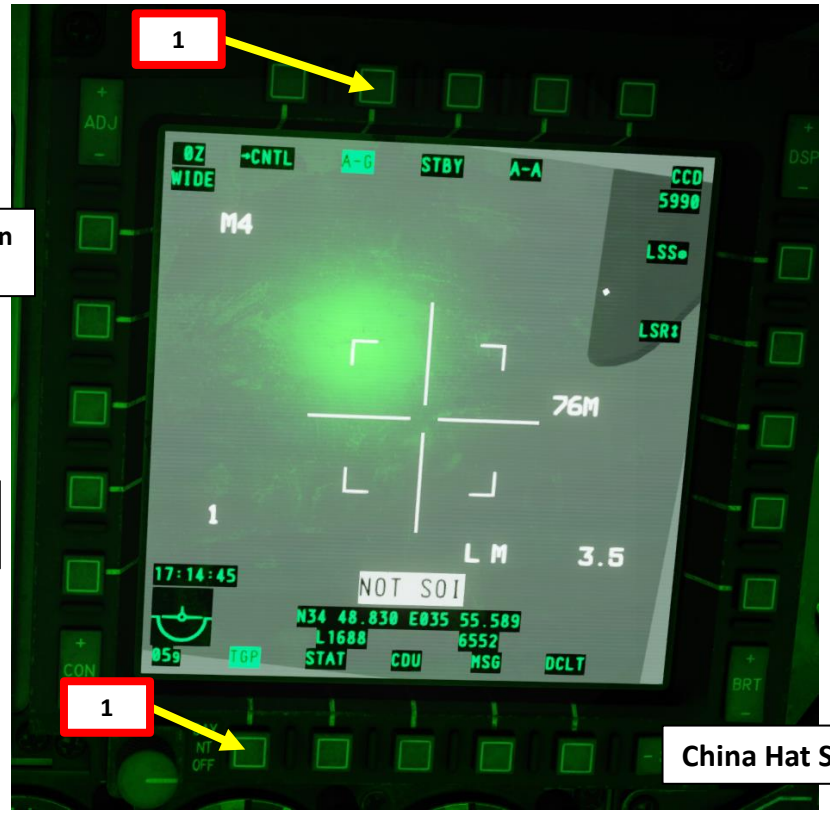
A-10C II Tank Killer Expansion Only

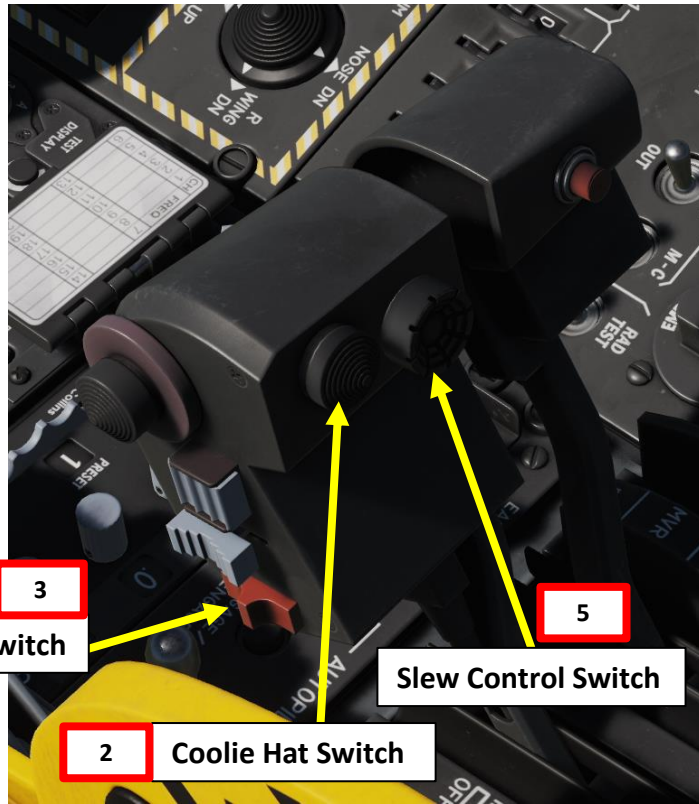
An interesting functionality is to combine the SPI generation ability of the HMCS with the TGP, which can be slaved to the HMCS Line of Sight (LOS).

1. Power up the targeting pod and set it in A-G mode.
2. Set the HMCS as the SOI: press the Coolie Hat Switch DOWN. Make sure the HMCS SOI Asterisk is visible.
3. Press China Hat AFT SHORT to recage the HDC (Helmet Designation Cursor) to the HMD Crosshair
4. Move your helmet to place the HMD crosshair near the desired target you want to designate and create a SPI (Sensor Point of Interest) over.
5. Use the Slew Control Switch to move the ground-stabilized HDC over the target you want to designate as a SPI.
6. Once HDC is over the desired target, press TMS (Target Management System) FWD LONG to create a SPI on the HDC.
7. Press DMS (Data Management Switch) LEFT SHORT to display the Targeting Pod Feed Overlay on the HMCS.









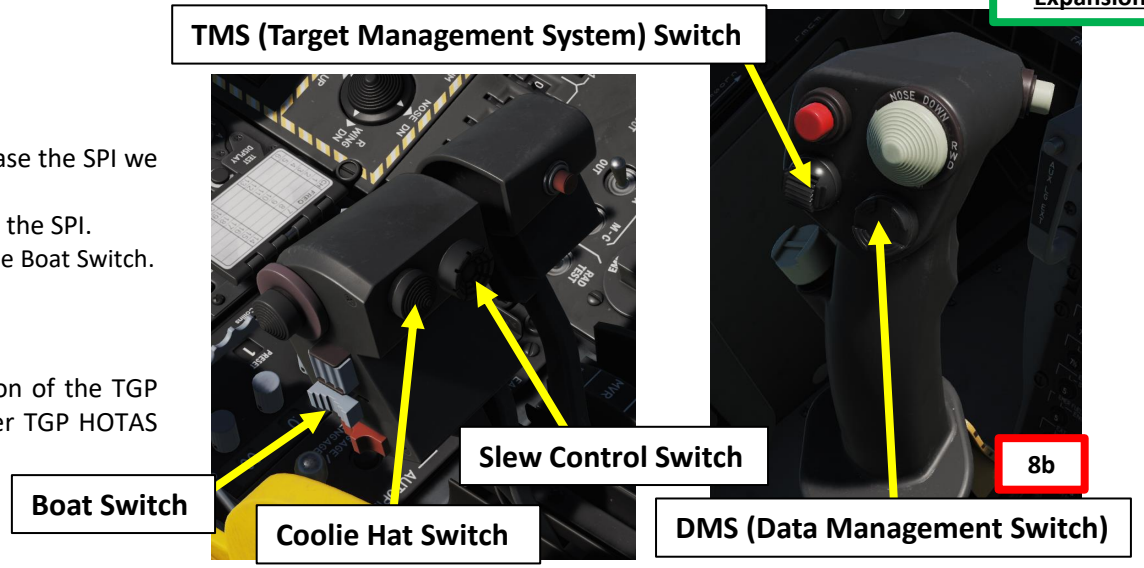
4 – SCORPION HMCS (HELMET-MOUNTED CUEING SYSTEM)

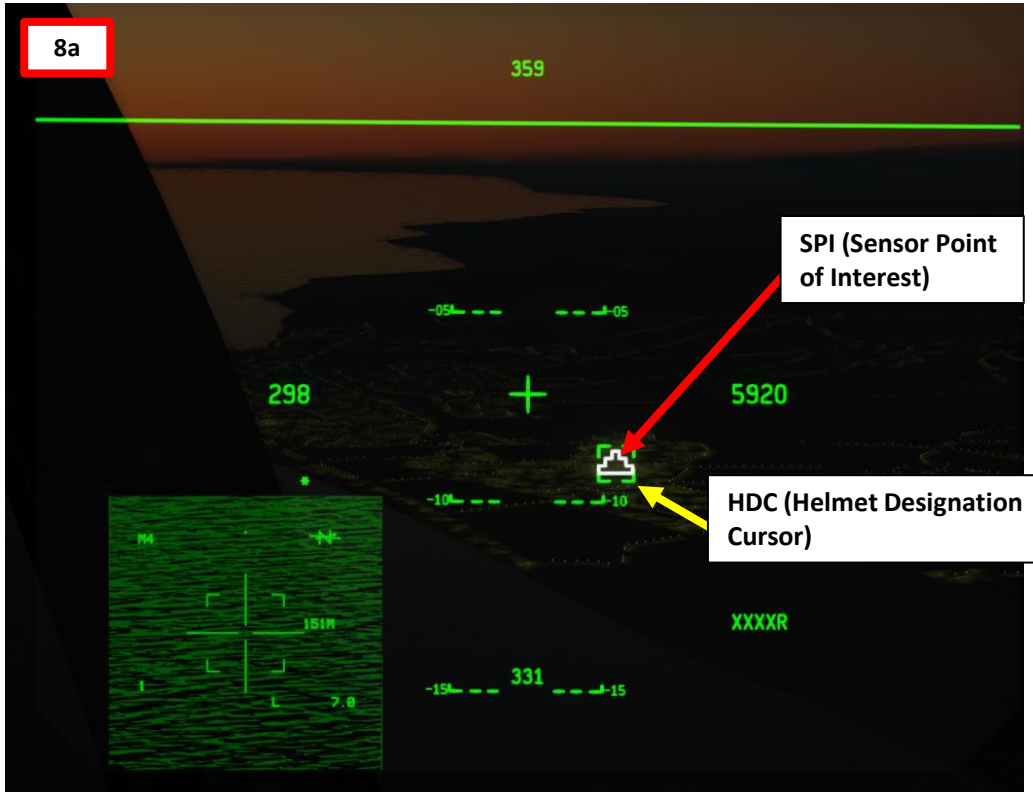
4.5 – HMCS Functions

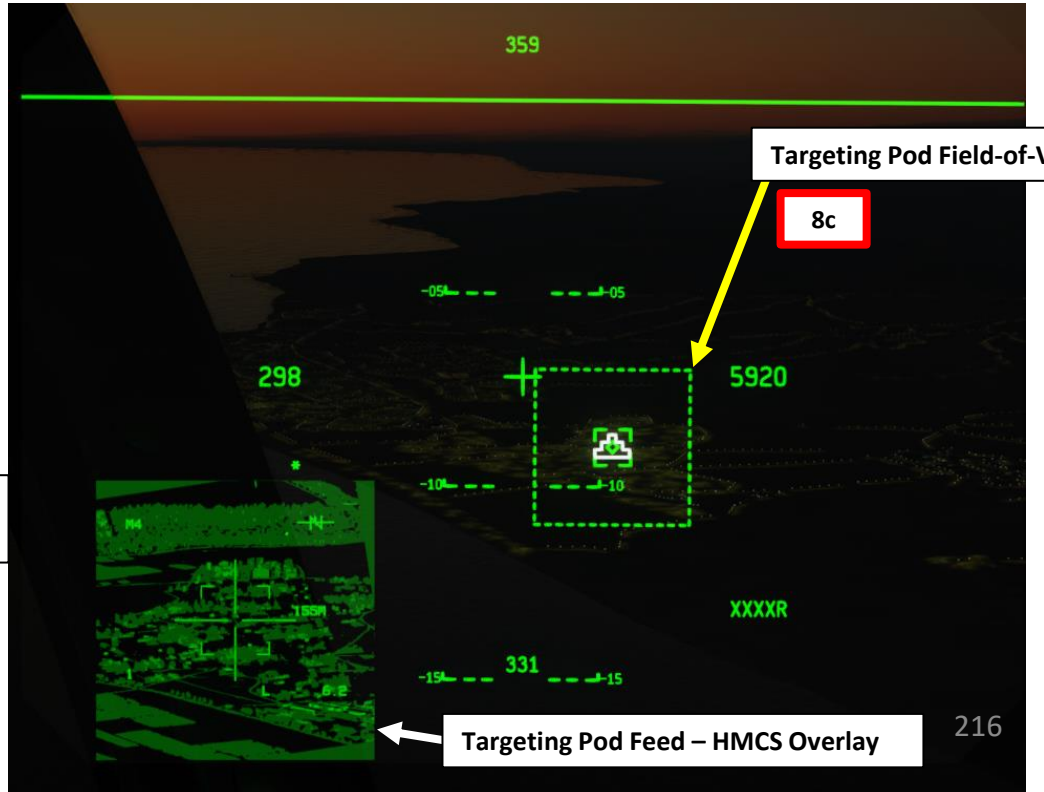
4.5.3 – Targeting Pod Slaving to LOS via HMCS

8. Press DMS RIGHT LONG to Slave Targeting Pod to HMCS Line-of-Sight (LOS), or in that case the SPI we just created over the HDC.
9. The Targeting Pod Field-of-View Box will then appear once the targeting pod is slaved to the SPI.
10. You can cycle through different TV or FLIR (forward looking infrared) camera modes using the Boat Switch.
    - FWD: FLIR BHOT (Forward-Looking Infrared Black Hot)
    - MIDDLE: CCD (Charge Coupled Device/TV)
    - AFT: FLIR WHOT (Forward-Looking Infrared White Hot)
11. You can slew the TGP (Targeting Pod) by pressing the Coolie Hat LONG in the direction of the TGP page to make it SOI (Sensor of Interest), then using the Slew Control switch and other TGP HOTAS controls.

A-10C II Tank Killer Expansion Only







4 – SCORPION HMCS (HELMET-MOUNTED CUEING SYSTEM)

4.5 – HMCS Functions

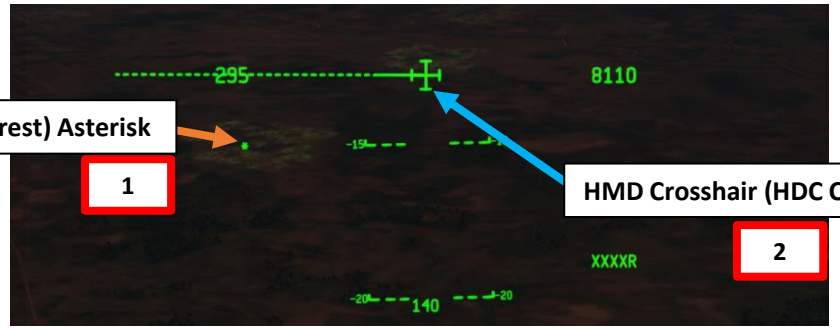
4.5.4 – Markpoint Creation via HMCS

A-10C II Tank Killer Expansion Only

1. Set the HMCS as the SOI: press the Coolie Hat Switch DOWN. Make sure the HMCS SOI Asterisk is visible.
2. Press China Hat AFT SHORT to recage the HDC (Helmet Designation Cursor) to the HMD Crosshair
3. Move your helmet to place the HMD crosshair near the desired target you want to designate and create a markpoint over.
4. Use the Slew Control Switch to move the ground-stabilized HDC over the target you want to create a markpoint on.
5. Once HDC is over the desired target, press TMS (Target Management System) RIGHT SHORT to create a markpoint on the HDC.
6. (Optional) You can create a SPI (Sensor Point of Interest) on the last created markpoint by pressing TMS RIGHT LONG.

TMS (Target Management System) Switch

5 6

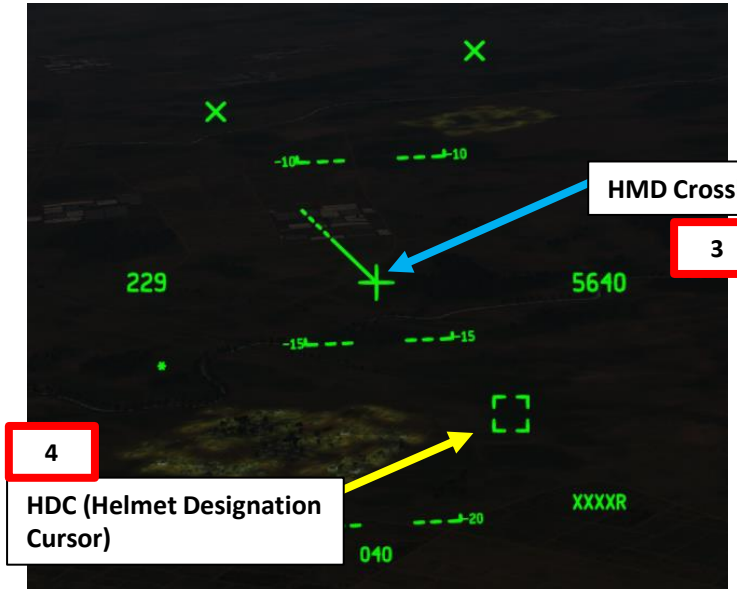


HMCS SOI (Sensor of Interest) Asterisk

1

HMD Crosshair (HDC Caged)

2



HMD Crosshair

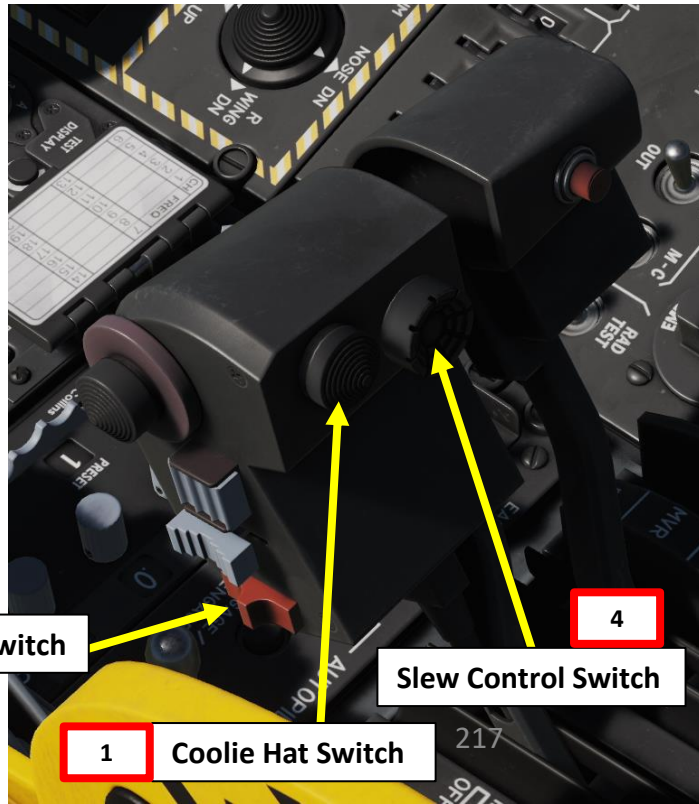
3

4

HDC (Helmet Designation Cursor)

5

Markpoint (MRK A)



China Hat Switch

2

4

Slew Control Switch

1

Coolie Hat Switch

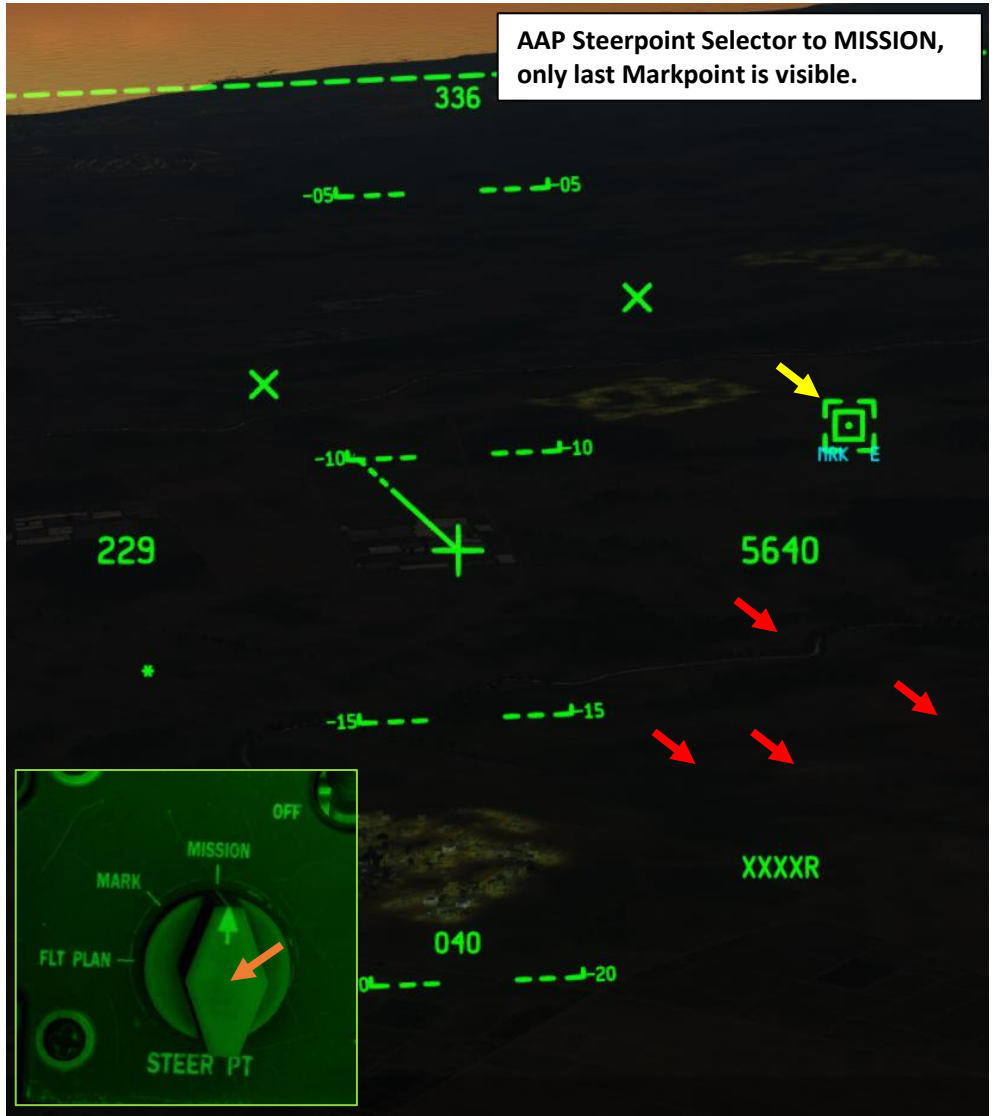
4 – SCORPION HMCS (HELMET-MOUNTED CUEING SYSTEM)

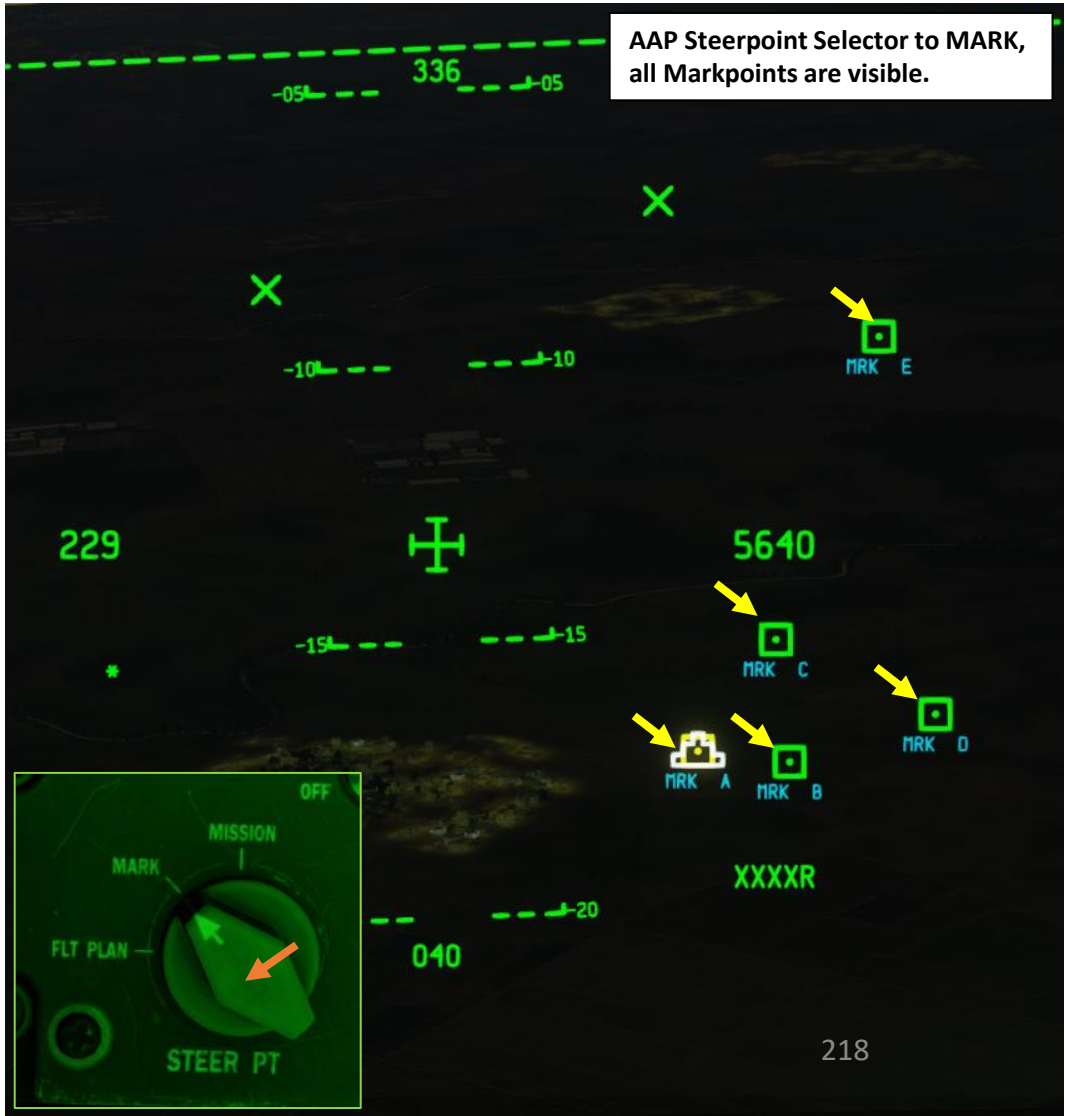
4.5 – HMCS Functions

4.5.4 – Markpoint Creation via HMCS

A-10C II Tank Killer Expansion Only

In order to view all available markpoints, set Auxiliary Avionics Panel (AAP) Steerpoint Selector Knob to MARK (you will access all markpoints).





SECTION STRUCTURE

- **1 - Introduction**
  - 1.1 – Introduction to Weapons
  - 1.2 – My Weapons Control Setup
  - 1.3 – DSMS (Digital Stores Management System) Page
  - 1.4 – Re-Arming Considerations
  - 1.5 – Master Modes
  - 1.6 – Bomb Delivery Modes
  - 1.7 – Procedures Summary

- **2 – Air-to-Ground Weapons**
  - 2.1 – Unguided Bomb (MK-82 Low Drag – CCIP)
    - 2.1.1 – Manual CCIP Release Mode
    - 2.1.2 – CCIP-CR Release Mode
  - 2.2 – Unguided Bomb (MK-82AIR High Drag – CCRP)
  - 2.3 – Rockets (CCIP)
  - 2.4 – GAU-8 Gun (Air-to-Ground)
    - 2.4.1 – Introduction
    - 2.4.2 – CCIP Reticle
    - 2.4.3 – CCIP Cross
    - 2.4.4 – 4/8/12 Reticle
    - 2.4.5 – 4000 Ft Wind Corrected Cross
  - 2.5 – GBU-38 JDAM (JTAC Coordinates)
  - 2.6 – GBU-38 JDAM (Targeting Pod)
  - 2.7 – CBU-105 WCMD (CCRP + Targeting Pod)
  - 2.8 – GBU-12 Paveway II (Laser-Guided)
  - 2.9 – AGM-65 Infrared Maverick (MAV Sensor)
  - 2.10 – AGM-65 Infrared Maverick (Targeting Pod)
  - 2.11 – AGM-65L Laser Maverick (Targeting Pod + Laser) – **A-10C II Tank Killer Only**
  - 2.12 – GBU-54 Laser JDAM (Targeting Pod + Laser) – **A-10C II Tank Killer Only**
  - 2.13 – APKWS Laser-Guided Rockets (Targeting Pod + Laser) – **A-10C II Tank Killer Only**

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  - 3.2 – AIM-9 Sidewinder

- **4 – Ordnance Jettison**
  - 4.1 – Selective Ordnance Jettison
  - 4.2 – Emergency Stores Jettison

1.1 – INTRODUCTION TO WEAPONS

The A-10C can use a HUGE variety of weapons.

A good loadout is not necessarily the biggest bomb: a good loadout is the one that you know how to use and are most comfortable with… and yet that remains flexible enough to allow you to adapt to different targets and situations.

There is a mindblowing selection of ordnance to pick from and it is easy to feel lost by the sheer number of different bombs. We will briefly explore the types of bombs together to help you understand what they are all about.

- Unguided rockets
- GAU-8/A 30 mm Gun
- Air-to-Ground Missile
  - Ex: AGM-65 MAVERICK (AGM = Air-to-Ground Missile)
- Air-to-Air Infrared Seeking Missile
  - AIM-9 SIDEWINDER
- Unguided bombs
  - Ex: Mk-82, Mk-82AIR, Mk-84
- PGM: Precision Guided Munition
  - LGB: Laser-Guided Bombs / GBU (Guided Bomb Unit)
    - Bomb is guided by a laser beam from operators on the ground, a JTAC or your own TGP (targeting pod).
    - Ex: GBU-10, GBU-12
  - IAM: Inertially Aided Munition
    - JDAM (Joint Directed Attack Munition)
      - Bomb is guided by a GPS satellite. Fire & Forget.
      - Ex: GBU-38, GBU-31
    - WCMD (Wind Corrected Munition Dispenser)
      - Guided by INS (Inertial Navigation System) . Fire & Forget.
      - Ex: CBU-87, CBU-97, CBU-105

WEAPON DESCRIPTIONS

LAUNCHERS

SER or TER	Single or Triple Ejector Rack
LAU-68/A or 131	7 tube rocket launcher (both essentially the same)
LAU-117	Single rail Maverick launcher
LAU-88	Triple rail Maverick launcher
1760	Inertially Aided Munitions (IAMS) - GPS or Inertial guided

WEAPONS

HYDRA 70 UNGUIDED ROCKETS

MK-5	High-explosive ANTI-TANK
M-151	ANTI-PERSONNEL fragmentation
M-156	White phosphorus SMOKE
M-257	Parachute retarded ILLUM FLARE
M-258	Parachute retarded INFARED ILLUM FLARE

GENERAL PURPOSE BOMBS

MK-82	500 lb general purpose bomb *(can carry on TER or SER)*
MK-82 APO	high drag MK-82 for low level drops (N/T or Tail fuze)
GBU-12	= LASER guided MK-82 (accurate enough to kill tanks)
GBU-38	= GPS (1760) guided MK-82 (stationary tgts only)
MK-84	2,000 lb general purpose bomb *(can only carry on SER)*
GBU-10	= LASER guided MK-84 (ideal for hardened targets)
GBU-31	= GPS (1760) guided MK-84 (stationary tgts only)

CLUSTER BOMBS

CBU-87	Cluster bomb (anti-personnel, light armour, top kill of hvy armour)
CBU-103	INS (1760) guided (WCMD - wind corrected munition dispenser) CBU-87
CBU-97	Anti-tank Cluster bomb
CBU-105	INS (1760) guided (WCMD - wind corrected munition dispenser) CBU-97

ILLUMINATION FLARES *(burn for approx. 5 min)*

LUU-2B/B	visible spectrum illumination flares
LUU-19	infared illumination flares

MAVERICK MISSILES ***(D + H on LAU-88 or LAU-117, G + K only on LAU-117)***

AGM-65-D	INFARED seeker, 125 lb warhead
AGM-65-H	ELECTRO-OPTICAL seeker, 125 lb warhead
AGM-65-G	INFARED seeker, 300 lb warhead
AGM-65-K	ELECTRO-OPTICAL seeker, 300 lb warhead

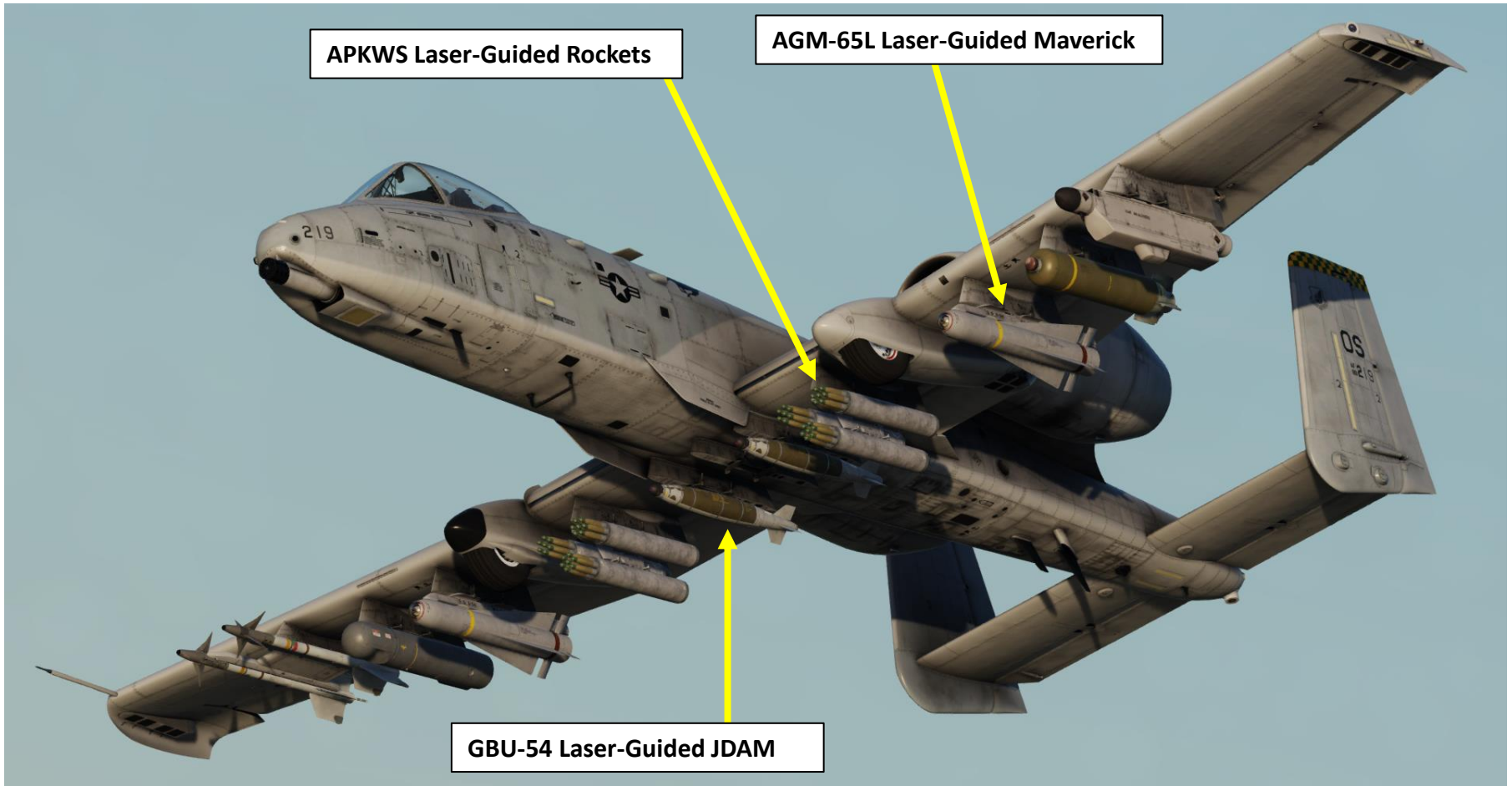
A-10C ** WEAPON DESCRIPTIONS - Rev 1.0.1 **** Pg. 1 of 1**

1.1 – INTRODUCTION TO WEAPONS

A-10C II Tank Killer Expansion Only

The A-10C II "Tank Killer" Expansion has three new weapons available:

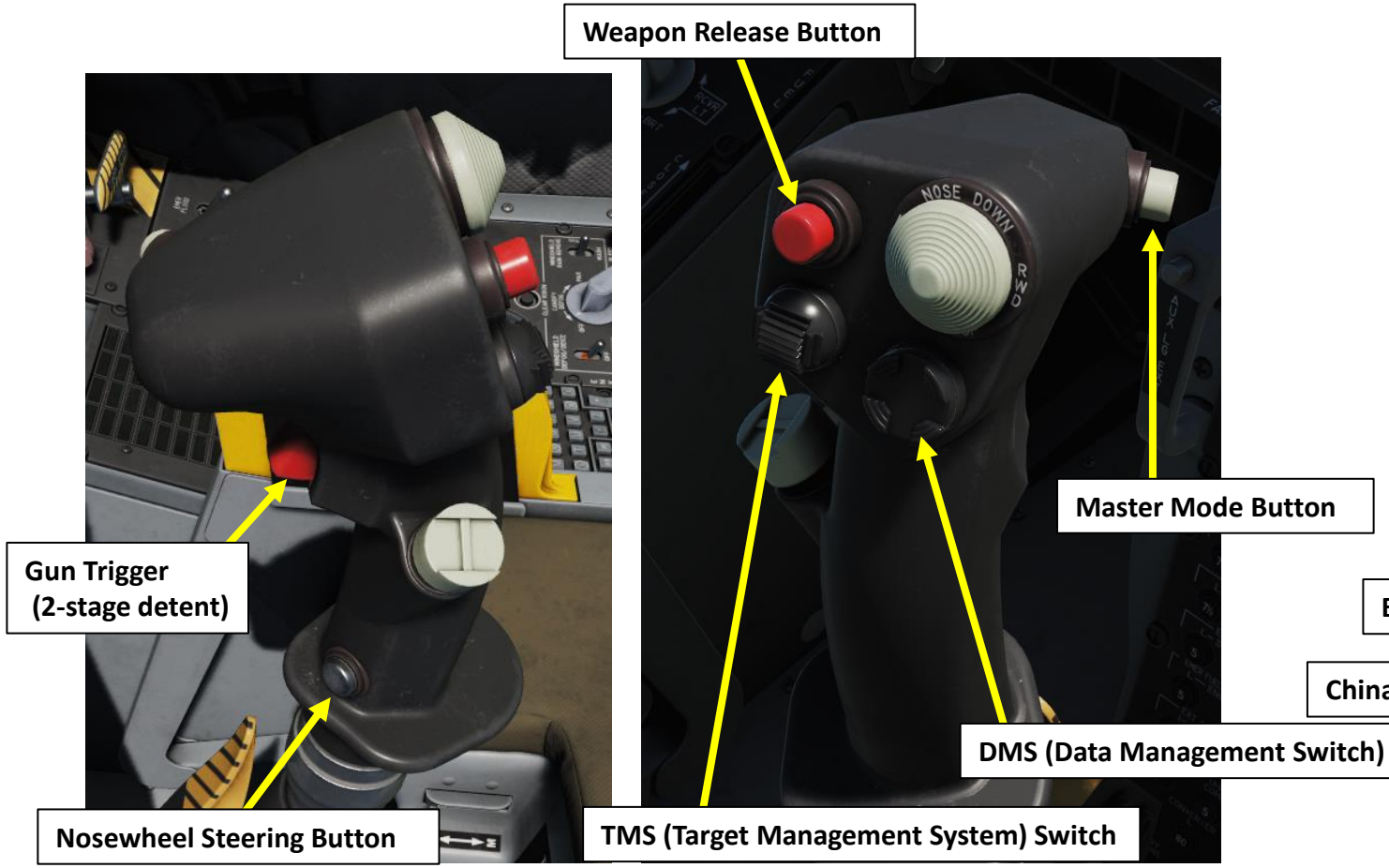
- **AGM-65L Maverick**: Laser-guided air-to-ground missile.
- **GBU-54 LJDAM**: A hybrid of a GBU-38 JDAM and a GBU-12 laser-guided bomb is the GBU-54/A LJDAM (Laser Joint Directed Attack Munition). This weapon can act in both INS/GPS and laser-guidance modes, this allowing it launch-and-leave and engaging through cloud/dust as an INS/GPS weapon, and with the precision and ability to engage moving targets that laser-guidance provides. The GBU-54/A is a strap-on guidance kit for a standard Mk-82 general purpose bomb. The guidance kit includes both the GPS/INS guidance kit and a laser seeker / target detection guidance kit that allows the bomb to guide on moving targets.
- **APKWS (Advanced Precision Kill Weapon System):** also displayed as the AGR-20A, the APKWS combines a standard 2.75-inch high explosive rocket with a laser guidance kit and control fins. There are two warhead options: the M-151 (High Explosive) and the M-282 (Penetrator Warhead).

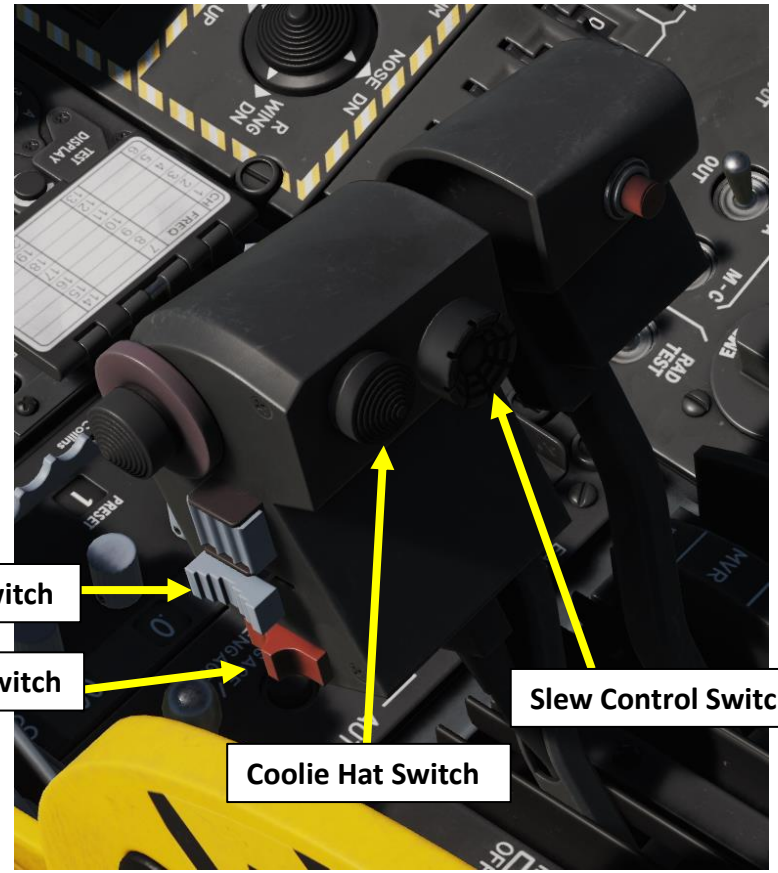


1.2 – MY WEAPONS CONTROL SETUP

The A-10C weapon systems are controlled pretty much exclusively with the stick and throttle. This gives you tremendous functionality at your fingertips.

Each function of these controls will change based on what sensor is selected as the SOI (Sensor of Interest) and what Master Mode is selected.





1.2 – MY WEAPONS CONTROL SETUP (A-10C LEGACY)

A-10C Legacy Only

Here is a summary of control functions based on SOI (Sensor of Interest).

7. **Slew Control.** Functions according to SOI include:

TAD	TGP	HUD	AIM-9	MAV
Slew TAD cursor	Slew TGP LOS	Slew TDC	Slew AIM-9 Seeker / Consent	Slew Maverick / Consent

8. **Coolie Hat.** Functions according to SOI include:

Direction	Duration	TAD	TGP	HUD	AIM-9	MAV
Up		HUD as SOI				
Down	Short	Swap MFCD Content				
	Long	DSMS Quick Look				
Left	Short	Cycle Left MFCD				
	Long	Set Left MFCD as SOI				
Right	Short	Cycle Right MFCD				
	Long	Set Right MFCD as SOI				

3. **Boat Switch.** Functions according to SOI include:

Direction	TAD	TGP	HUD	AIM-9	MAV
Forward		FLIR BHOT			Black Symbols
Center		CCD			Force Correlate / AUTO
Aft		FLIR WHOT			White Symbols

4. **China Hat.** Functions according to SOI include:

Direction	Duration	TAD	TGP	HUD	AIM-9	MAV
Forward	Short	FOV EXP Toggle	FOV Wide / NARO Toggle	Set MAV as SOI	Uncage	FOV Toggle
	Long	Slave all to SPI			Slave AIM-9 to TGP LOS	Slave all to SPI
Aft	Short	Reset Cursor	Boresight TGP	Cage TDC to TVV	Missile Step	
	Long	Slave TGP to Steerpoint				

6. **Weapon Release Button.** Functions according to SOI include:

TAD	TGP	HUD	AIM-9	MAV
Release Weapon				

Note: For some weapons like JDAM and laser-guided bombs, you will need to hold down the weapon release button for a full one second.

8. **Trigger.** Functions according to SOI include:

TAD	TGP	HUD	AIM-9	MAV
Fire Cannon				

1. **Master Mode Control Button (MMCB).** Functions according to SOI include:

Duration	TAD	TGP	HUD	AIM-9	MAV
Short	Toggle HUD				
Long	Air-to-Air Mode				

2. **Data Management Switch (DMS).** Functions according to SOI include:

Direction	Duration	TAD	TGP	HUD	AIM-9	MAV
Forward		TAD Scale Increase	Zoom Increase	Steerpoint Increment		Reticle Up
Aft		TAD Scale Decrease	Zoom Decrease	Steerpoint Decrement		Reticle Down
Left	Short		FLIR Auto Focus	Gunsight Cycle	A-A Target Toggle	Reticle Left
	Long	Broadcast SPI				
Right	Short	Center/ Depressed Mode	Laser Toggle	Gunsight Cycle	A-A Target Toggle	Reticle Right
	Long		LSS Toggle			

3. **Target Management Switch (TMS).** Functions according to SOI include:

Direction	Duration	TAD	TGP	HUD	AIM-9	MAV
Forward	Short	Hook	Track Toggle	Stabilize	Scan	Track
	Long	Make SPI				
Aft	Short	Un-hook	INR Track	Set SPI Submode	Break Lock	Ground Stabilize
	Long	SPI to Steerpoint				
Left	Short	Reset WCN				
	Long					Space Stabilize
Right	Short	Markpoint				
	Long					

4. **Nosewheel Steering (NWS) Button.** Functions according to SOI include:

	TAD	TGP	HUD	AIM-9	MAV
On Ground	NWS				
In Air	Lase / AR disconnect				

1.2 – MY WEAPONS CONTROL SETUP (A-10C II TANK KILLER)

Here is a summary of control functions based on SOI (Sensor of Interest).

HOTAS Commands - Throttle

Switch	Action		Selected SOI							
			TAD	TGP	HUD	A/A	MAV	HMCS	HMCS B/S	MSG
Boat Switch	Fwd		TGP FLIR Black Hot				MAV Dark/Cold Light/Hot	TGP FLIR Black Hot		
	Aft		TGP FLIR White Hot				MAV Light/Hot Dark/Cold	TGP FLIR White Hot		
	Center		TGP CCD				Boresight Forced Correlation Auto	TGP CCD		
China Hat	Fwd	Short	FOV Toggle	FOV Change LSS FOV Change	MAV Video/ MAV SOI	Uncage/ Consent to Self-Track	FOV Change	TGP FOV Change - LSS FOV Change		
		Long	Slave All to SPI							
	Aft	Short	Reset Cursor	LSS Toggle	Reset/Cage TDC to TVV	Recage/ Manual Sequence	Recage/ Manual Sequence	Reset/Cage HDC to Crosshair		
		Long	Slave TGP to Current Steerpoint							
Slew/ Track	Slew		Slew TAD Cursor	Slew TGP	Slew TDC	Slew AIM-9	Slew MAV	Slew HDC	Slew Boresight	Slew Cursor
	Depress									
Coolie Switch	Up	Short	HUD as SOI							
		Long	Message Quick Look							
	Down	Short	HMCS as SOI							
		Long	Display DSMS Weapon Status Page & Selected Profile							
	Left	Short	Cycle Left MFCD Page							
		Long	Left MFCD as SOI							
	Right	Short	Cycle Right MFCD Page							
		Long	Right MFCD as SOI							

6. **Weapon Release Button.** Functions according to SOI include:

TAD	TGP	HUD	AIM-9	MAV	HMIT
Release Weapon					

A-10C II Tank Killer Expansion Only

Note: For some weapons like JDAM and laser-guided bombs, you will need to hold down the weapon release button for a full one second.

8. **Trigger.** Functions according to SOI include:

TAD	TGP	HUD	AIM-9	MAV	HMIT
Fire Cannon					

Hotas Commands - Stick

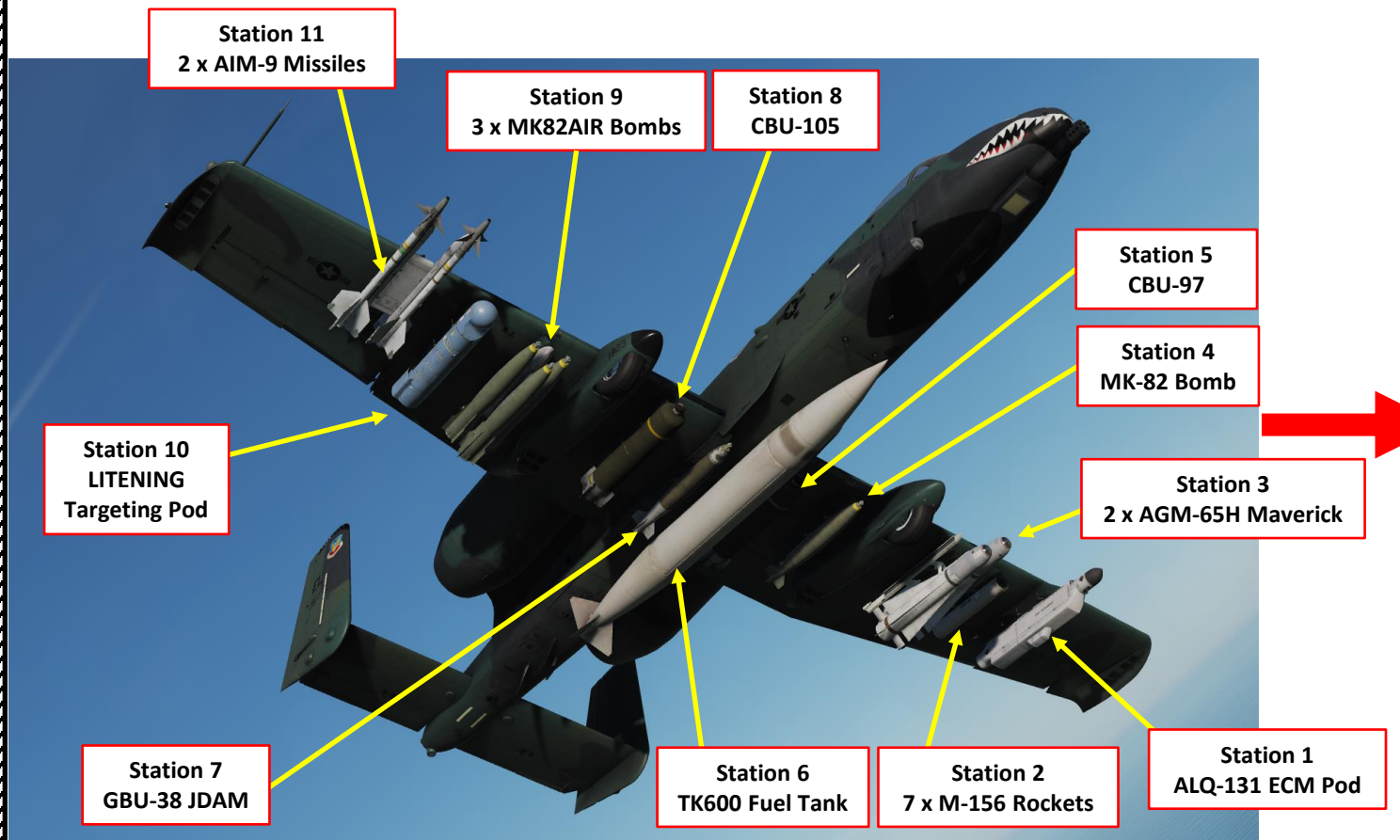
Switch	Action		Selected SOI							
			TAD	TGP	HUD	A/A	MAV	HMCS	HMCS B/S	MSG
MMCB	Depress	Short	Toggle HUD							
		Long	Enter A/A							
DMS	FWD	Short	TAD Scale Decrease	Zoom & Focus Increase	Steerpoint Increment	Steerpoint Increment	MAV BS Rect UP	Brightness Increase	Text Rotate CCW	Change Shape
		Long	Map Quick Toggle				MAV BS Rect UP/ Gyro Stab			Drop Shape
	Aft	Short	TAD Scale Increase	Zoom & Focus Decrease	Steerpoint Decrement	Steerpoint Decrement	MAV BS Reticle Down	Brightness Decrease	Text Rotate CW	
		Long	Select TAD Center Option							
	Left	Short	CEN/DEP Mode CNTR Own	R MFCD Video on HMD	Gunsight Toggle Profile Toggle	Gunsight Toggle Profile Toggle	MAV BS Reticle Left	R MFCD Video on HMD	Boresight Roll CCW	
		Long	HMD ON/OFF							HMD ON/OFF
	Right	Short	Cycle TAD Center Option	Laser/IR Pointer Toggle	Gunsight Toggle Profile Toggle	Gunsight Toggle Profile Toggle	MAV BS Reticle Right	Cycle HMCS Profiles	Boresight Roll CW	
		Long	Slave TGP to HMCS LOS				Slave MAV to HMCS	Slave TGP to HMCS		Slave TGP to HMCS
TMS	FWD	Short	Hook Symb under Cursor	Area/ Point/NR Track	TDC Ground Stabilize	Conical Scan	Track	Hook Symb under Crosshair	Compl BS Sett Occl Point	
		Long	Make Hooked Obj SPI	Make SPI				Make Hooked Obj SPI	Complete Occl Pt	
	Aft	Short	Un-Hook Symbol	FLIR Auto-Focus	IFFCC Wpns Sol SPI	Break Lock	Ground Stabilize	Un-Hook Symbol	Remove Occl Pnt	
		Long	Reset SPI to Current Steerpoint							
	Left	Short	Acknowledge W/C/N (includes message receipt ackn.)							
		Long	SPI Broadcast							
	Right	Short	Mark at TAD Cursor	Mark at TGP LOS	Mark at TGP	Mark at TGP	Mark at MAV LOS	Mark at HDC		
		Long	Make Last Markpoint SPI							
NWS	Ground		NWS Engage/Disengage							
	Air		Laser/IR Pointer HOT Fire and Toggle Fire							
		AR	AR Disconnect/Reset							

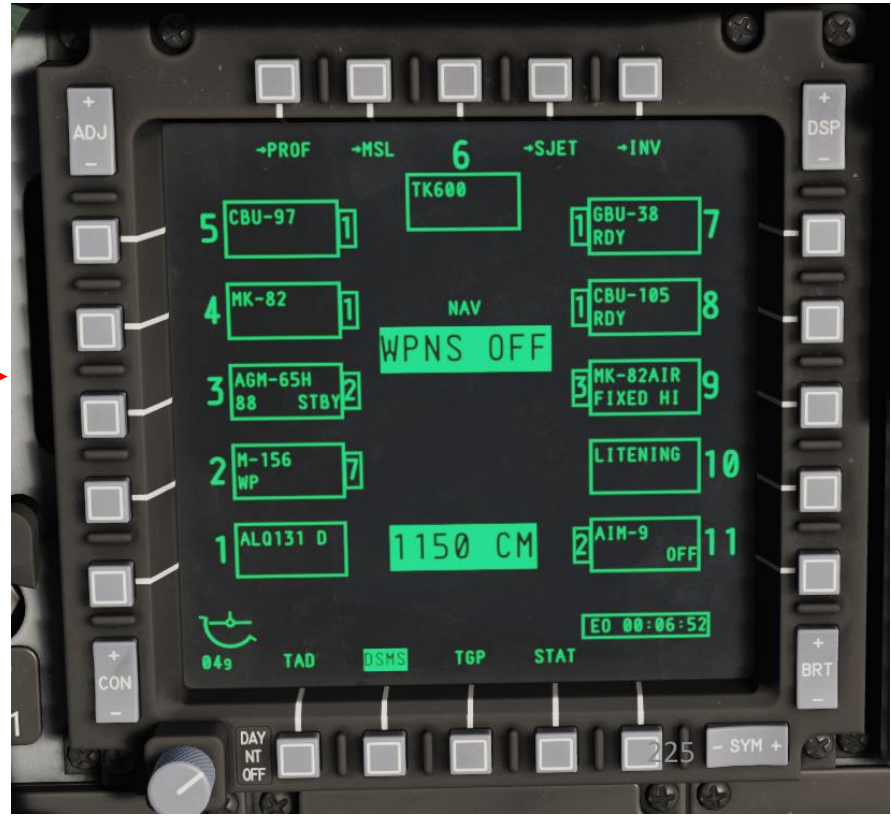
1.3 – DSMS (DIGITAL STORES MANAGEMENT SYSTEM) PAGE

The DSMS (Digital Stores Management System) replaces the old A-10A Armament Control Panel (ACP). All of the settings for weapons, release parameters, and control of the various types of armament are now handled using the DSMS pages on an MFCD.

The DSMS provides you with an overall display of weapons status, inventory of each station on the aircraft, which stations are selected, the arm state, status of the GAU-8 gun, and what profile is currently selected for each weapon.

The DSMS also contains a separate page that provides you the ability to view, select, and control profiles and delivery parameters such as interval and ripple settings for appropriate weapon types. Each of these combinations is called a profile. These weapon profiles can either be selected from the DSMS page or selected as a rotary HUD selection from the HOTAS. The DSMS provides selective jettison options and parameters for each weapon, rack, launcher, or station. DSMS also has a set of pages used to control settings mode, power, and boresighting functions for AGM-65 and AIM-9 missiles.

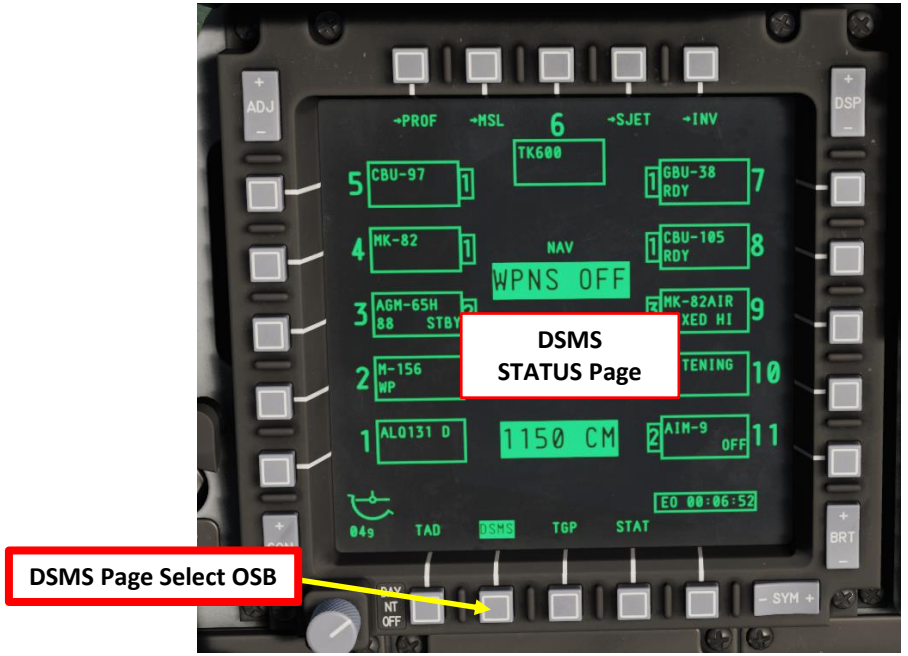


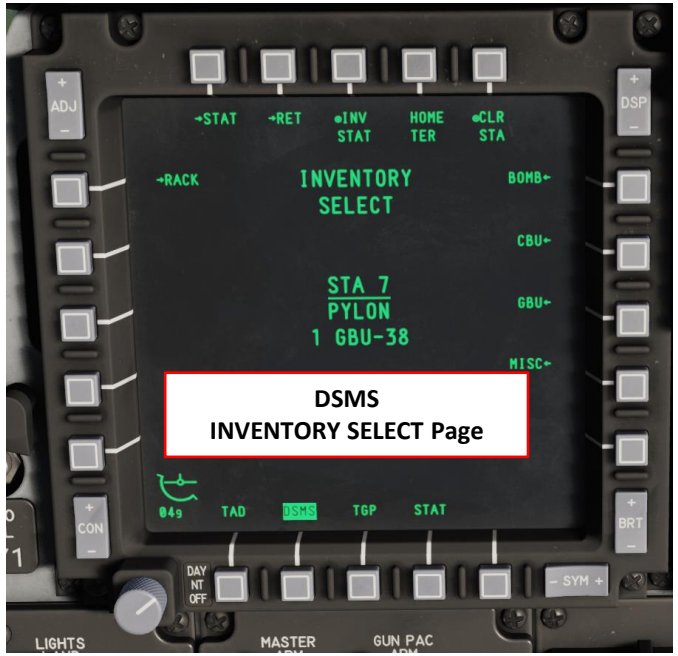


1.3 – DSMS (DIGITAL STORES MANAGEMENT SYSTEM) PAGE

The DSMS is accessed by pressing the lower OSB (Option Select Button) next to DSMS. The DSMS is divided in the following sub-pages:

- **Status Page**
  - Profile Main Page
  - Profile Control Page
  - Profile Settings Page
  - Inventory Main Page
- **Inventory Select Page**
  - Inventory Class Page
  - Inventory Store Type Page
  - Inventory Store Select
- **Selective Jettison Page**
- **Missile Control Page**

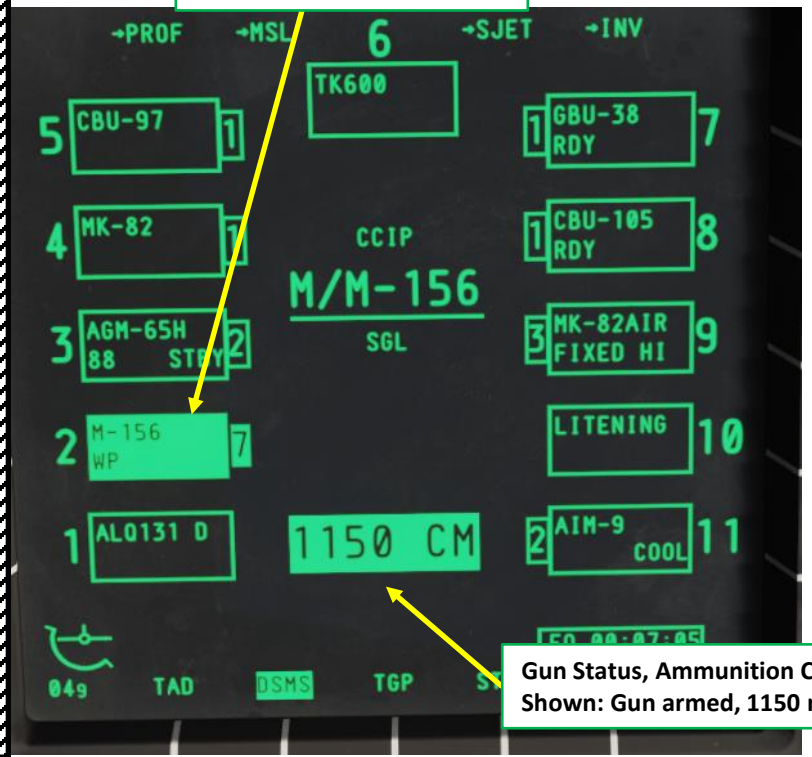


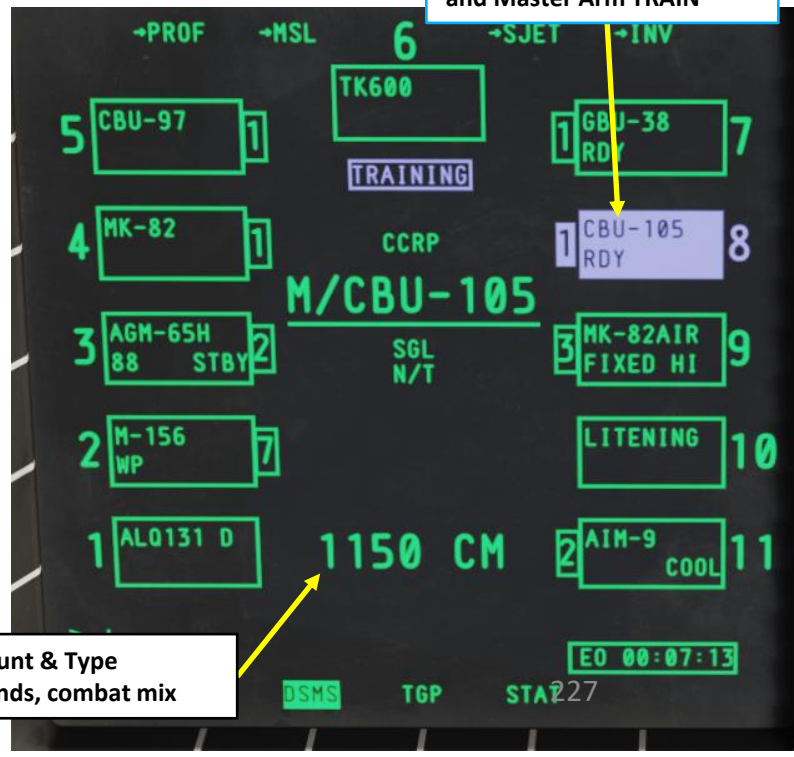


1.3 – DSMS (DIGITAL STORES MANAGEMENT SYSTEM) PAGE

Color coding represents the status of the weapon.

- **White**: Master Arm is set to SAFE. When in SAFE mode, all systems behave as if in ARM mode but no weapons or flares will be released. However, if Maverick is selected, no video is shown.
- **Blue**: Master Arm is set to TRAIN. This is a simulated mode in which "virtual" weapons can be loaded on the aircraft. TRAIN profiles will not show any mismatch errors from what is in the profile and what is detected as loaded on the aircraft.
- **Green**: Master Arm is set to ARM.
- **Red**: A red indication means that the profile and the inventory have conflicting information for what is loaded on the station. Additionally, the station may be red if the weapon profile for that station has invalid settings.





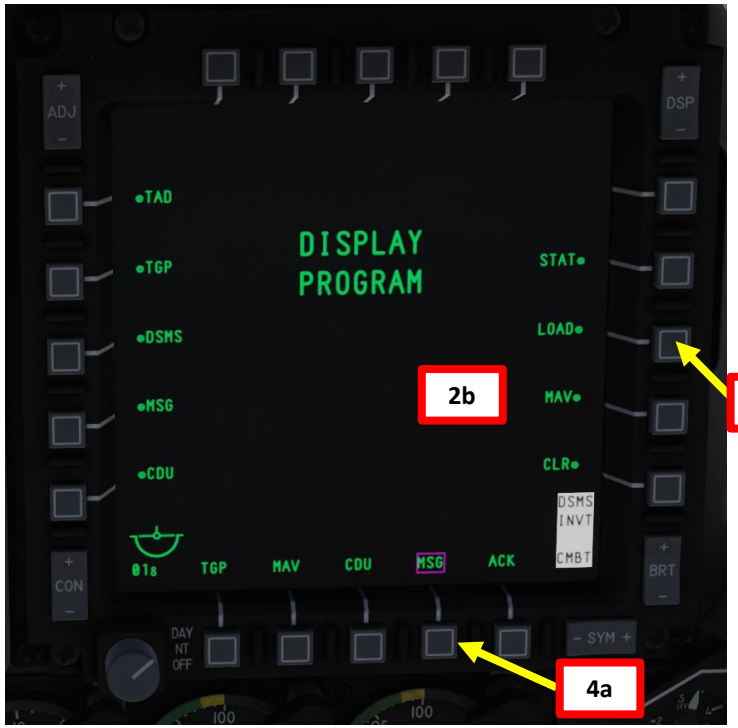
1.4 – RE-ARMING CONSIDERATIONS

When a ground crew re-arms the A-10's stations, the ground crew installs a new Data Transfer Cartridge (DTC) containing all the information relevant to the ordnance you have loaded on the aircraft pylons. However, the DSMS (Digital Stores Management System) needs to re-load the Data Cartridge in order to update the weapon data in its stations.

1.4 – RE-ARMING CONSIDERATIONS

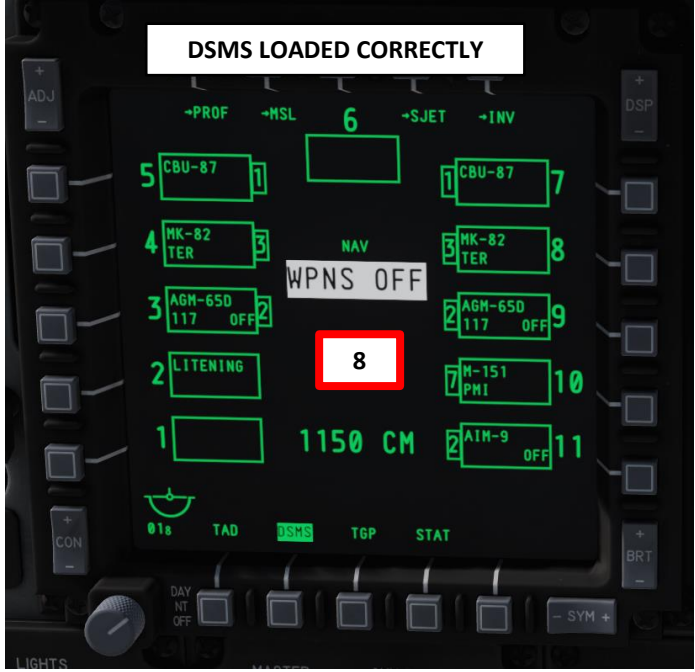
Here is the procedure to **re-load the DSMS correctly** after the ground crew has re-armed your aircraft.

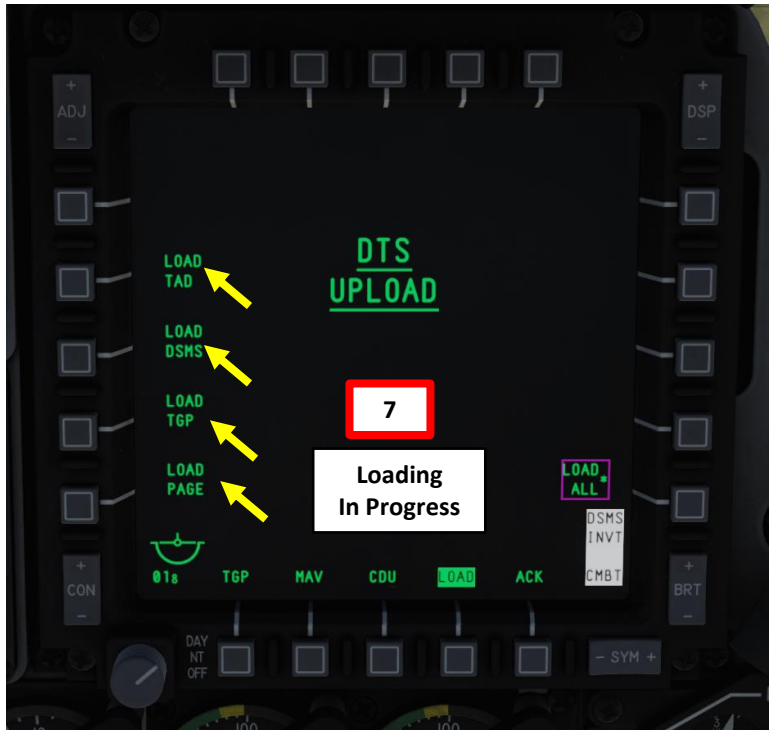
1. Select any page on the right MFCD
2. Click and hold “MSG” OSB until you see the DISPLAY PROGRAM page appear
3. Click on “Load” OSB on the right menus.
4. Click on lower “MSG” OSB. OSB will replace the “MSG” page with the “LOAD” page.
5. Click on the new lower “LOAD” OSB menu. This will select the DTS UPLOAD (Data Transfer System) page.

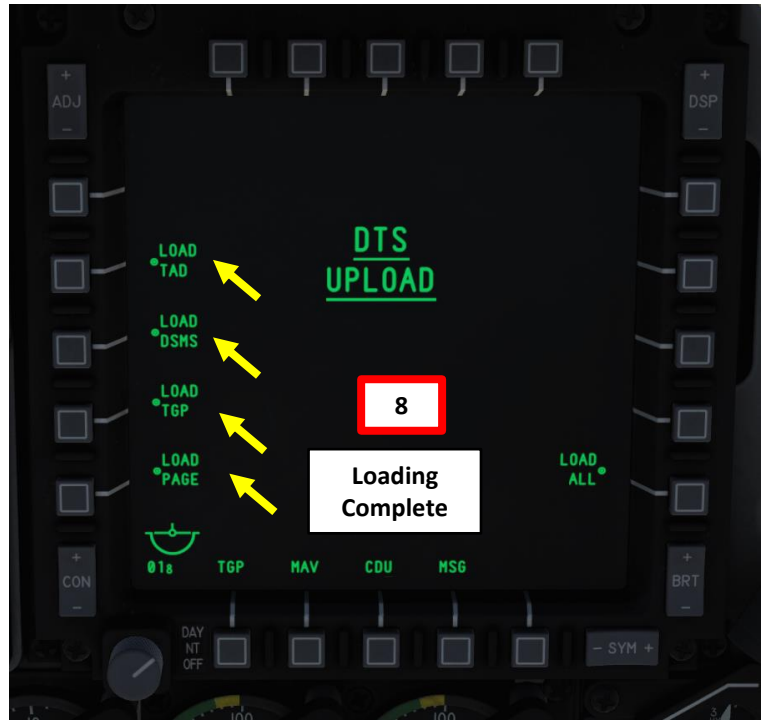


1.4 – RE-ARMING CONSIDERATIONS

6. Click on “LOAD ALL” OSB on the right to reload all DSMS stations.
7. While DTC loading is in process, all asterisks near menus being reloaded will disappear.
8. When DTC loading is complete, asterisks will appear next to every menu and DSMS page will be available and updated with the correct ordnance.



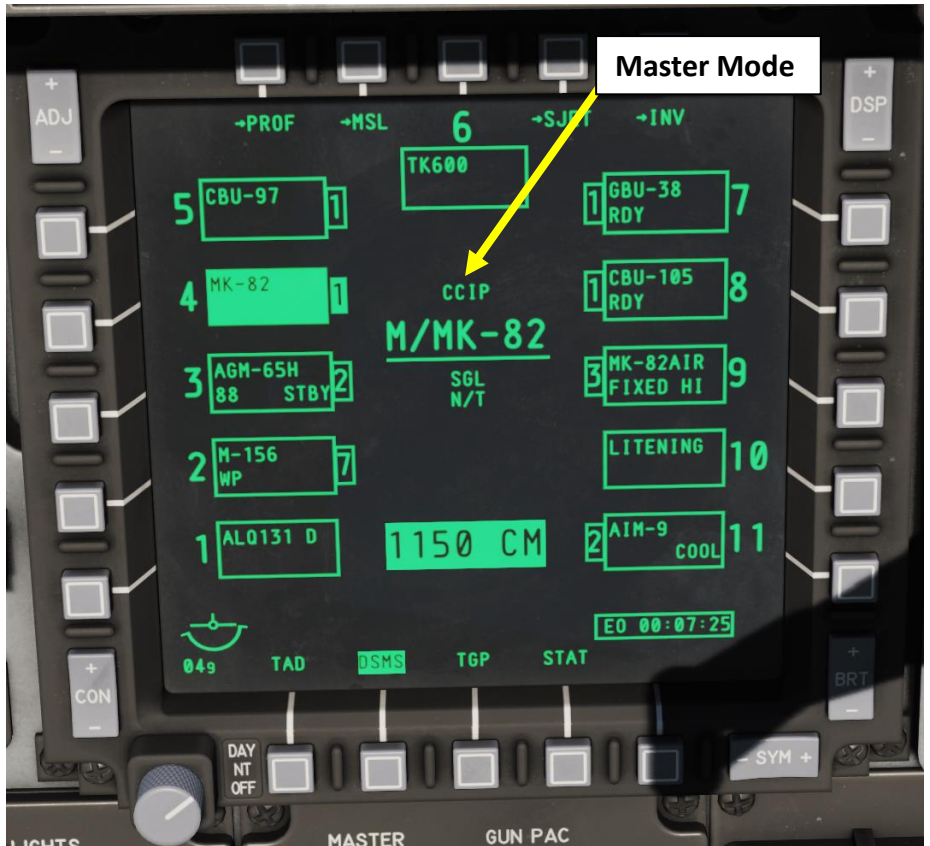


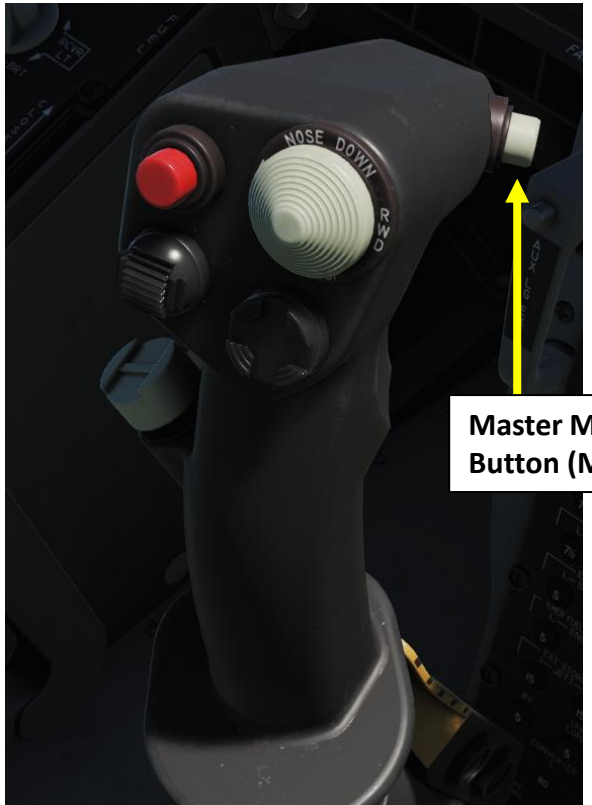


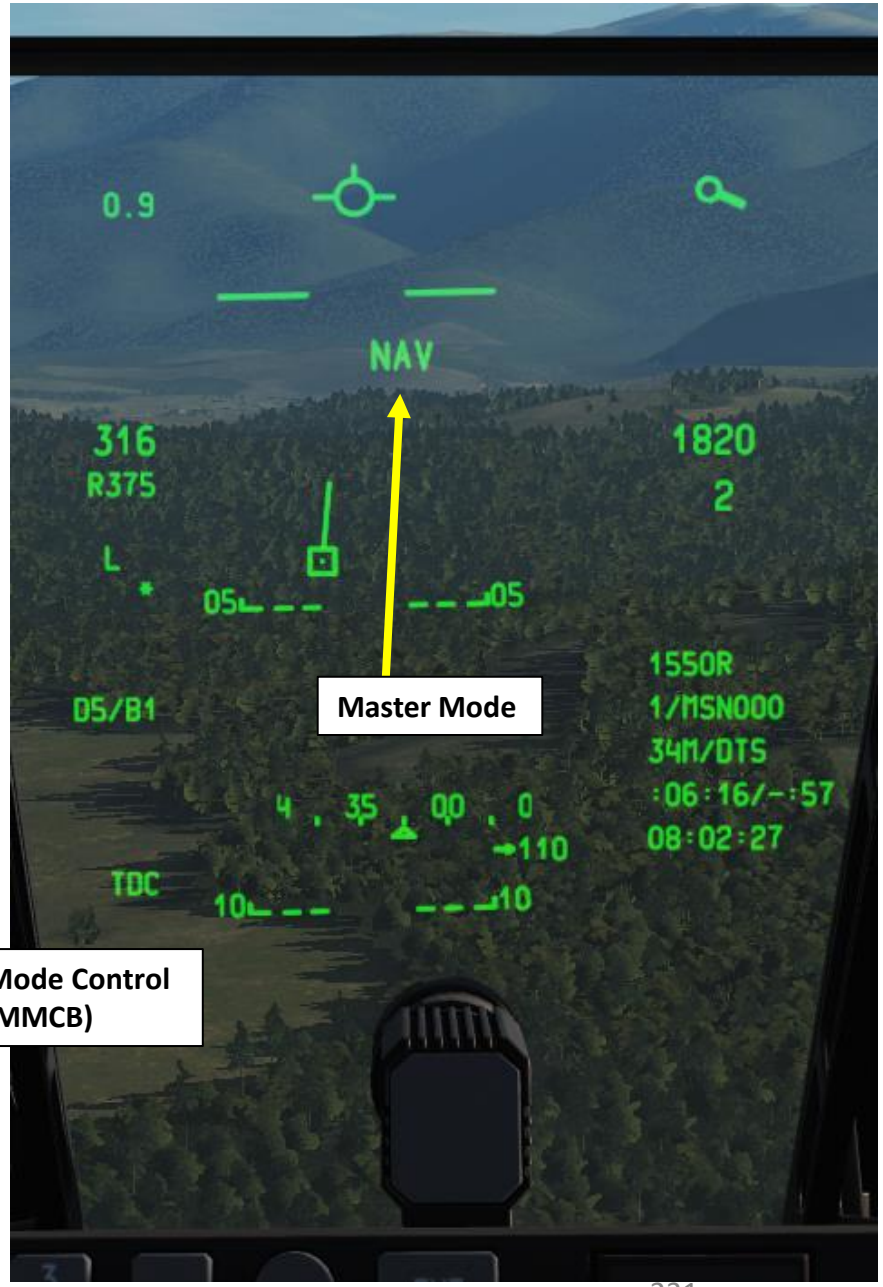
1.5 – MASTER MODES

There are five master HUD (Heads-Up Display) modes that you can cycle through using the ***Master Mode Control Button*** on the control stick.

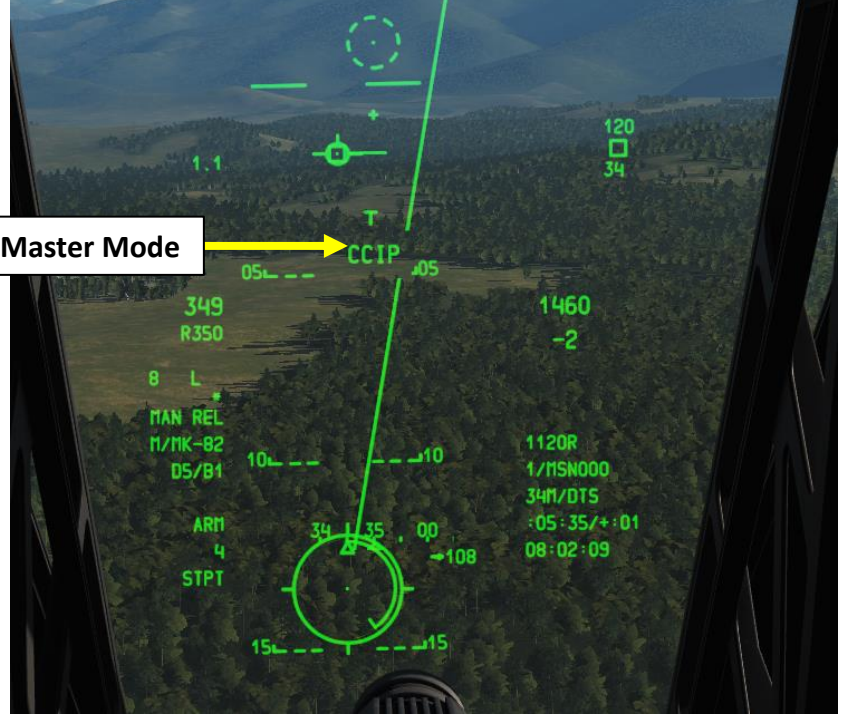
- **NAV**: Navigation data only with no weapon delivery symbology.
- **GUNS**: Select and display multiple gunsight options.
- **CCIP**: Bombing symbology for Continuously Computed Impact Point delivery including Consent to Release (CR) modes. Maverick delivery also uses the CCIP mode.
- **CCRP**: Bombing symbology for Continuously Computed Release Point delivery for illumination flares, unguided bombs, laser-guided bombs, and Inertially Aided Munitions (IAM).
- **AIR-TO-AIR**: Display symbology for Air-to-Air gun and AIM-9 missile.
    - *Air-to-Air mode can only be selected by holding the Master Mode Control Button for about 3 seconds.*

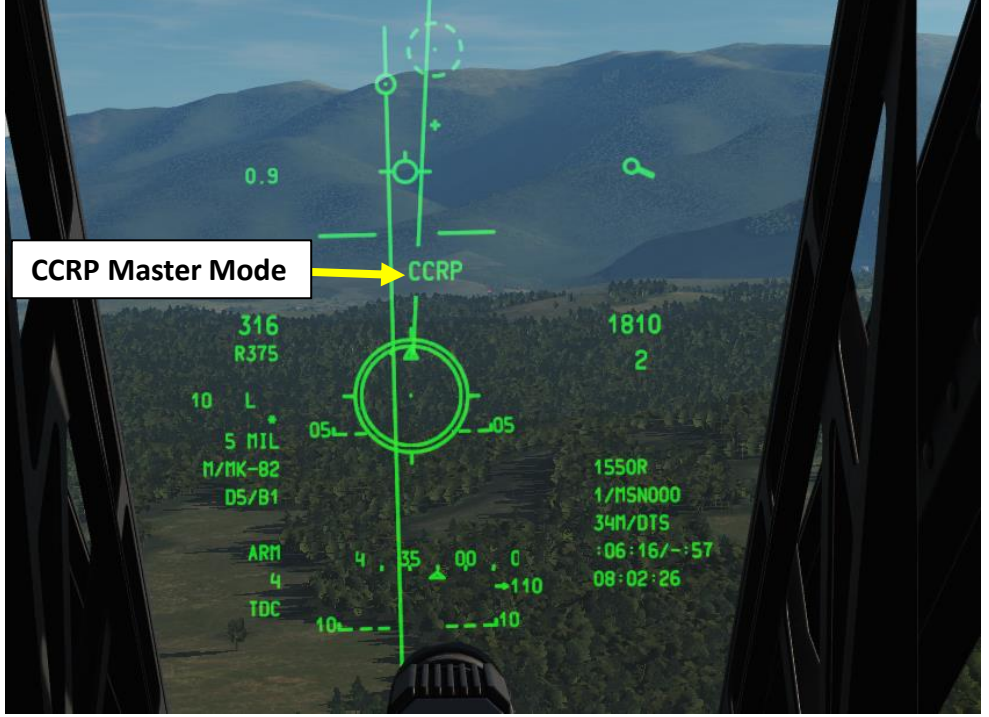


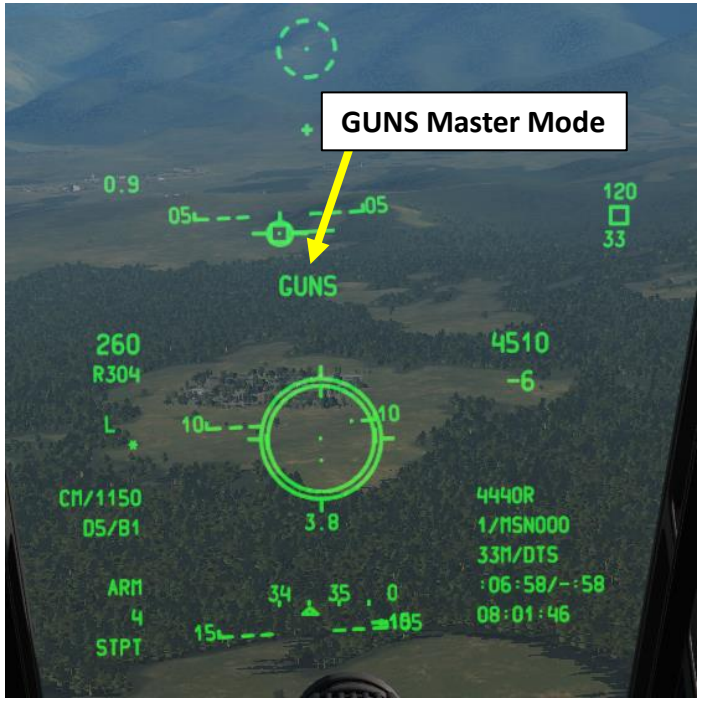


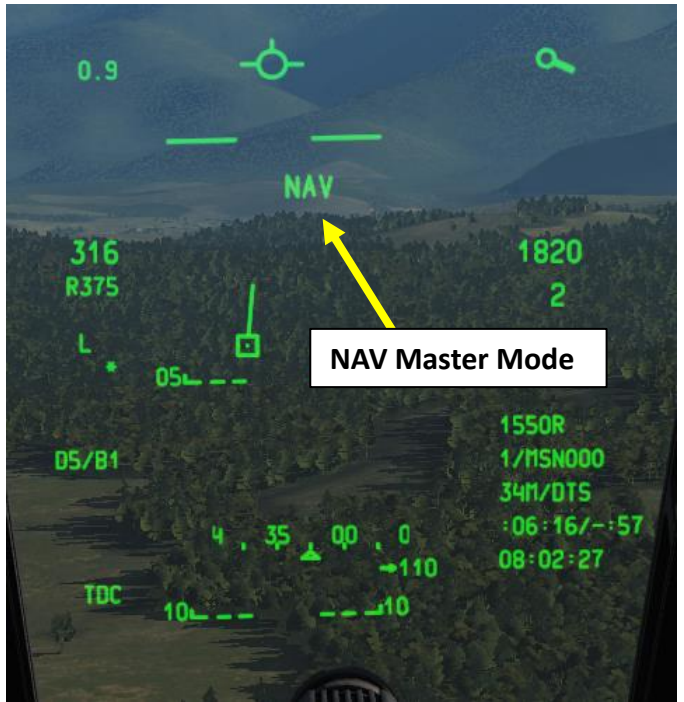


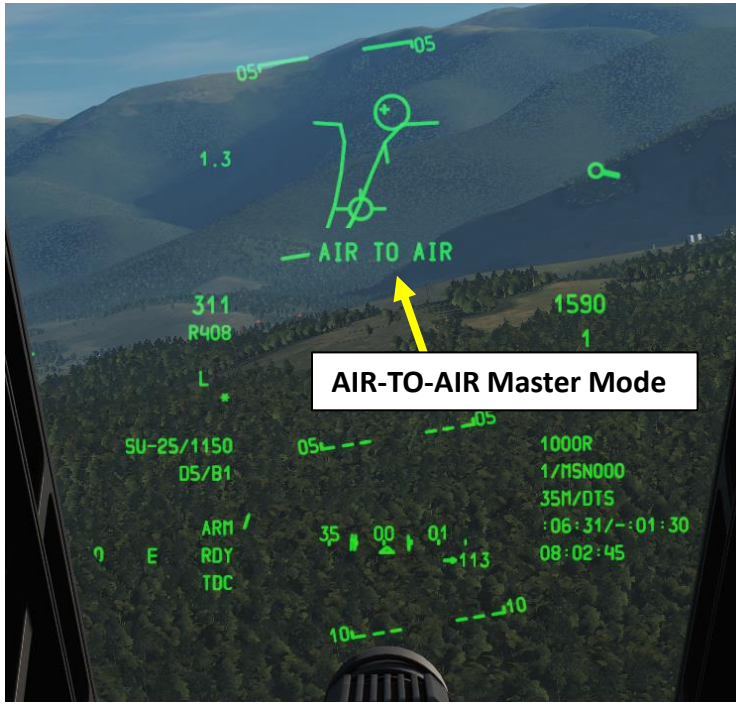
1.5 – MASTER MODES











1.6 – BOMB DELIVERY MODE - CCRP VS CCIP

There are 2 ways to deliver bombs: CCRP or CCIP modes.

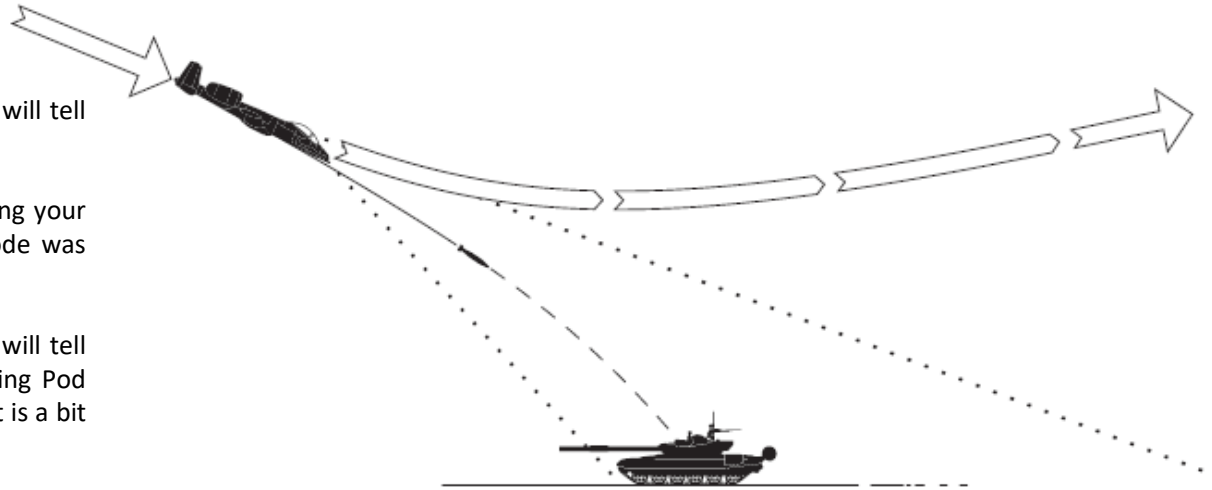
CCIP mode is the traditional dive bombing approach: you dive on target and the reticle will tell you where the bomb will impact.

However, dive bombing is a risky business, especially if anti-air defences are surrounding your target. The lower you go, the more vulnerable you are. This is why CCRP release mode was invented.

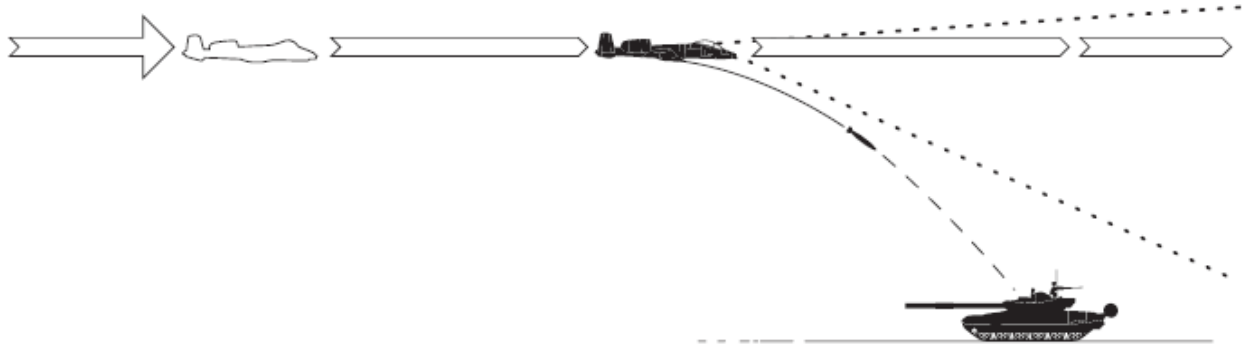
CCRP mode allows you to fly straight and level without having to dive down. The HUD will tell you when to release your bomb for the target you have designated with your Targeting Pod (TGP). It is a much safer way to release a bomb, but as you may have guessed already, it is a bit less precise.

Using CCRP or CCIP is up to you and the situation you are in. Some pilots prefer to use CCIP, while others would not touch CCRP with a 10-ft pole. Both delivery modes work, and only experience will teach you what you prefer to use, and in which situations. As shown previously, **CCRP or CCIP delivery can be set throughout the DSMS during the PREFLIGHT phase**.

Your delivery mode can be set throughout your DSMS in your weapon profiles.



CCIP: Continuously Computed Impact Point



CCRP: Continuously Computed Release Point

1.7 – PROCEDURES SUMMARY

These are the steps you must do in order to fire a weapon.

1. **Select a weapon** using your DSMS.
2. **Select weapon profile:** make the HUD SOI (Sensor of Interest) with Coolie Hat Switch UP, then press the DMS (Data Management Switch) left or right to cycle between weapon profiles.
3. **Arm** selected weapon and sensors
4. **Select bomb delivery mode** if applicable (CCIP or CCRP)
5. **Use one of your sensors** (by making it SOI) to find a target, move your SPI over your target, slave all your sensors to the SPI/target and lock it.
6. **Fire** weapon when you have a firing solution.

An excellent weapons tutorial by Robert Sogomonian
https://www.youtube.com/watch?v=-MDNcdFJ8x0

Note: Rob10 from the DCS forums did a couple of lists and detailed procedures on how to use each weapon type. These charts are listed at the end of this section, so I recommend that you print them out. This is good, useful stuff.

There is also another tutorial by Sim that shows weapon employments with lots of pretty pictures.
http://simhq.com/forum/ubbthreads.php/topics/3171145/How_to_use_weapons_Picture_gui.html#Post3171145

WEAPONS USAGE

GUNS

GUNS: best used at 0.5 - 2 mile slant range
- keep to 0.5-0.8 and prefer from behind for tanks
- 1.2 mile for lightly armoured
- 1.5 mile for unarmoured
- high angle = less dispersion (best for armour)
- low angle = more dispersion (good for infantry)

1. Master Arm to ARM
2. GUN/PAC switch to ARM or GUNARM (no PAC in Gunarm mode)
3. HUD Master Mode to GUNS
4. HUD to SOI
5. Put target under reticle
6. Partially depress trigger or key to activate PAC and stabilize flight
7. Depress trigger to fire gun

CCIP Reticle
Min alt cue triangle to left -- at min when beside 3 o'clock
Below is current range to target
Dots either side of centre are lead distance for tgt at 20 kts

CCIP Cross (horz. line across top)
Simplied CCIP Reticle but as accurate as it

4 / 8 / 12 Gun Reticle -- less accurate than CCIP reticles
TOP DOT: 4,000 ft slant range
MID DOT: 8,000 ft slant range
BOTTOM DOT: 12,000 ft slant range

4,000 Wind Corrected Cross (no line across top)
4,000 ft wind corrected slant range
Not very accurate, use if can't get CCIP due to innacurate elev. data

CCIP INVALID HUD message - target at elevation higher than aircraft
SOL'N = attack from higher altitude or use 4-8-12 or 4,000 ft reticles

ROCKETS USAGE

ROCKETS

Bombing reticle/lines won't show in HUD until at >3 deg depression angle

1. Set up Rockets from DSMS Profile page
2. Master Arm to ARM
3. Set HUD as SOI

CCIP TARGETING:

4. Select CCIP mode with HUD MASTER
5. DMS LEFT/RIGHT to select Rocket profile
6. Pipper shows RKT underneath and slant range if > 2 miles
   - at <2 miles slant range, analog bar inside pipper shows range
7. At approx. 1 mile range press WPN RELEASE

CCRP TARGETING:

8. Designate target as SPI with TAD, TDC, TGP, MAV or GUN PIPPER
9. Select CCRP mode with HUD MASTER
10. DMS LEFT/RIGHT to select Rocket profile
11. Azimuth Steering Line (ASL) will appear on HUD with SOL'N CUE circle near the top -- RKT PIPPER will also appear with no range indicators
12. Fly to put RKT PIPPER inside SOL'N CUE then press WPN RELEASE

CCRP MODE: less accurate than CCIP but can fire from level flight or pitched up and longer range. Use to suppress heavily guarded tgt.

UNGUIDED ORDINANCE USAGE (1 of 2)
(applies to MK-82, MK-82APO, MK-84, CBU-87, CBU-97)

CONSENT TO RELEASE MODES: changed in IFFCC test menu
OFF - MAN REL - Manual release mode - wpn release as soon as pressed
3/9 - Solution Cue must pass through reticle
5 mils - Solution Cue must pass over reticle pipper

CCIP RELEASE MODE (UNGUIDED ORDINANCE)

Best if start at >10,000 ft

1. Set up desired bomb profile in DSMS Profile page
2. Select OFF in CCIP CONSENT OPT in IFFCC TEST MENU
   >> entering IFFCC TEST MENU resets HUD MASTER mode to guns
3. Master Arm to ARM
4. *OPTIONAL*: Make target SPI (via TGP, TDC in HUD etc)
   >> bottom left of HUD indicates sensor current SPI entered from
5. Set HUD as SOI
6. DMS LEFT/RIGHT to select desired bomb and bomb profile
7. Select CCIP mode with HUD MASTER (MAN REL shows in HUD)
   - Projected Bomb Impact Line (PBIL) shows as dashed line when reticle below HUD
8. Pitch nose down -30 to -40 degrees
9. Line Projected Bomb Impact Line (PIBL) up with target
   - *PIBL solid line when can see reticle*
   - *DO NOT chase reticle -- allow reticle to "walk" up PIBL onto target*
   - *IF have X in reticle check for valid release manoveur in DSMS profile*
   - *if selected Desired Time of Fall keep reticle over Desired Release Cue*
10. Press WPN REL button to release bombs when pipper over target

--- MUST KEEP reticle below Min Range Staple on line ---

CCIP-CR (Consent to Release) RELEASE MODE (UNGUIDED ORDINANCE)

1. Set up desired bomb profile in DSMS Profile page
2. Select 3/9 or 5 mil CCIP CONSENT OPT in IFFCC TEST MENU
3. Master Arm to ARM
4. Set HUD as SOI
5. DMS LEFT/RIGHT to select desired bomb + bomb profile
6. Select CCIP RELEASE mode with HUD MASTER (3/9 or 5 mil shows in HUD)
7. Reticle will clamp to bottom of HUD FOV if below that level
   NOTE: in 3/9 or 5 mil mode reticle won't "walk" up PBIL
8. Place reticle over target, *press and hold* WPN RELEASE to select target -- continue holding WPN RELEASE until bomb is released
   - if "X" over sol'n cue means steering error too large won't release
   >> Triangle caret represents MIN ALT -- dashed X on reticle once below min alt.
9. To cancel drop - release button prior to sol'n cue reaching release point

UNGUIDED ORDINANCE USAGE (2 of 2)
(applies to MK-82, MK-82APO, MK-84, CBU-87, CBU-97)

CCRP RELEASE MODE (UNGUIDED ORDIDNANCE)

1. Set up desired bomb profile in DSMS Profile page
2. Master Arm to ARM
3. Make target SPI (via TGP, TDC in HUD etc)
   >> bottom left of HUD indicates sensor current SPI entered from
4. DMS LEFT/RIGHT to select desired bomb + bomb profile
5. Select CCRP RELEASE mode with HUD MASTER (5 mil shows)
   >> only 5 mil mode available in unguided CCRP release mode
6. Line up reticle pipper with Projected Bomb Impact Line (PBIL)
   - Triangle caret on reticle is Desired Release Cue (DRC) range
7. Solution Cue will drop from top (# beside it is time to release)
8. When range line inside reticle starts to move press and hold weapon release
   - X inside Sol'n Cue indicates too much error, weapon will not drop
   - dashed X inside reticle indicates below minimum release altitude
9. To cancel drop - release button prior to sol'n cue reaching release point

GUIDED ORDINANCE USAGE

(applies to GBU-10, GBU-12, GBU-31, GBU-38, CBU-103, CBU-105)

CONSENT TO RELEASE MODES *: changed in IFFCC test menu*
3/9 - Solution Cue must pass through reticle
5 mils - Solution Cue must pass over reticle pipper

CCRP RELEASE MODE (LASER / IAM GUIDED ORDINANCE)

- In CCRP mode don't need to ever put reticle over target. Can designate target via SPI from TDC, TGP or MAVERICK.
- Can only use 3/9 release mode for Laser Guided bombs in CCRP
- For ripple drops Desired Release Cue (DRC) puts middle bomb on target (for even # of bombs to ripple DRC brackets target point)
- Bombing reticle only shows at >3 deg depression angle

1. Set up from bomb from DSMS Profile page
2. Master Arm to ARM
3. HUD to SOI
4. Prefer height >5,000 ft to allow bomb time to correct (10-15K ft ideal)
5. Make target SPI (via TGP, HUD, TDC etc)
   >> bottom left of HUD indicates sensor current SPI entered from

LASER GUIDED BOMBS (GBU-10, GBU-12)

6. Select CCRP mode (3/9 or 5 mil release) with HUD MASTER
7. *If AUTO-LASE option not selected in profile AND no external Lasing:*
   TGP LATCH OFF: press and hold Nose-wheel Steer btn to activate laser
   TGP LATCH ON: press Nose-wheel Steering button to activate laser
   >> L on HUD will flash when Lasing is active (all modes)
8. Upside down bracket on line is min. range staple (based on Min Alt, Hgt of Function and Fuze settings)
   - must keep CCRP reticle below this for valid release
9. Sol'n Cue must pass through Reticle while WPN RELEASE button is held down to release weapon
   - if "X" over sol'n cue means steering error too large or too much pitch down and weapon won't release

INERTIALLY AIDED MUNITIONS (IAM)/JDAM GUIDED BOMBS
- Loaded on 1760 station (GBU-31, GBU-38, CBU-103, CBU-105)

10. No Sol'n Cue in HUD for IAM's guided bombs
11. Reticle remains attached below TVV
12. Fly to align reticle over Azimuth Steering Line (ASL)
13. Max/Min release ranges shown by carets inside reticle
14. Press and HOLD WPN RELEASE when HUD displays "MAN REL"
    - will be between min/max caret range
    - if release WPN RELEASE button too soon weapon will hang

AGM-65 MAVERICK USAGE

AGM-65 MAVERICK MISSILE

RANGE IS RESTRICTED BY SEEKER LOCK (TYPICALLY 3-7 NM)
Left side HUD and MAV page shows range
Top tick is max. launch range (15 mile)
Middle is Dynamic Launch Zone bracket -- shows if tgt within 30 deg of either side of nose of aircraft.
Bottom tick is min. launch range
Bottom left has status indicator
- ALN - aligning, RDY - ready, EMPTY - selected profile no MAV remaining
FLAPS MUST BE FULL UP TO FIRE A MAVERICK!!

1. Set up Maverick from DSMS Profile page
2. EO ON (DSMS or MAV page)
3. Master Arm to ARM
4. HUD to SOI
5. Select MAV page on MFCD
6. OSB 6 - toggle EO ON/OFF
7. OSB 7 (ADJ) - adjust
8. OSB 8 (SLEW) - enters slew speed from scratchpad (smaller # = faster)
9. OSB 11 (DCLT) - remove OSB labels from screen (OSB still functions)

"SENSOR" ON RIGHT SIDE OF SCREEN *: no active Maverick profile selected >> currently working only as a sensor*
"FLAPS" on screen: Flaps are not fully retracted -- can't fire Maverick

10. Use TGP, TDC in HUD etc.to find target and make it SPI
    >> bottom left of HUD indicates sensor current SPI entered from
11. CHINA HAT FWD LONG - to slave all to SPI
12. MAV MFCD to SOI
13. TMS AFT to ground stabilize -- *"locks" seeker to spot on ground*
14. Slew large MAV target cross to target
    - *small cross shows where seeker LOS is in relation to nose*
    - CHINA HAT AFT - boresights (HUD centre) the MAV SEEKER
      >> use to reset seeker or break lock on current target
15. TMS FWD to LOCK MAV to TGT - *crosshair will shimmer and centre will close when locked*
    - small cross will flash while MAV is LOCKED
    - if MAV won't lock, try jiggling slew
16. WPN RELEASE to fire (Launch Inhibit msg if don't have valid lock)

"NOTE" MSG IN HUD - may be caused by "Check EO Timer" message in MFCD. Clear by TMS-Left or ACK OSB in MFCD

AIR to AIR USAGE

AIR TO AIR MODE (GUNS and AIM-9)

Gun Funnel sights based on target aircraft size set in IFFCC menu

1. Set up AIM-9 from DSMS Profile page
2. Master Arm to ARM
3. HUD to SOI
4. HOLD down HUD MASTER button to enter A-A HUD mode
   - *"AIR TO AIR" shows briefly in HUD*
   - *Seeker reticle shows in HUD*
5. DMS LEFT/RIGHT to select AIM-9 profile

TGP USAGE IN A-A MODE

6. Slew as for ground targeting - *RATES shows on screen*
7. Small cross indicates trackable object
8. Large crosshair open centre while seaching, closes when detects target
9. TMS FWD to lock target -- *POINT shows on screen and box appears around target*
10. TMS AFT to break track on target

GUN USAGE

11. Keep edges of aircraft wingspan just touching edges of funnel gunsight

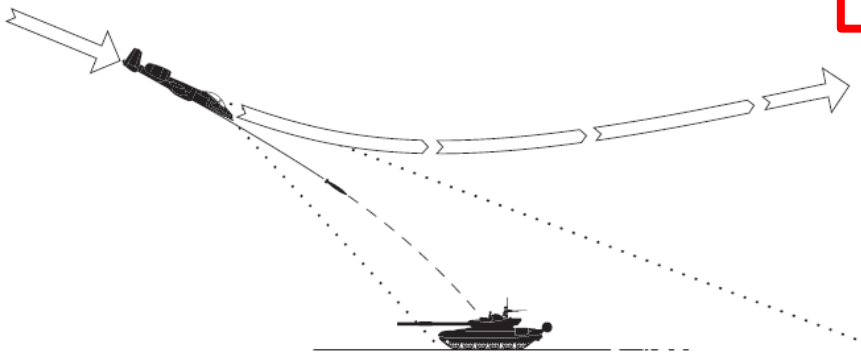
AIM-9 USAGE

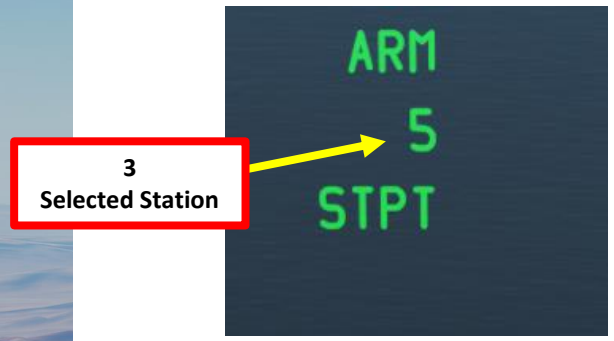
12. *Seeker starts in BORESIGHT mode*
13. Slew AIM-9 reticle over target or fly to put reticle over target
14. Get growling tone if have enough IR signal to track and symbol latches
15. TRACK MODE - 1st press TMS FWD to SCAN mode with allows slewing
    2nd press TMS FWD to CIRCULAR SCAN - scans in circular pattern and starts tracking automatically if detects enough IR signal
16. BREAK LOCK - TMS AFT - commands AIM-9 to boresight if uncaged
17. UNCAGE - CHINA HAT FWD - commands missile to track if currently caged
    - if strong enough IR signal will track otherwise seeker will drift and need to be re-caged. Good way to confirm solid lock.
18. MISSILE REJECT - CHINA HAT AFT - 1st press cages and boresights missile
    2nd press rejects missile and takes it out of service. If all missiles in profile are rejected will return them to all to active service.
19. SLAVE TO TGP - CHINA HAT FWD LONG - slaves AIM-9 to TGP line of sight
20. WPN RELEASE - fires AIM-9

2.1 – MK-82 LOW-DRAG UNGUIDED BOMBS - CCIP
2.1.1 – MANUAL CCIP RELEASE MODE

A: SELECT WEAPON

1. Set Master Arm Switch ON (UP)
2. Select DSMS (Digital Stores Management System) page
3. Select MK-82 Bomb (green when selected)
4. Select PROF (Weapon Profile) menu





2.1 – MK-82 LOW-DRAG UNGUIDED BOMBS - CCIP

2.1.1 – MANUAL CCIP RELEASE MODE

B: SET WEAPON PROFILE

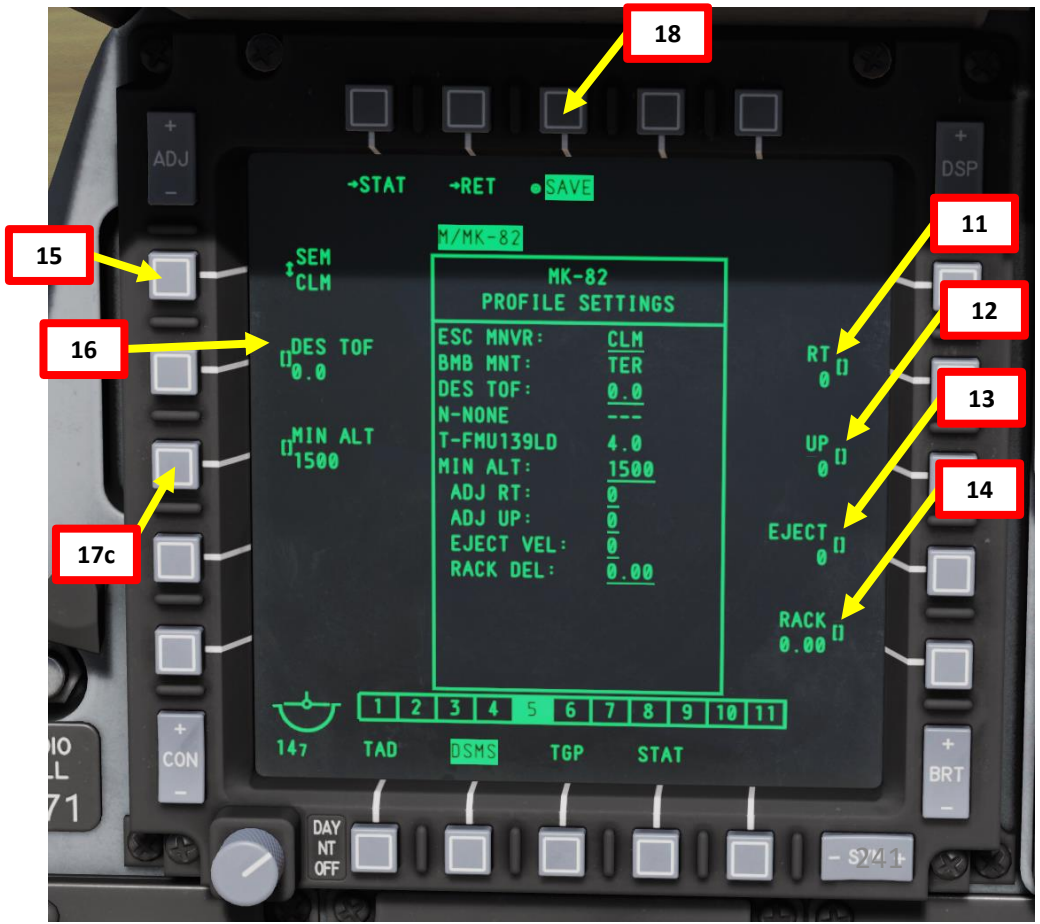
5. Set CCIP (Continuously Computed Impact Point) Mode
6. Set Release Type
    - SGL (Single): Single Bomb Drop
    - PRS (Pairs): Bombs dropped in Pairs
    - RIP SGL (Ripple Single): Each press of the weapon release button will release the set number of bombs set from the RIP QTY (Ripple Quantity) setting
    - RIP PRS (Ripple Pairs): Each press of the weapon release button will release the number of bombs specified in the RIP PRS setting, in pairs
7. Set Bomb Fuze Setting (Nose, Tail, or Nose & Tail)
8. If required, set Bomb Ripple Quantity by typing the desired quantity on the UFC scratchpad (2), then pressing the OSB (Option Select Button) next to RIP QTY.
9. If required, set Bomb Interval Distance in feet by typing the desired distance on the UFC scratchpad (75), then pressing the OSB next to FT.
10. Select the OSB next to CHG SET (Change Settings) to modify bomb settings.

2.1 – MK-82 LOW-DRAG UNGUIDED BOMBS - CCIP

2.1.1 – MANUAL CCIP RELEASE MODE

B: SET WEAPON PROFILE

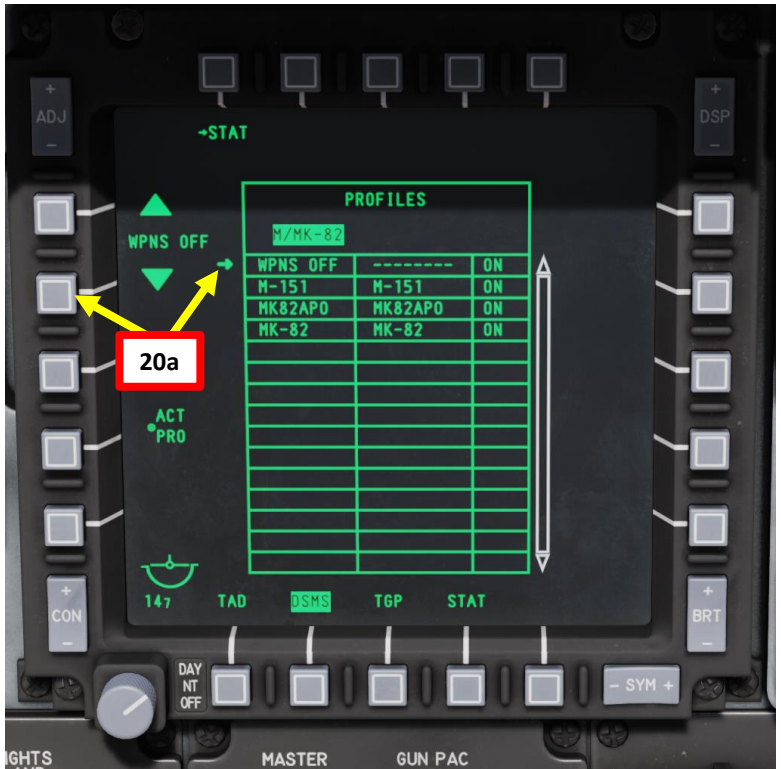
11. OPTIONAL: If using an horizontal offset (we aren't), enter Horizontal Offset value (in mils) on the UFC scratchpad, then press on the OSB next to RT (Right Adjustment). Value must be between -15 and +15 mils.
12. OPTIONAL: If using a vertical offset (we aren't), enter Vertical Offset value (in mils) on the UFC scratchpad, then press on the OSB next to UP (Upwards Adjustment). Value must be between -15 and +15 mils.
13. OPTIONAL: If using a Weapon eject Velocity setting, enter velocity in ft/sec on the UFC scratchpad, then press on the OSB next to EJECT. Value must be between -10 and +30 ft/sec.
14. OPTIONAL: If using a bomb rack delay, enter delay on the UFC scratchpad, then press on the OSB next to RACK. Value must be between -0.40 and +0.40.
15. Select desired Escape Maneuver Type
    - NONE: No Escape Maneuver
    - CLB: Climbing Maneuver
    - TRN: Turn Maneuver
    - TLT: Turn Level Turn Maneuver
16. OPTIONAL: If you want to set a desired Time of Fall (in sec) of the bomb from release time to impact time, enter ToF value on the UFC scratch pad, then press on the OSB next to DES TOF.
17. OPTIONAL: If you want to see Minimum Release Altitude cues on the Heads-Up Display, enter Minimum Altitude on the UFC scratchpad, then press on the OSB next to MIN ALT.
18. Press on the OSB next to SAVE to save Weapon Profile.

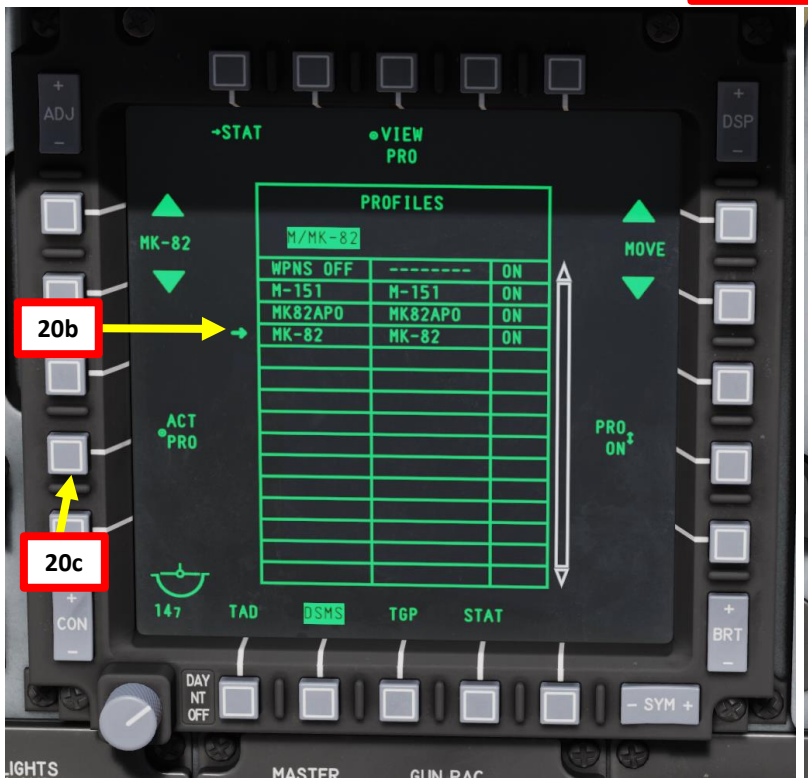


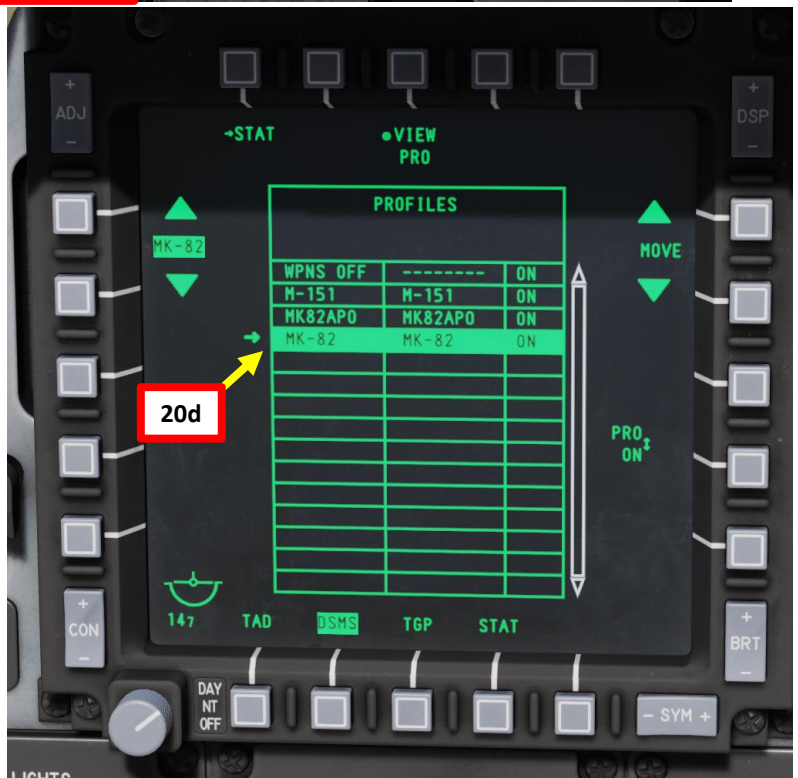
2.1 – MK-82 LOW-DRAG UNGUIDED BOMBS - CCIP
2.1.1 – MANUAL CCIP RELEASE MODE

C: SELECT WEAPON PROFILE

19. Once weapon profile is saved, the DSMS page will showcase all different weapon profiles available.
20. Select MK-82 profile by pressing the Option Select Button Selectors, then press on the OSB next to ACT PRO (Active Profile).
    - While HUD is SOI (Coolie Hat Switch UP), cycle between profiles and stations using the DMS (Data Management Switch) left or right.
21. The MK-82 Profile will be displayed on the Heads-Up Display.





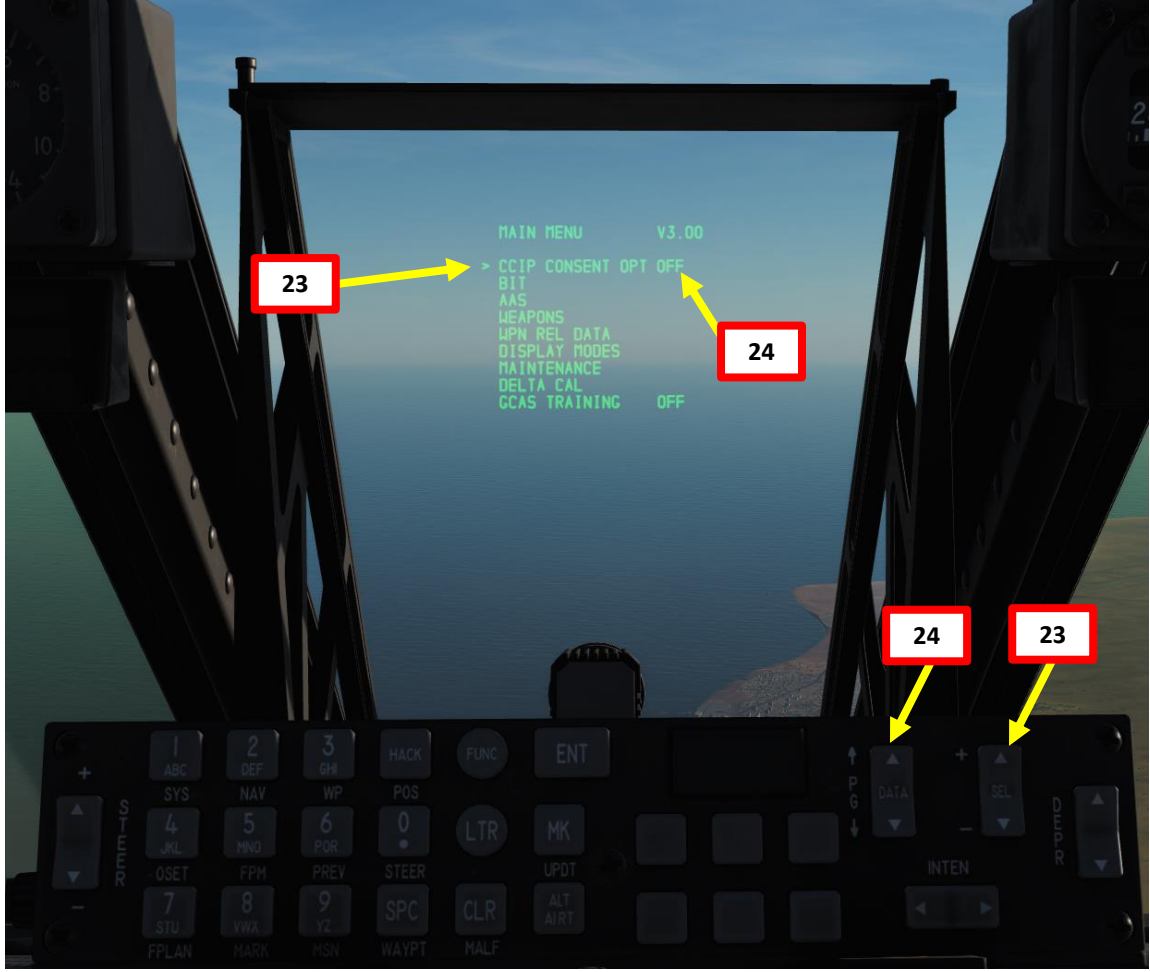


2.1 – MK-82 LOW-DRAG UNGUIDED BOMBS - CCIP

2.1.1 – MANUAL CCIP RELEASE MODE

C: SELECT WEAPON PROFILE

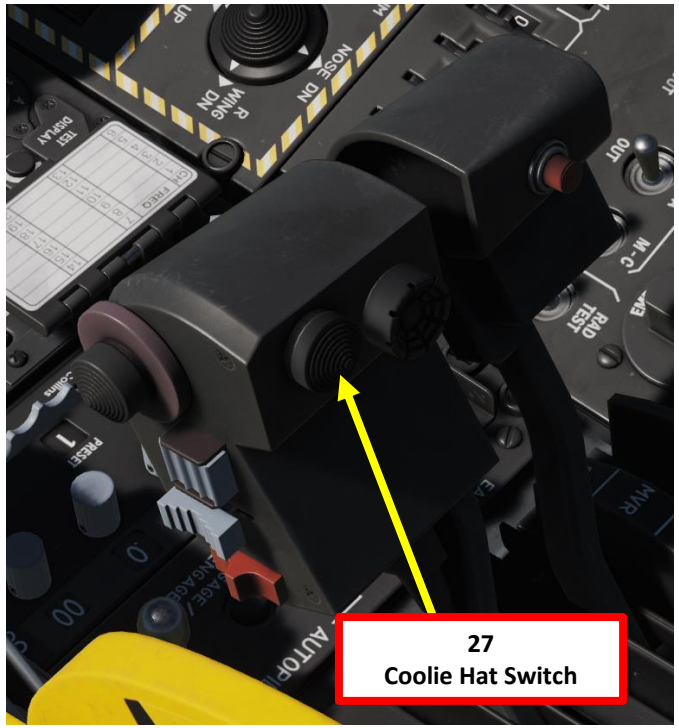
22. Set IFFCC (Integrated Flight & Fire Control Computer) to TEST (MIDDLE) position by Left Clicking on the switch.
23. Select CCIP CONSENT option with the SEL Rocker Key.
24. If CCIP CONSENT option is not in “OFF”, use the DATA rocker key to cycle between modes until “OFF” is displayed.
25. Set IFFCC switch to ON (UP) position by Right Clicking on the switch. The Heads-Up Display will revert to its normal state.



2.1 – MK-82 LOW-DRAG UNGUIDED BOMBS - CCIP
2.1.1 – MANUAL CCIP RELEASE MODE

D: PERFORM ATTACK

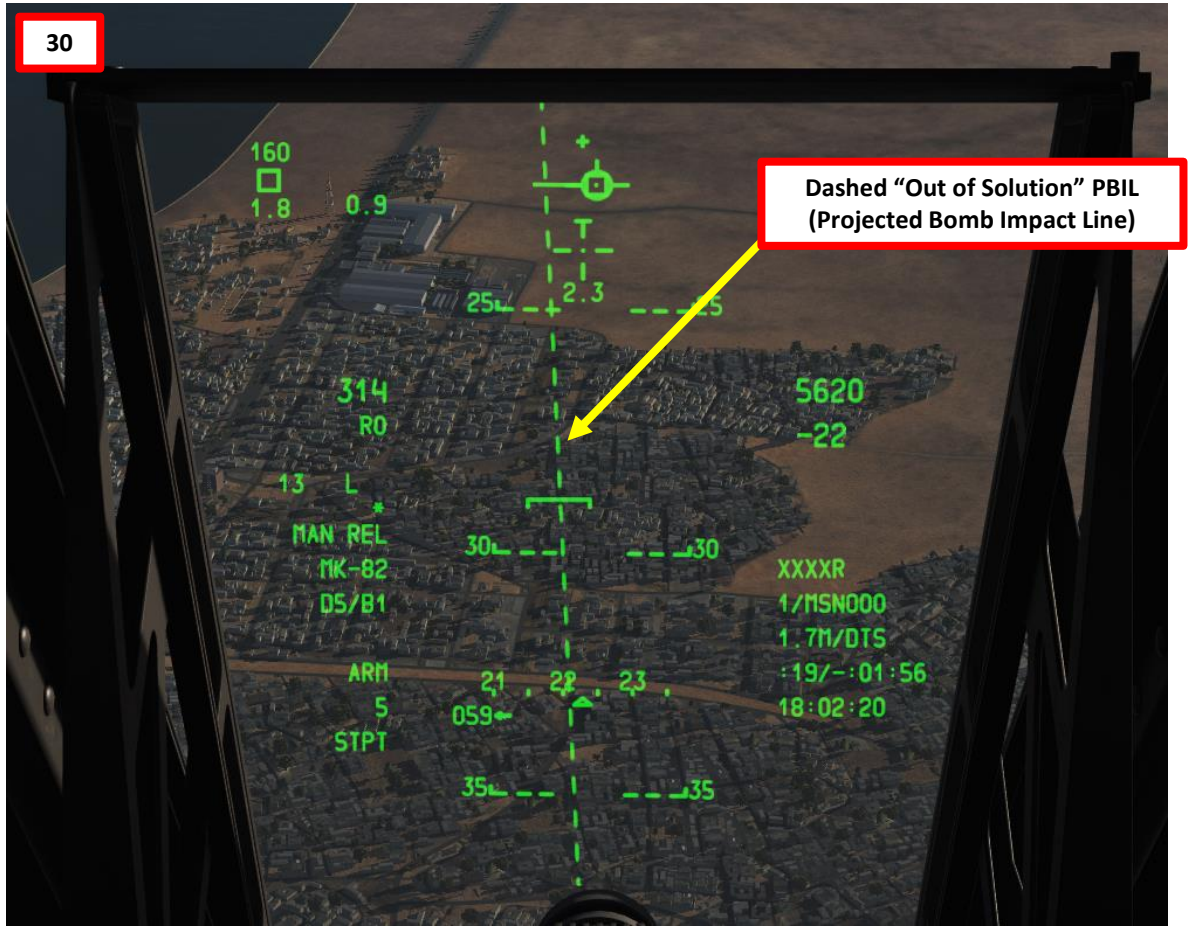
26. Press the Master Mode button until the CCIP HUD Mode is selected.
27. Press Coolie Hat UP Short to set the Heads-Up Display as the SOI (Sensor of Interest). Asterisk will indicate HUD is SOI.
28. Verify on the Heads-Up Display that MAN REL mode, CCIP release, MK-82 profile and ARM status are displayed.

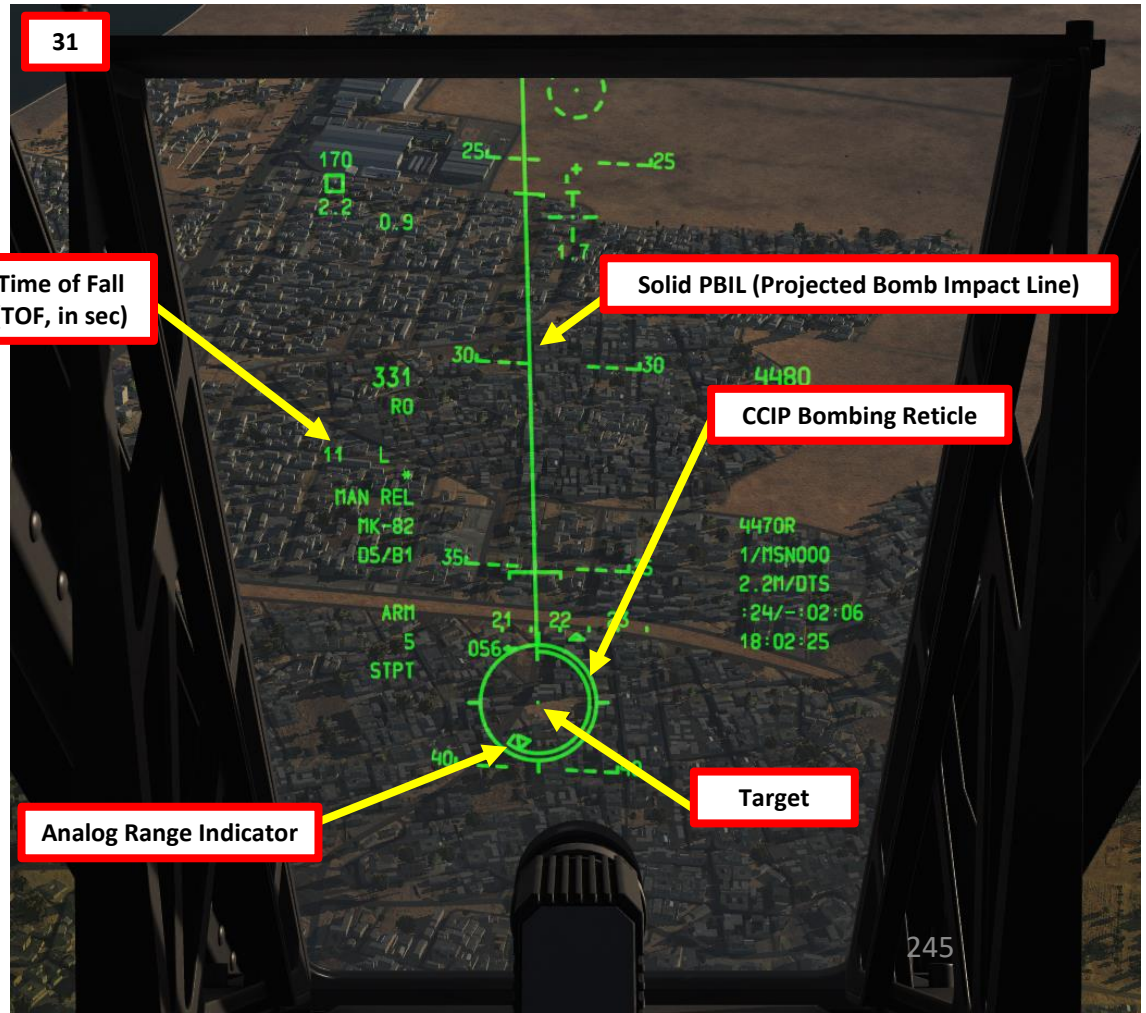


2.1 – MK-82 LOW-DRAG UNGUIDED BOMBS - CCIP
2.1.1 – MANUAL CCIP RELEASE MODE

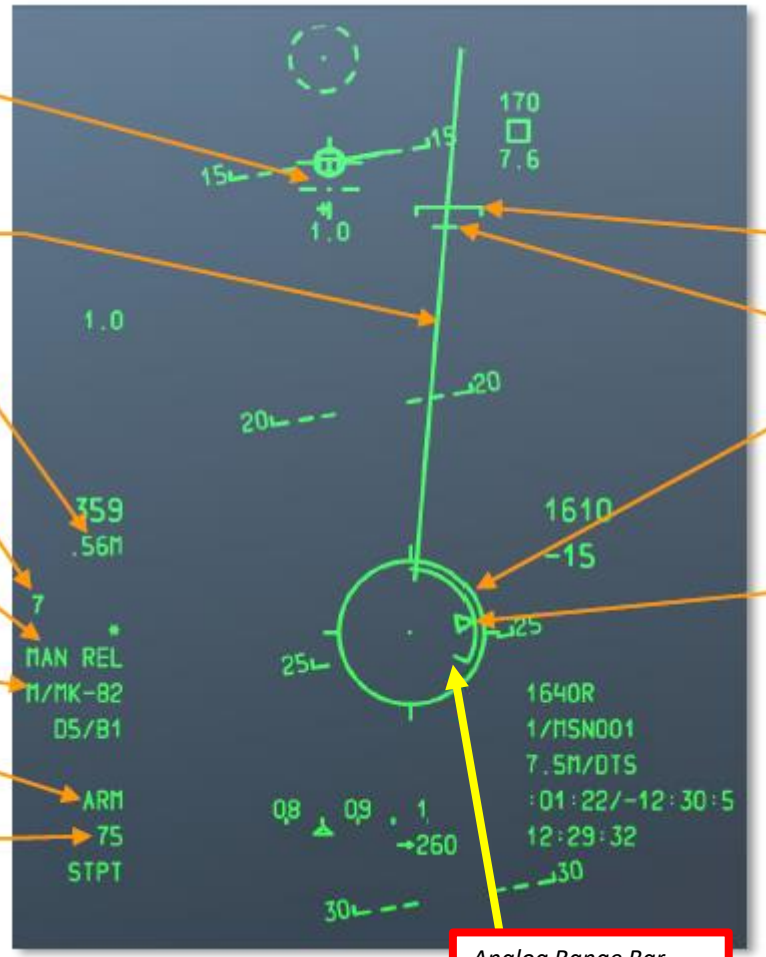
D: PERFORM ATTACK

29. Perform a shallow dive between 10 and 45 deg from at least 10000 ft.
30. A dashed "Out of Solution" PBIL (Projected Bomb Impact Line) will appear when you are not yet close enough to the target (the aiming pipper is currently positioned too low to be visible on the HUD).
31. When you are close enough to the target, the CCIP Bombing Reticle will come into view from the bottom of the HUD and the PBIL will turn from dashed to solid.
32. Place the center of the CCIP Bombing Reticle on the target.
33. Press and hold the Weapon Release Button (RALT+SPACE) to release bombs.





2.1 – MK-82 LOW-DRAG UNGUIDED BOMBS - CCIP
2.1.1 – MANUAL CCIP RELEASE MODE



CCIP Gun Cross (Range in nm under cross)

PBIL (Projected Bomb Impact Line)

Mach Airspeed Indicator

Time-of-Fall (TOF) Display

Release Mode

Profile Name

Weapon Status Indicator

Selected Stations

MRS (Minimum Range Staple) indicates the set minimum escape range of the selected profile as set in DSMS

Desired Release Cue
Desired time of fall as entered in the DSMS weapon profile (DES TOF)

CCIP Bomb Reticle

MRC (Minimum Range Caret)

Analog Range Bar
5 o'clock = 5000 ft
12 o'clock = 12000 ft

2.1 – MK-82 LOW-DRAG UNGUIDED BOMBS - CCIP

2.1.1 – MANUAL CCIP RELEASE MODE

2.1 – MK-82 LOW-DRAG UNGUIDED BOMBS - CCIP
2.1.2 – CCIP-CR RELEASE MODE

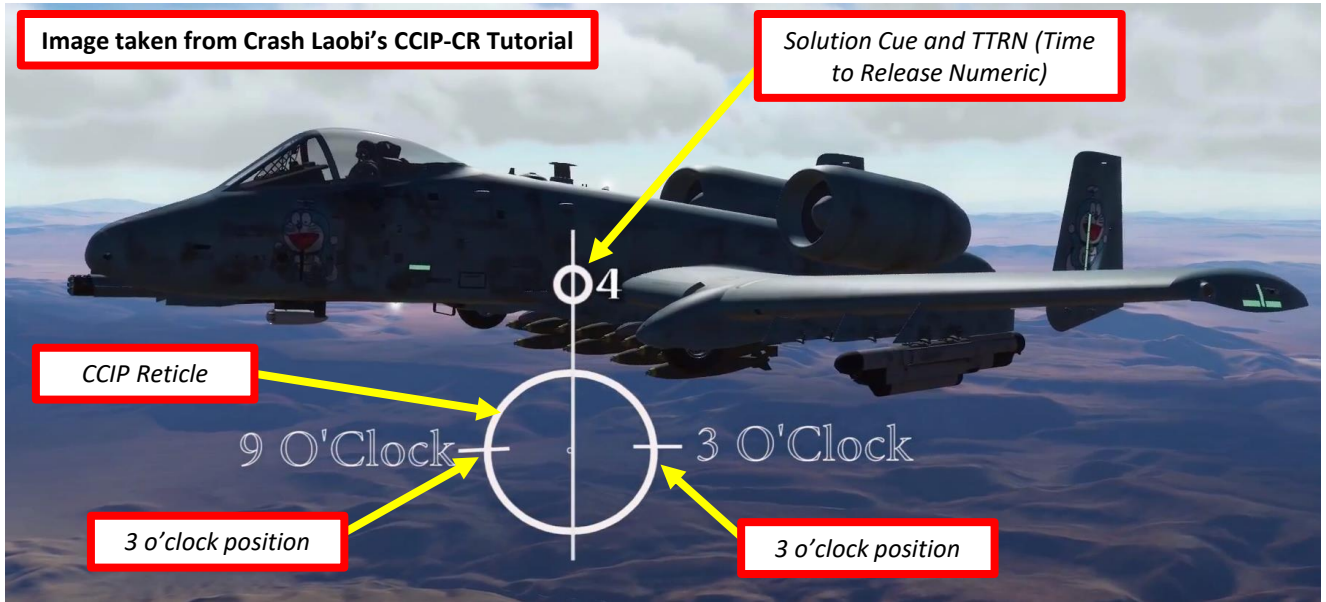
The Consent Release (CR) mode allows you to designate a target much as you would attack it with a CCIP Manual Release attack, and then pull up out of the attack with the target well below the HUD lower field of view. This can be a useful delivery when you want to reduce the time you are in an attack dive and it allows you to start your escape maneuver earlier.

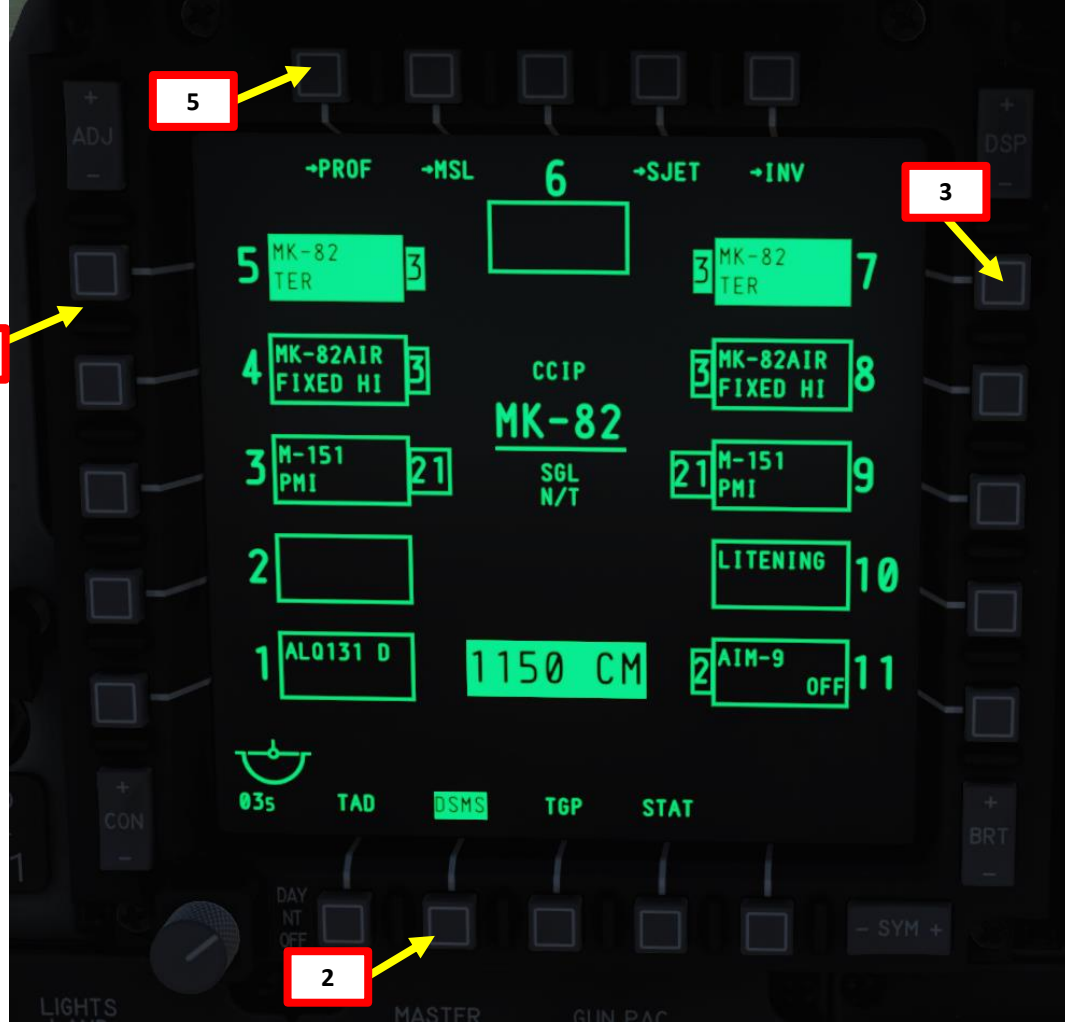
There are two CR modes: **3/9** (named after the 3 o'clock and 9 o'clock positions on the reticle) and **5 M**

- If 3/9 is selected, the Solution Cue simply needs to pass through the reticle.
- If 5-MIL is selected, you must maneuver the aircraft such that the solution cue passes through the pipper of the reticle.

A: SELECT WEAPON

1. Set Master Arm Switch ON (UP)
2. Select DSMS (Digital Stores Management System) page
3. Select MK-82 Bomb (green when selected)
4. Select PROF (Weapon Profile) menu





2.1 – MK-82 LOW-DRAG UNGUIDED BOMBS - CCIP

2.1.2 – CCIP-CR RELEASE MODE

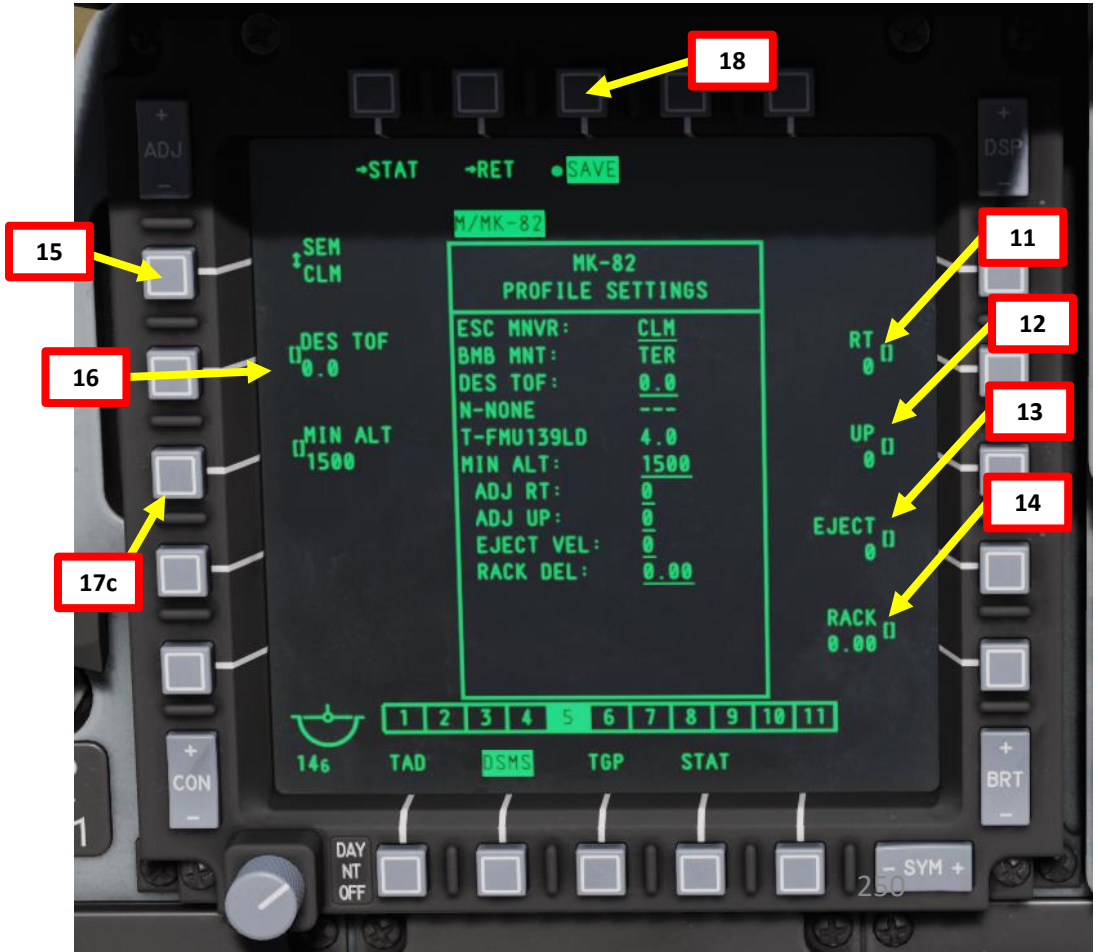
B: SET WEAPON PROFILE

5. Set CCIP (Continuously Computed Impact Point) Mode
6. Set Release Type
    - SGL (Single): Single Bomb Drop
    - PRS (Pairs): Bombs dropped in Pairs
    - RIP SGL (Ripple Single): Each press of the weapon release button will release the set number of bombs set from the RIP QTY (Ripple Quantity) setting
    - RIP PRS (Ripple Pairs): Each press of the weapon release button will release the number of bombs specified in the RIP PRS setting, in pairs
7. Set Bomb Fuze Setting (Nose, Tail, or Nose & Tail)
8. If required, set Bomb Ripple Quantity by typing the desired quantity on the UFC scratchpad (4), then pressing the OSB (Option Select Button) next to RIP QTY.
9. If required, set Bomb Interval Distance in feet by typing the desired distance on the UFC scratchpad (75), then pressing the OSB next to FT.
10. Select the OSB next to CHG SET (Change Settings) to modify bomb settings.

2.1 – MK-82 LOW-DRAG UNGUIDED BOMBS - CCIP
2.1.2 – CCIP-CR RELEASE MODE

B: SET WEAPON PROFILE

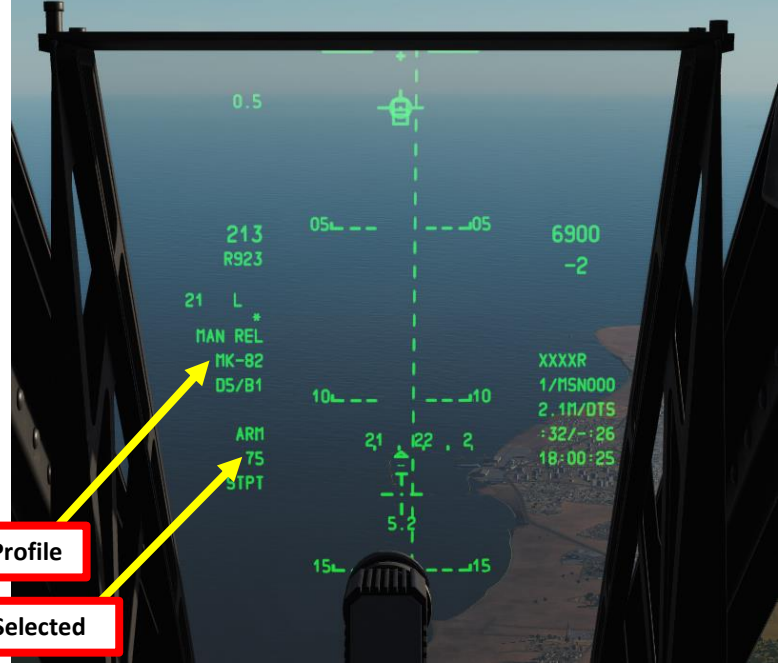
11. OPTIONAL: If using an horizontal offset (we aren't), enter Horizontal Offset value (in mils) on the UFC scratchpad, then press on the OSB next to RT (Right Adjustment). Value must be between -15 and +15 mils.
12. OPTIONAL: If using a vertical offset (we aren't), enter Vertical Offset value (in mils) on the UFC scratchpad, then press on the OSB next to UP (Upwards Adjustment). Value must be between -15 and +15 mils.
13. OPTIONAL: If using a Weapon eject Velocity setting, enter velocity in ft/sec on the UFC scratchpad, then press on the OSB next to EJECT. Value must be between -10 and +30 ft/sec.
14. OPTIONAL: If using a bomb rack delay, enter delay on the UFC scratchpad, then press on the OSB next to RACK. Value must be between -0.40 and +0.40.
15. Select desired Escape Maneuver Type
    - NONE: No Escape Maneuver
    - CLB: Climbing Maneuver
    - TRN: Turn Maneuver
    - TLT: Turn Level Turn Maneuver
16. OPTIONAL: If you want to set a desired Time of Fall (in sec) of the bomb from release time to impact time, enter ToF value on the UFC scratch pad, then press on the OSB next to DES TOF.
17. OPTIONAL: If you want to see Minimum Release Altitude cues on the Heads-Up Display, enter Minimum Altitude on the UFC scratchpad, then press on the OSB next to MIN ALT.
18. Press on the OSB next to SAVE to save Weapon Profile.

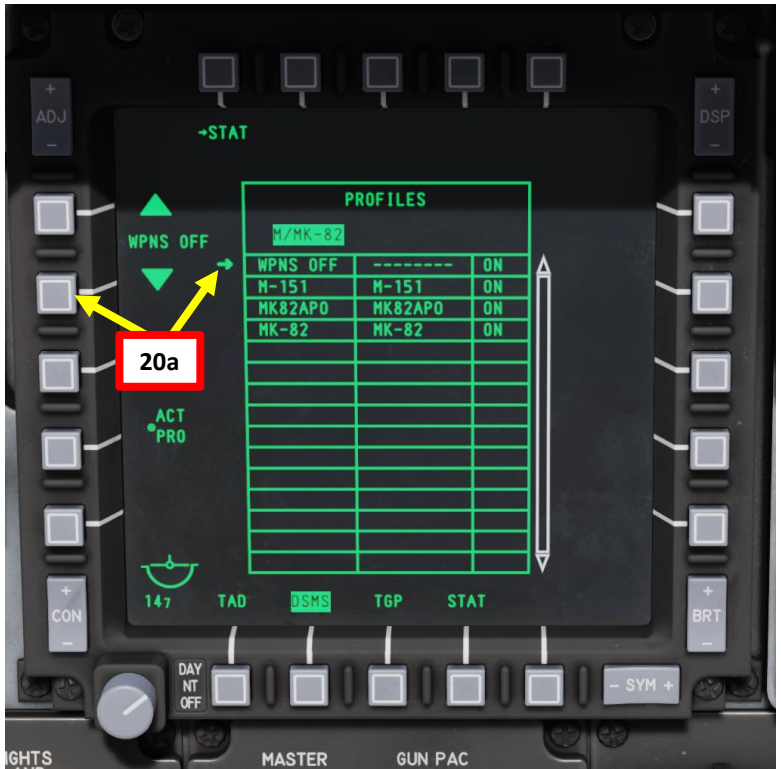


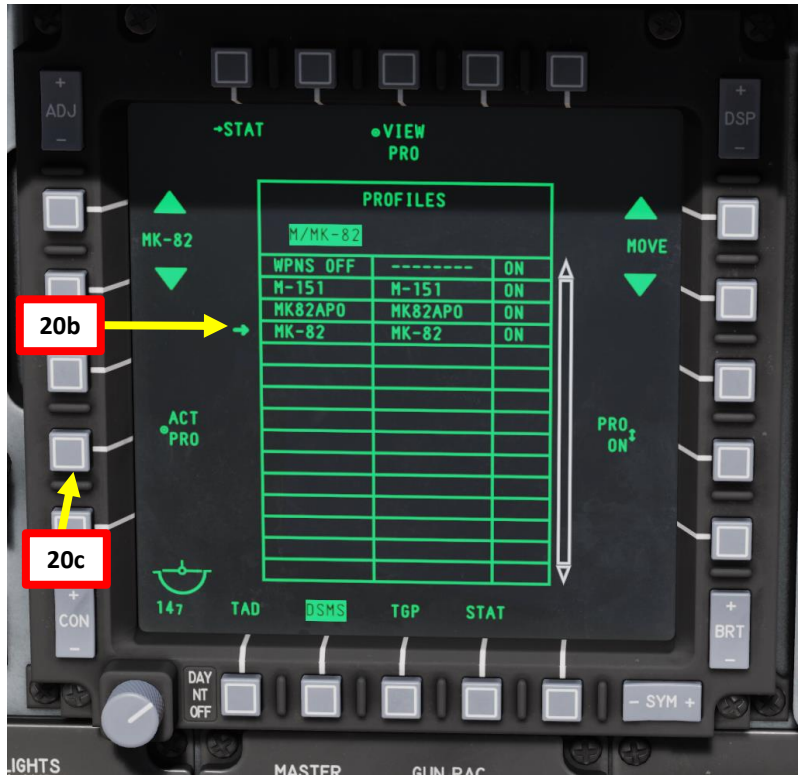
2.1 – MK-82 LOW-DRAG UNGUIDED BOMBS - CCIP
2.1.2 – CCIP-CR RELEASE MODE

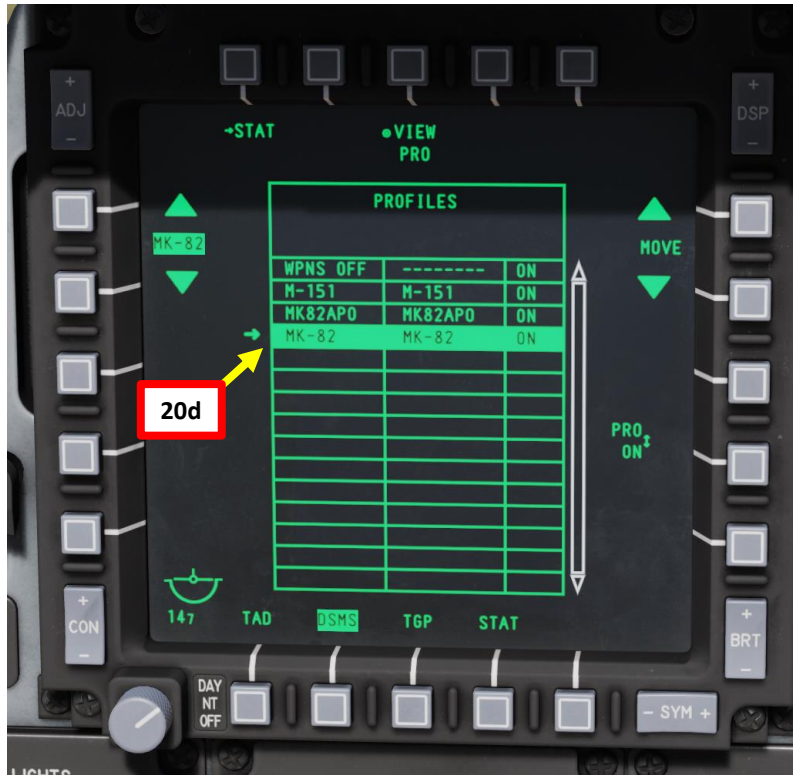
C: SELECT WEAPON PROFILE

19. Once weapon profile is saved, the DSMS page will showcase all different weapon profiles available.
20. Select MK-82 profile by pressing the Option Select Button Selectors, then press on the OSB next to ACT PRO (Active Profile).
    - While HUD is SOI (Coolie Hat Switch UP), cycle between profiles and stations using the DMS (Data Management Switch) left or right.
21. The MK-82 Profile will be displayed on the Heads-Up Display.





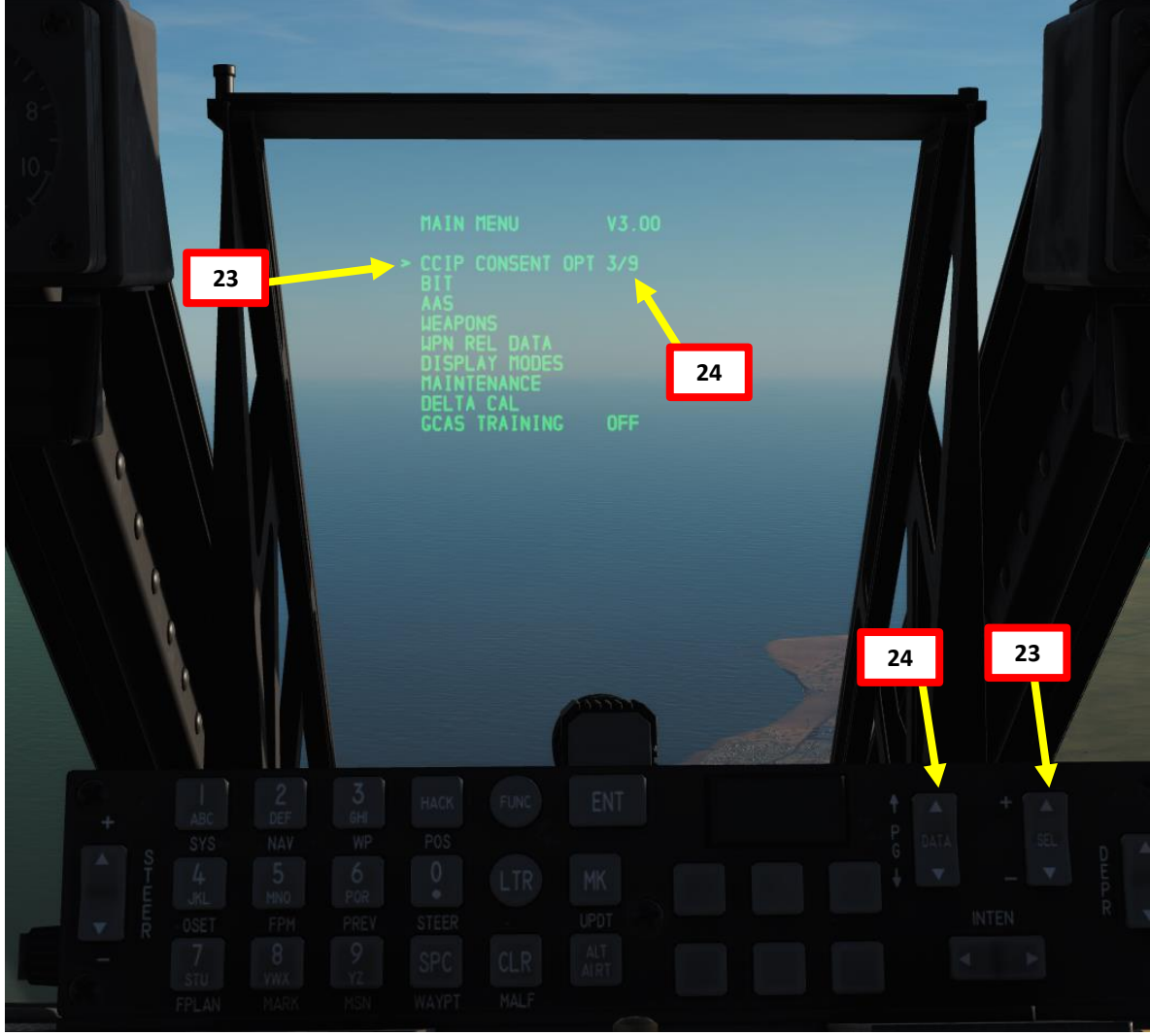




2.1 – MK-82 LOW-DRAG UNGUIDED BOMBS - CCIP
2.1.2 – CCIP-CR RELEASE MODE

C: SELECT WEAPON PROFILE

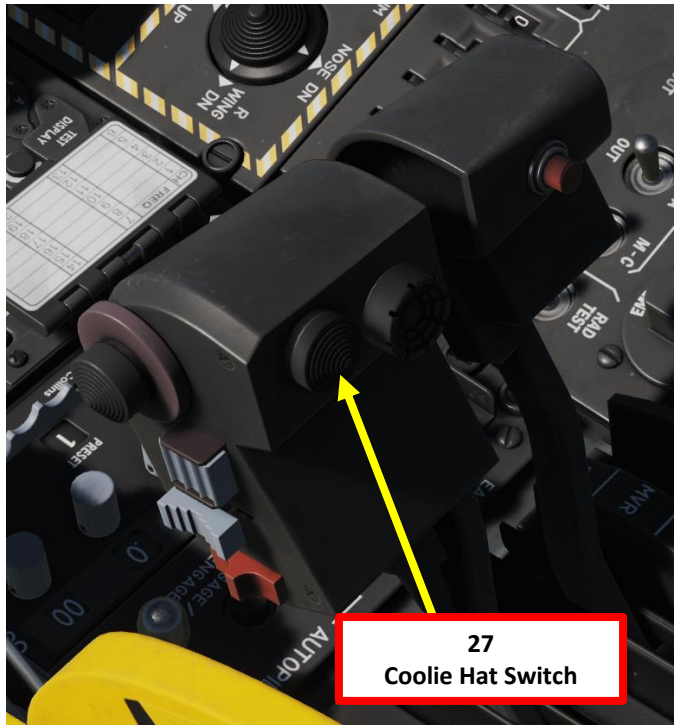
22. Set IFFCC (Integrated Flight & Fire Control Computer) to TEST (MIDDLE) position by Left Clicking on the switch.
23. Select CCIP CONSENT option with the SEL Rocker Key.
24. If CCIP CONSENT option is in "OFF", use the DATA rocker key to cycle between modes until either "3/9" or "5 MIL" is displayed.
    - 3/9 means the solution cue must pass through the reticle
    - 5 mils means the solution cue must pass over the reticle pipper
25. Set IFFCC switch to ON (UP) position by Right Clicking on the switch. The Heads-Up Display will revert to its normal state.

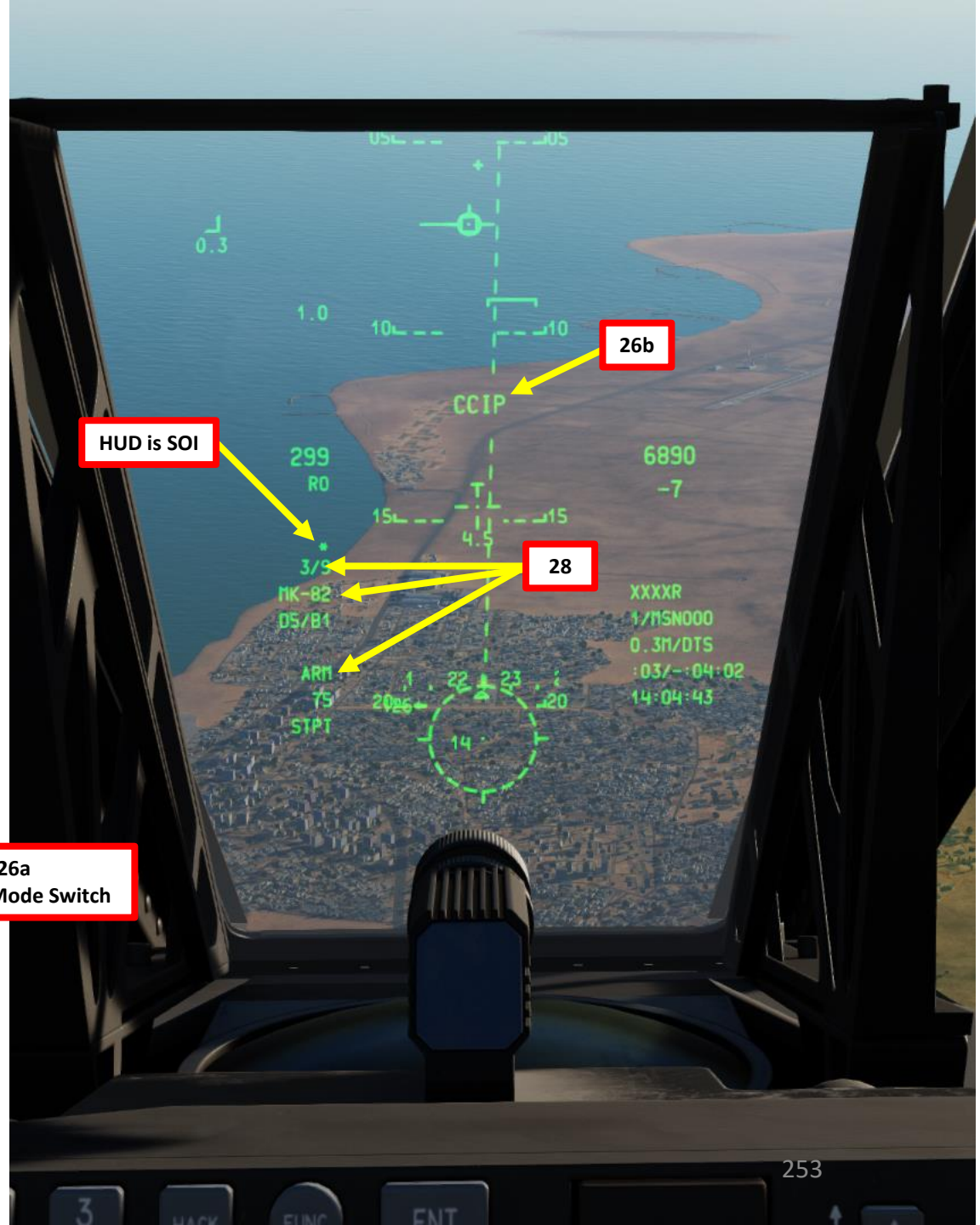


2.1 – MK-82 LOW-DRAG UNGUIDED BOMBS - CCIP
2.1.2 – CCIP-CR RELEASE MODE

D: PERFORM ATTACK

26. Press the Master Mode button until the CCIP HUD Mode is selected.
27. Press Coolie Hat UP Short to set the Heads-Up Display as the SOI (Sensor of Interest). Asterisk will indicate HUD is SOI.
28. Verify on the Heads-Up Display that MAN REL mode, CCIP release, MK-82 profile and ARM status are displayed.

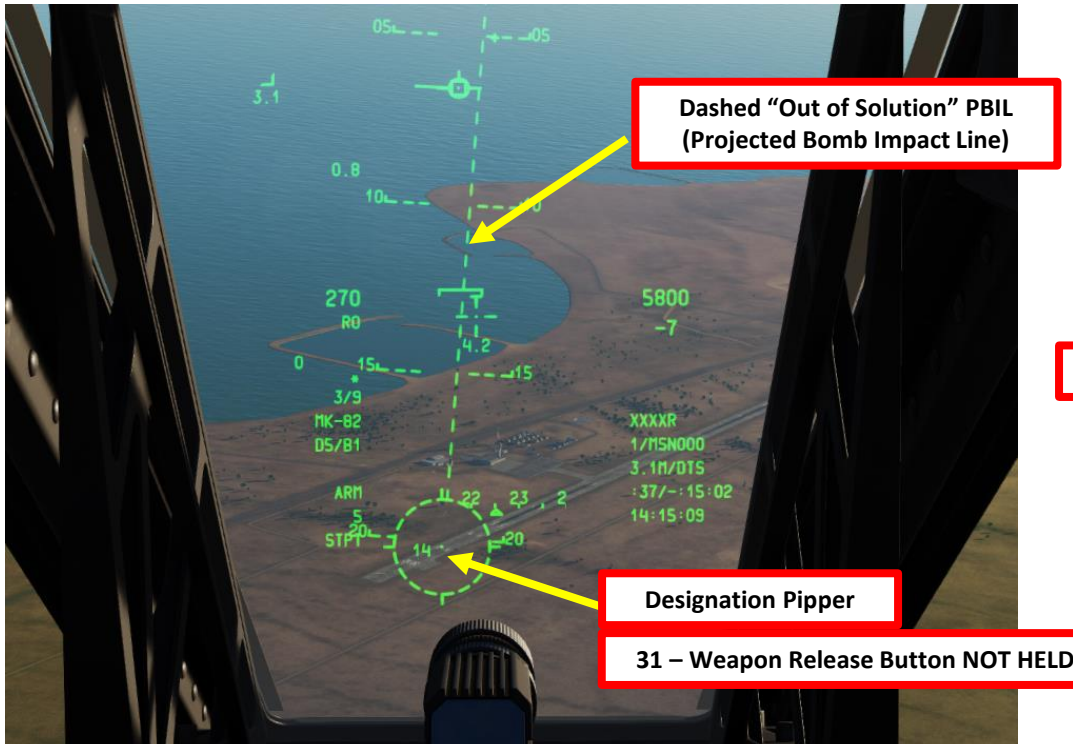


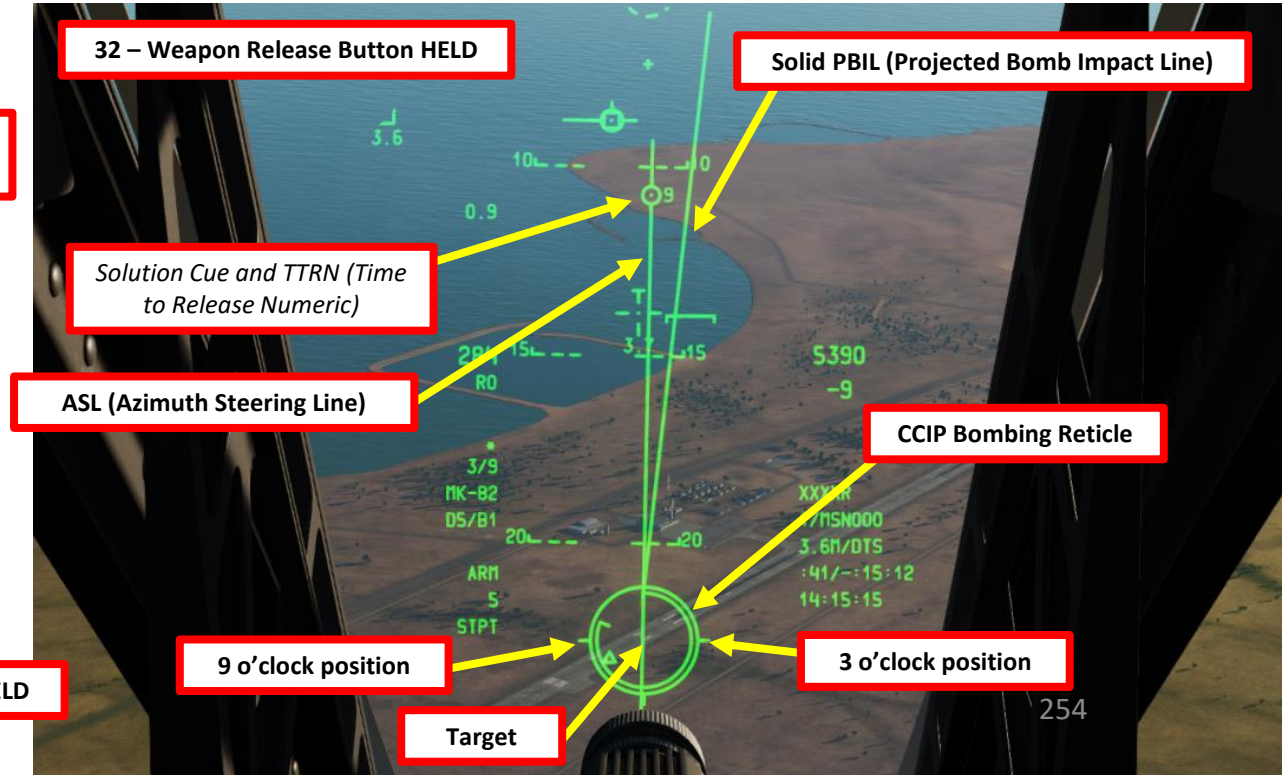


2.1 – MK-82 LOW-DRAG UNGUIDED BOMBS - CCIP
2.1.2 – CCIP-CR RELEASE MODE

D: PERFORM ATTACK

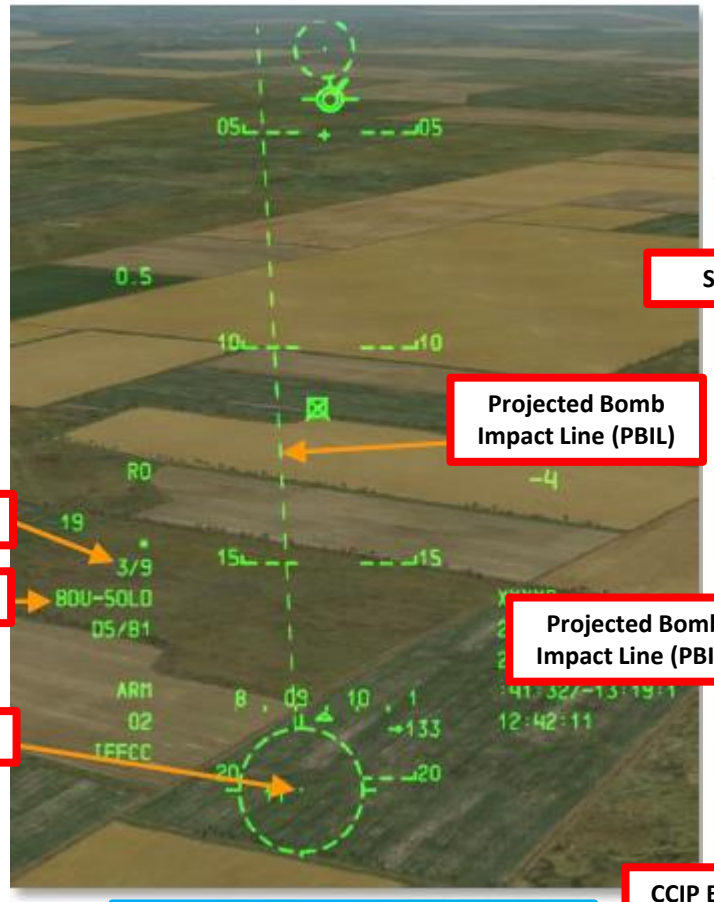
29. Perform a shallow dive between 10 and 45 deg from at least 10000 ft.
30. When you are pitched down more than 3 degrees, a dashed "Out of Solution" PBIL (Projected Bomb Impact Line) will appear when you are not yet close enough to the target (the aiming pipper is currently positioned too low to be visible on the HUD).
31. Maneuver the aircraft to place the designation pipper over the intended target and then press and **HOLD** the weapon release button (RALT+SPACE).
32. With the weapon release button held down, the PBIL will turn solid and an Azimuth Steering Line (ASL) will appear along the heading to the designated target. On the ASL a small circle will appear called the Solution Cue and next to the cue is the Time To Release Numeric (TTRN).
33. As you fly to the target along the ASL, the Solution Cue and ASL will start to drop down on the HUD. If 3/9 is selected, the Solution Cue simply needs to pass through the reticle.
34. With the weapon release button still held down and the Solution Cue passing through the pipper / reticle, the bomb(s) will automatically be released.

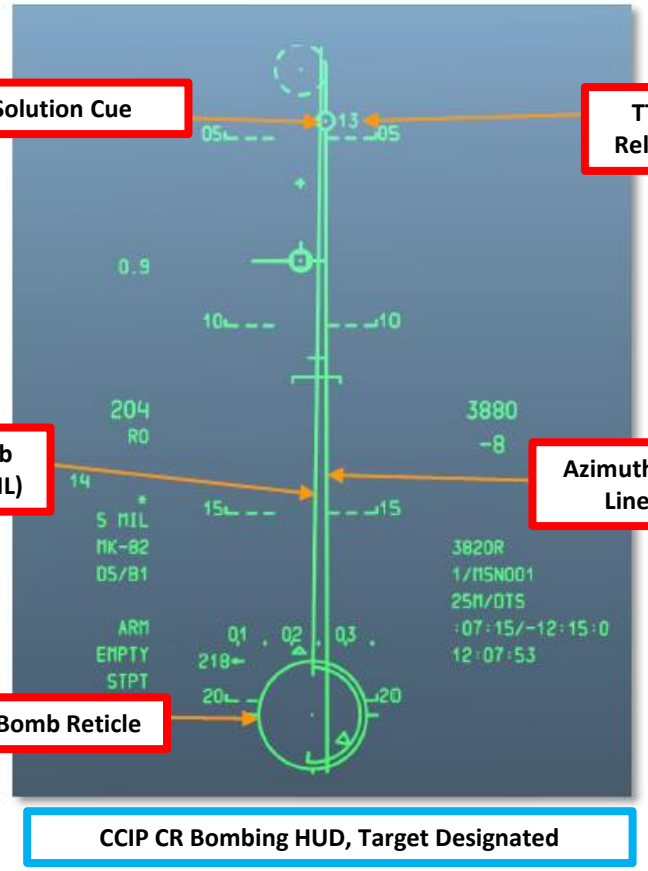


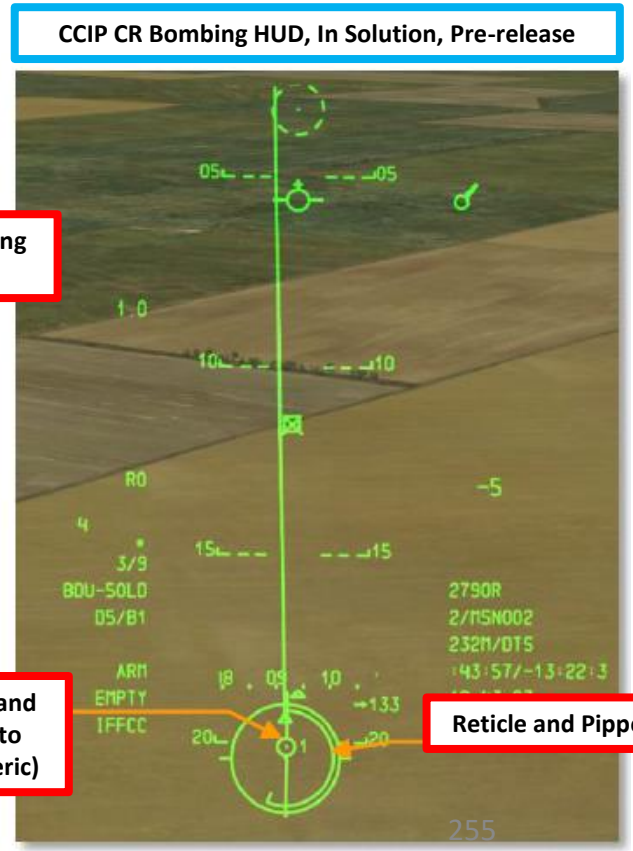


2.1 – MK-82 LOW-DRAG UNGUIDED BOMBS - CCIP

2.1.2 – CCIP-CR RELEASE MODE







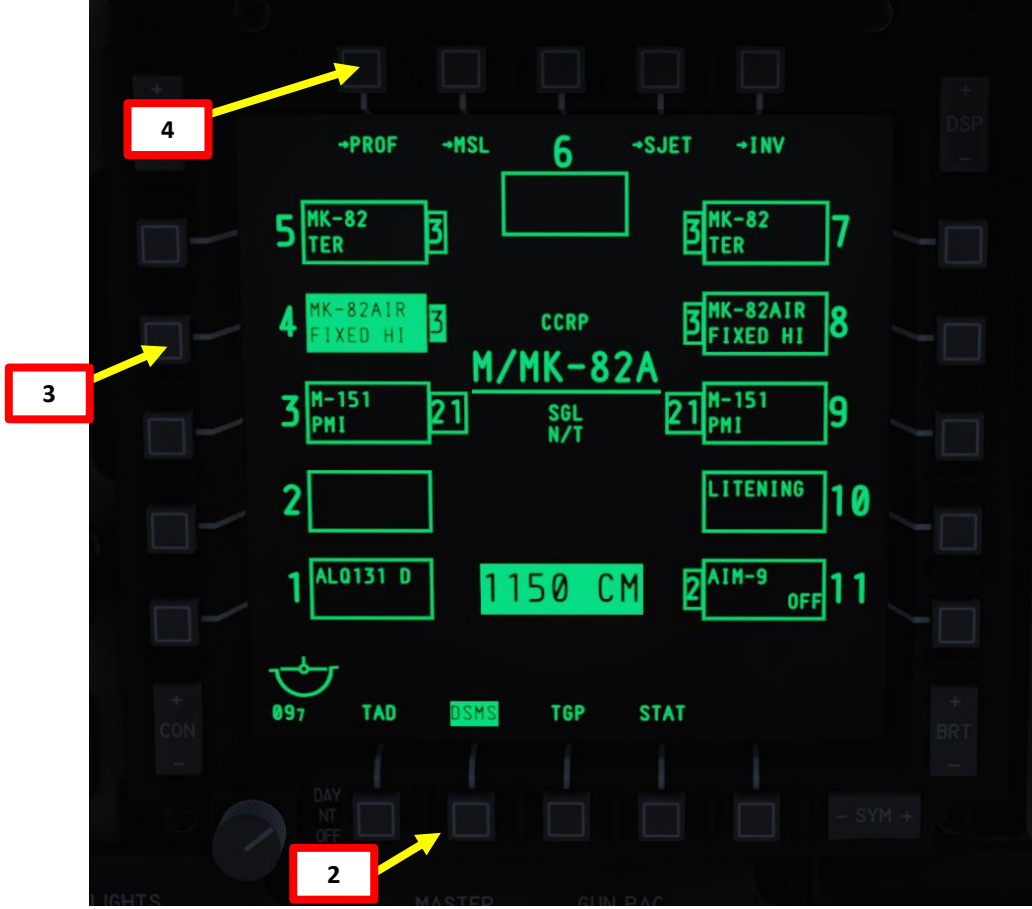
2.1 – MK-82 LOW-DRAG UNGUIDED BOMBS - CCIP

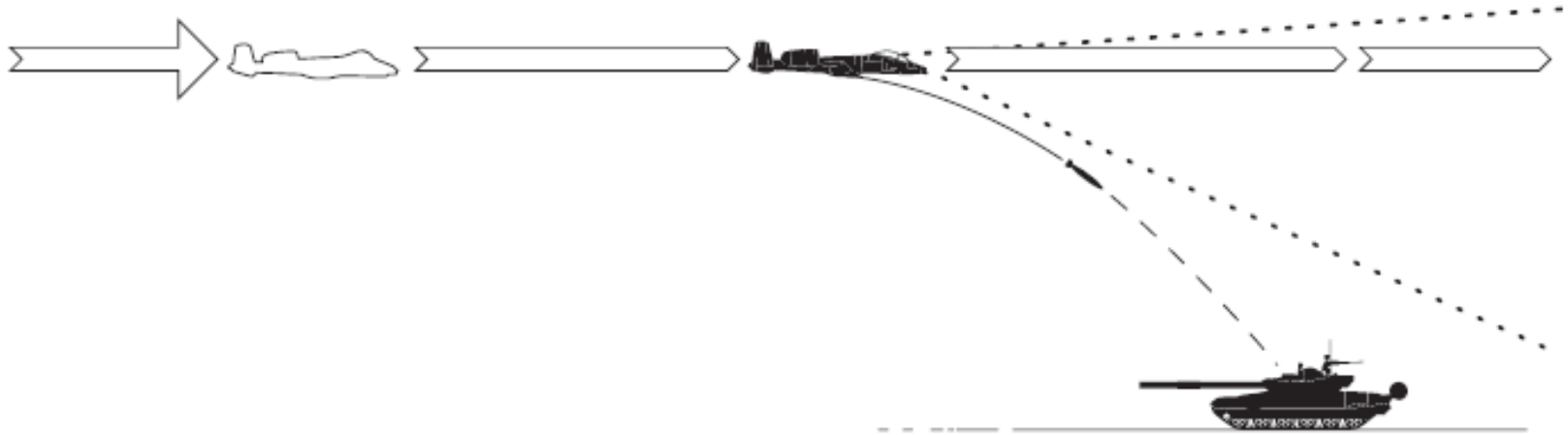
2.1.2 – CCIP-CR RELEASE MODE

2.2 – MK-82AIR HIGH-DRAG UNGUIDED BOMBS CCRP RELEASE MODE

A: SELECT WEAPON

1. Set Master Arm Switch ON (UP)
2. Select DSMS (Digital Stores Management System) page
3. Select MK-82AIR Bomb (green when selected)
4. Select PROF (Weapon Profile) menu

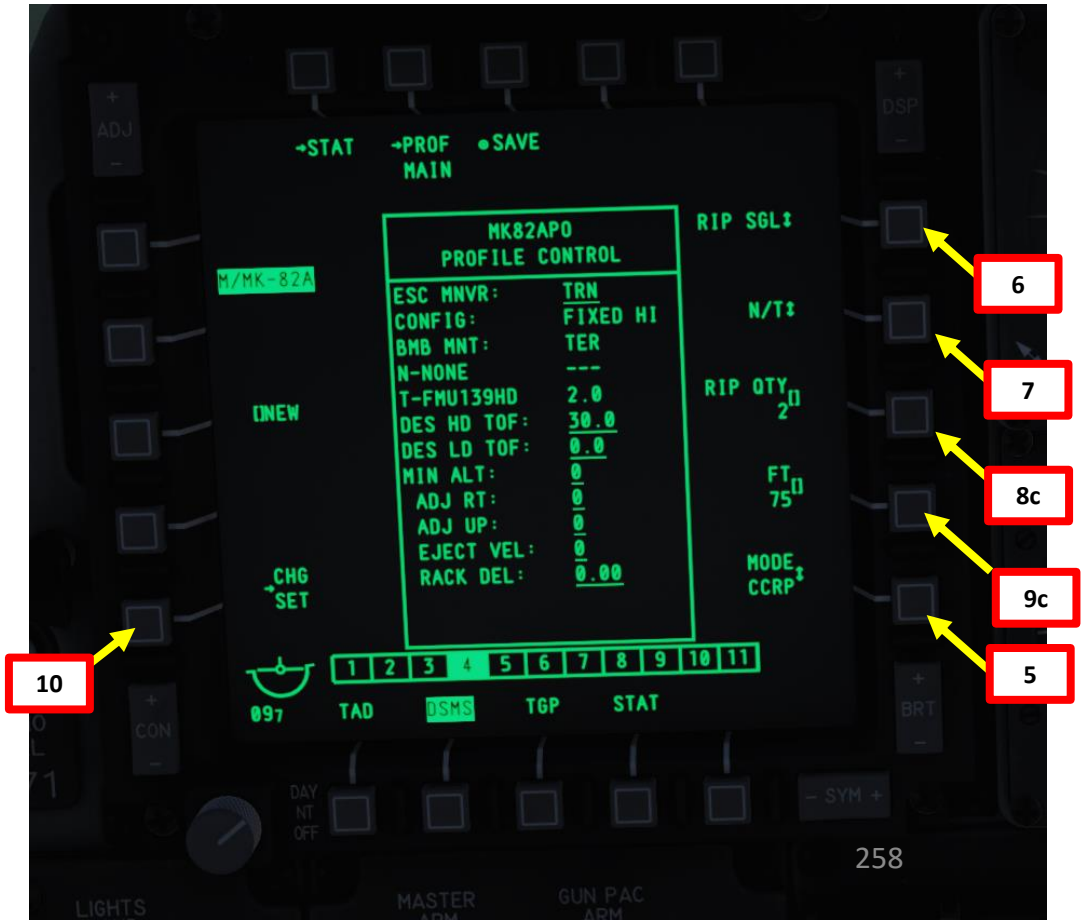




2.2 – MK-82AIR HIGH-DRAG UNGUIDED BOMBS CCRP RELEASE MODE

B: SET WEAPON PROFILE

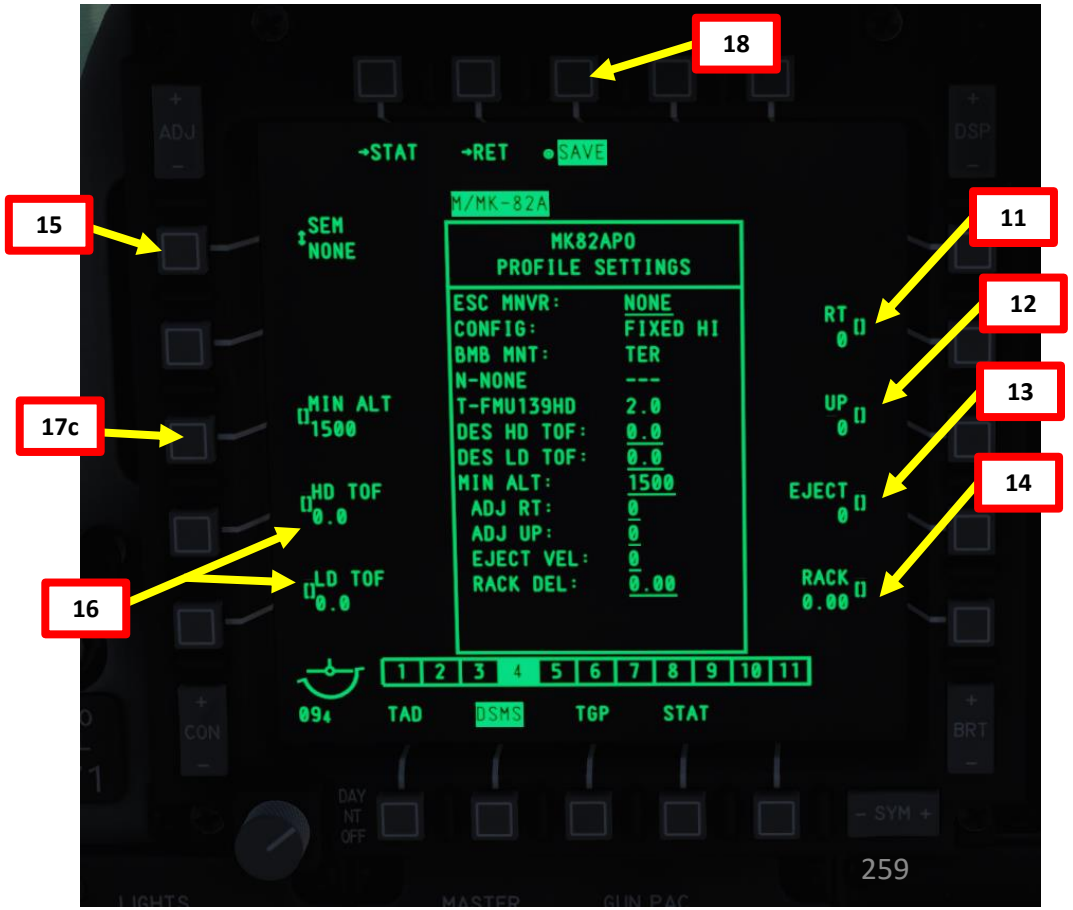
5. Set CCRP (Continuously Computed Release Point) Mode
6. Set Release Type
    - SGL (Single): Single Bomb Drop
    - PRS (Pairs): Bombs dropped in Pairs
    - RIP SGL (Ripple Single): Each press of the weapon release button will release the set number of bombs set from the RIP QTY (Ripple Quantity) setting
    - RIP PRS (Ripple Pairs): Each press of the weapon release button will release the number of bombs specified in the RIP PRS setting, in pairs
7. Set Bomb Fuze Setting (Nose, Tail, or Nose & Tail).
    - The Fuze setting will determine whether the bomb is released in “slick” (high drag ballute assembly NOT deployed) or “retarded” (high drag ballute assembly deployed) mode.
    - To drop as a slick, select only a nose fuze.
    - To release retarded, select nose/tail or tail fuze setting in the DSMS profile.
8. If required, set Bomb Ripple Quantity by typing the desired quantity on the UFC scratchpad (6), then pressing the OSB (Option Select Button) next to RIP QTY.
9. If required, set Bomb Interval Distance in feet by typing the desired distance on the UFC scratchpad (75), then pressing the OSB next to FT.
10. Select the OSB next to CHG SET (Change Settings) to modify bomb settings.



2.2 – MK-82AIR HIGH-DRAG UNGUIDED BOMBS CCRP RELEASE MODE

B: SET WEAPON PROFILE

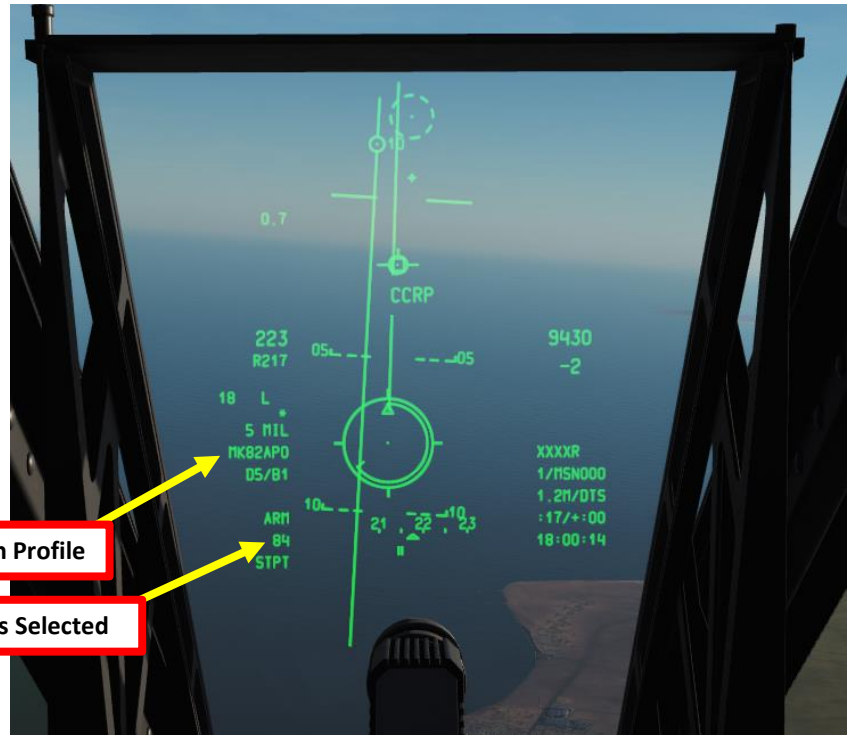
11. OPTIONAL: If using an horizontal offset (we aren't), enter Horizontal Offset value (in mils) on the UFC scratchpad, then press on the OSB next to RT (Right Adjustment). Value must be between -15 and +15 mils.
12. OPTIONAL: If using a vertical offset (we aren't), enter Vertical Offset value (in mils) on the UFC scratchpad, then press on the OSB next to UP (Upwards Adjustment). Value must be between -15 and +15 mils.
13. OPTIONAL: If using a Weapon eject Velocity setting, enter velocity in ft/sec on the UFC scratchpad, then press on the OSB next to EJECT. Value must be between -10 and +30 ft/sec.
14. OPTIONAL: If using a bomb rack delay, enter delay on the UFC scratchpad, then press on the OSB next to RACK. Value must be between -0.40 and +0.40.
15. Select desired Escape Maneuver Type
    - NONE: No Escape Maneuver
    - CLB: Climbing Maneuver
    - TRN: Turn Maneuver
    - TLT: Turn Level Turn Maneuver
16. OPTIONAL: If you want to set a desired HD (High Drag) or a LD (Low Drag) Time of Fall (in sec) of the bomb from release time to impact time, enter ToF value on the UFC scratch pad, then press on the OSB next to HD TOF or LD TOF. We will leave those at 0.
17. OPTIONAL: If you want to see Minimum Release Altitude cues on the Heads-Up Display, enter Minimum Altitude on the UFC scratchpad, then press on the OSB next to MIN ALT.
18. Press on the OSB next to SAVE to save Weapon Profile.

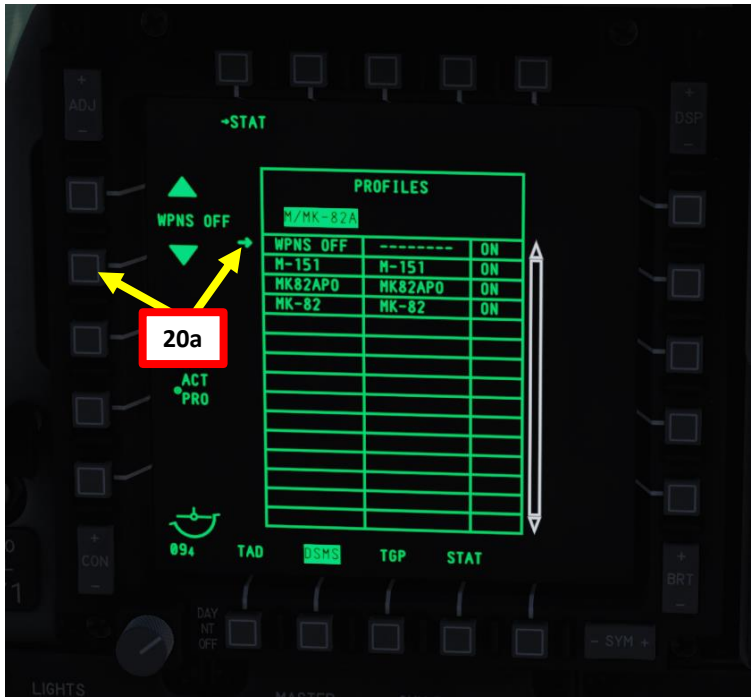


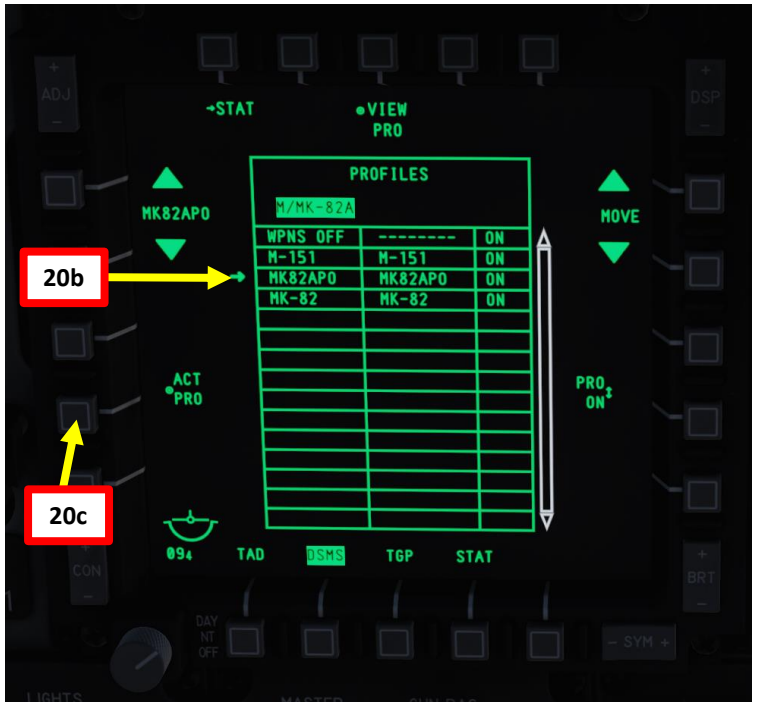
2.2 – MK-82AIR HIGH-DRAG UNGUIDED BOMBS CCRP RELEASE MODE

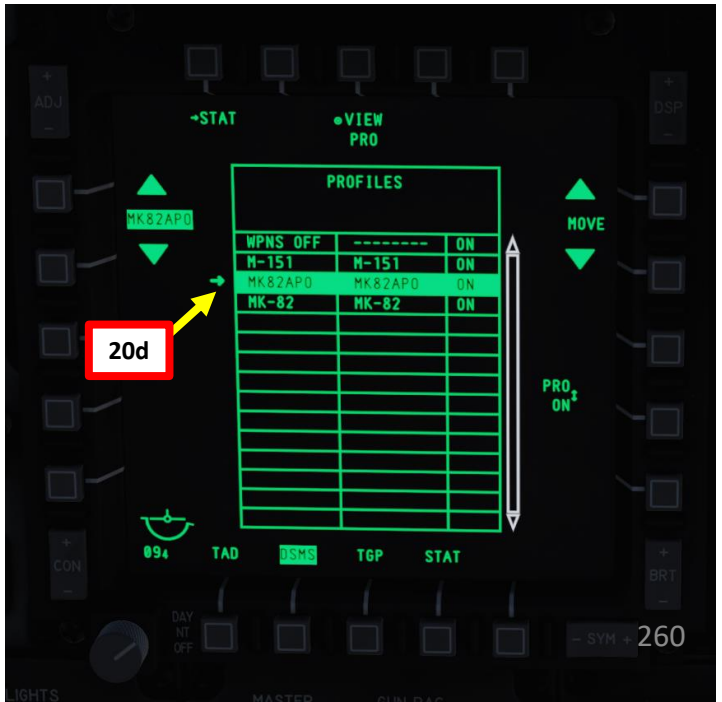
C: SELECT WEAPON PROFILE

19. Once weapon profile is saved, the DSMS page will showcase all different weapon profiles available.
20. Select MK-82APO profile by pressing the Option Select Button Selectors, then press on the OSB next to ACT PRO (Active Profile).
    - While HUD is SOI (Coolie Hat Switch UP), cycle between profiles and stations using the DMS (Data Management Switch) left or right.
21. The MK-82APO Profile will be displayed on the Heads-Up Display.





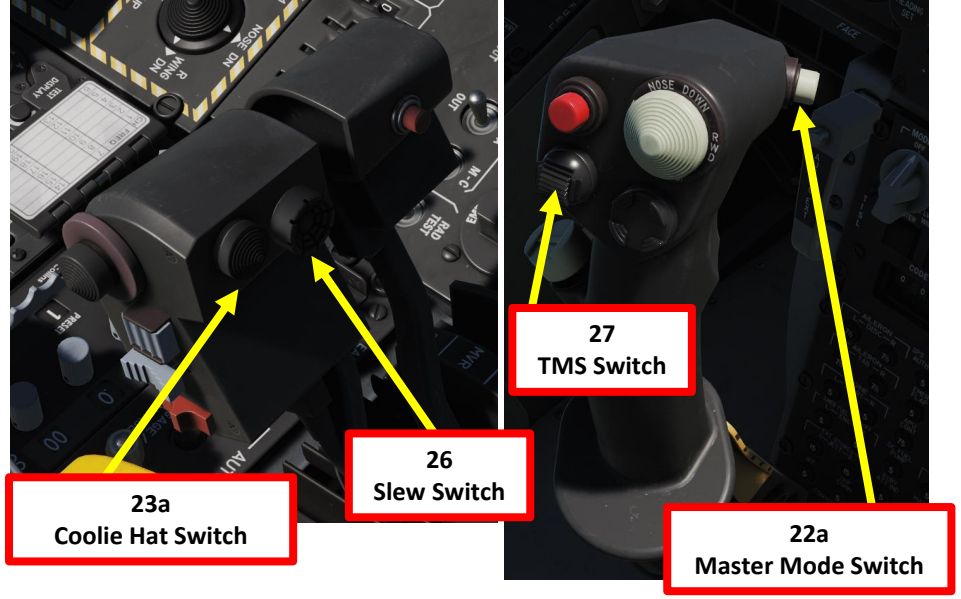


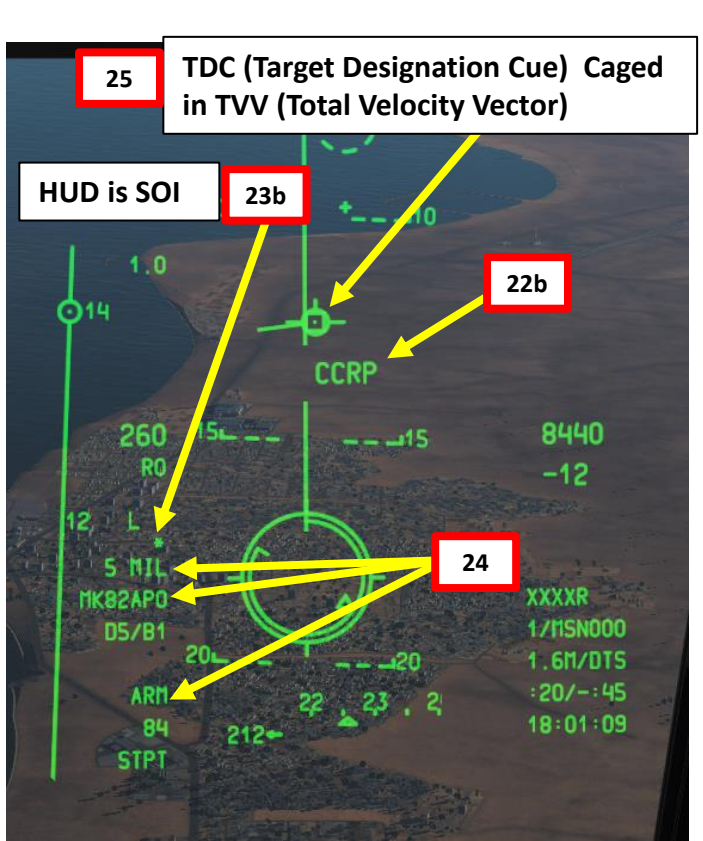


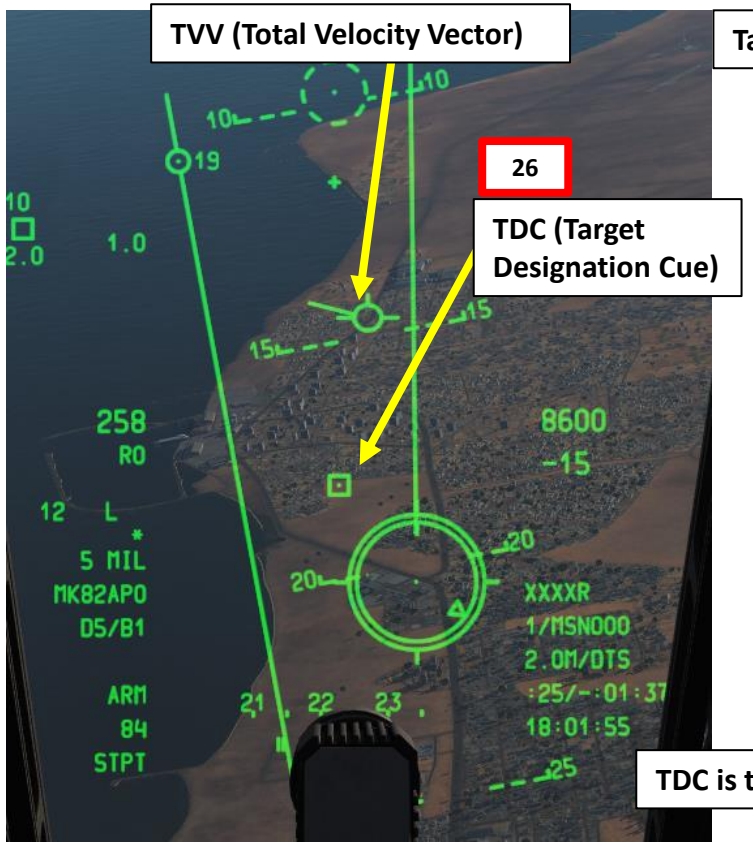
2.2 – MK-82AIR HIGH-DRAG UNGUIDED BOMBS CCRP RELEASE MODE

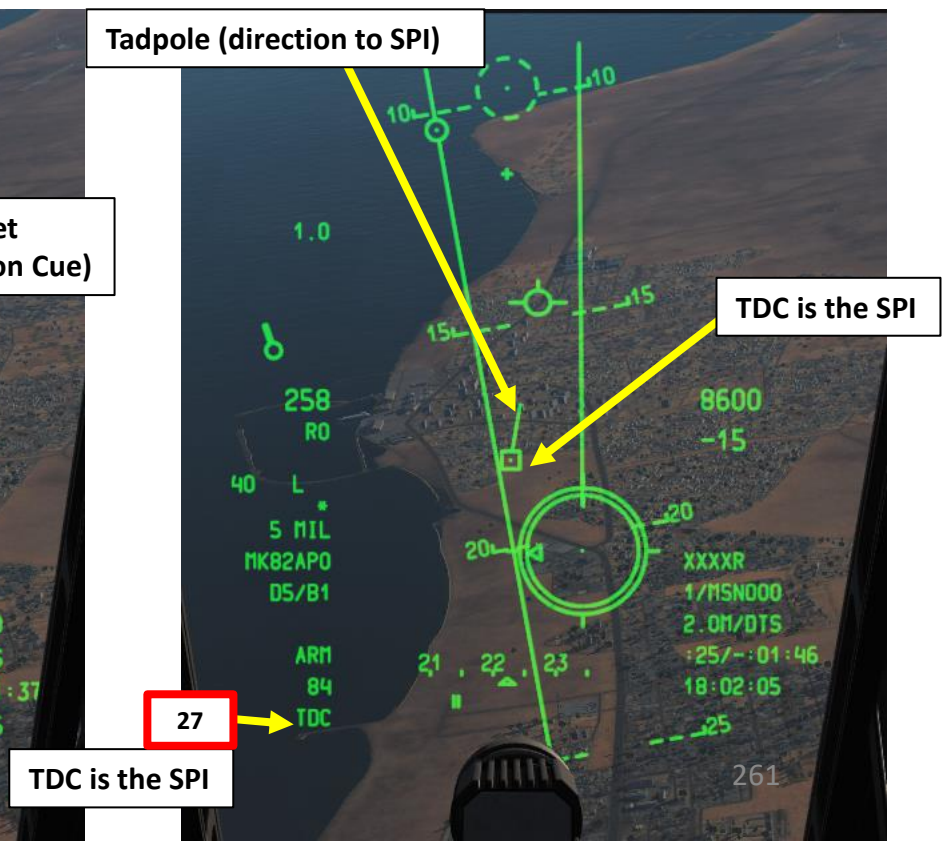
D (OPTION 1):
DESIGNATE SPI (SENSOR POINT OF INTEREST) WITH HUD TDC AS THE SOI (SENSOR OF INTEREST)

22. Press the Master Mode button until the CCRP HUD Mode is selected.
23. Press Coolie Hat UP Short to set the Heads-Up Display as the SOI (Sensor of Interest). Asterisk will indicate HUD is SOI.
24. Verify on the Heads-Up Display that 5 MIL mode, CCIP release, MK-82APO profile and ARM status are displayed.
25. By default, the TDC (Target Designation Cue) is caged on the Total Velocity Vector (TVV).
26. Use the Slew Control Switch to move the TDC to the desired target location.
27. Press the TMS (Target Management System) Switch FWD LONG to make the current TDC location the SPI (Sensor Point of Interest).





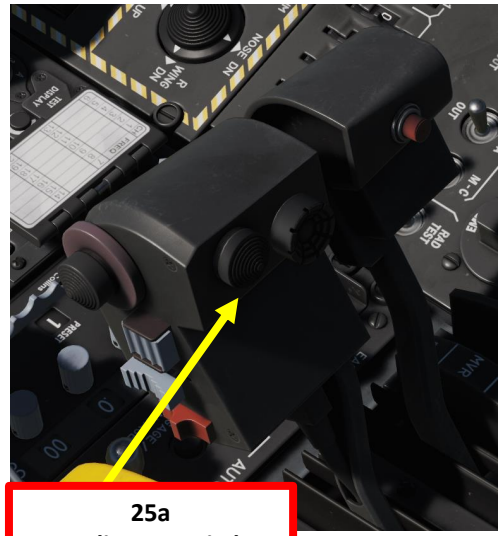


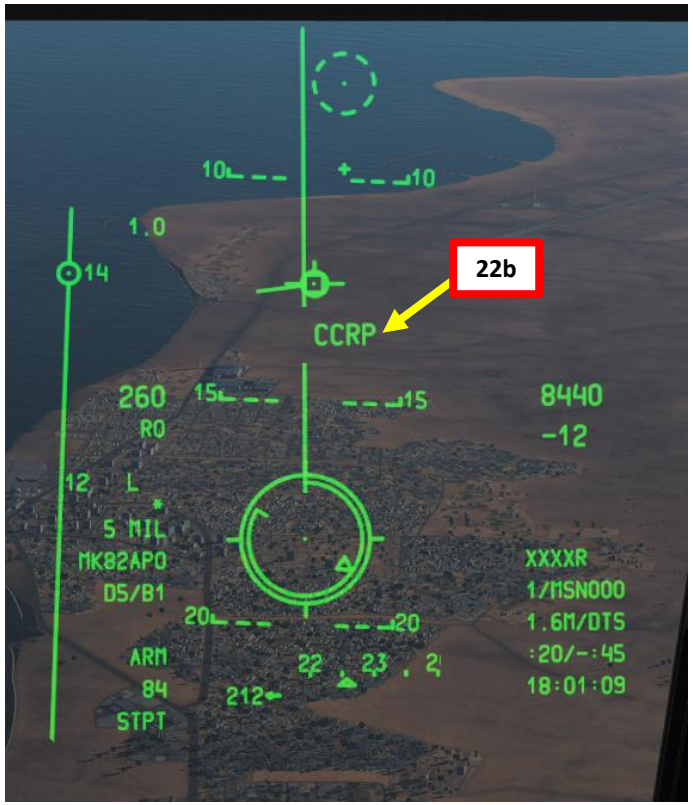


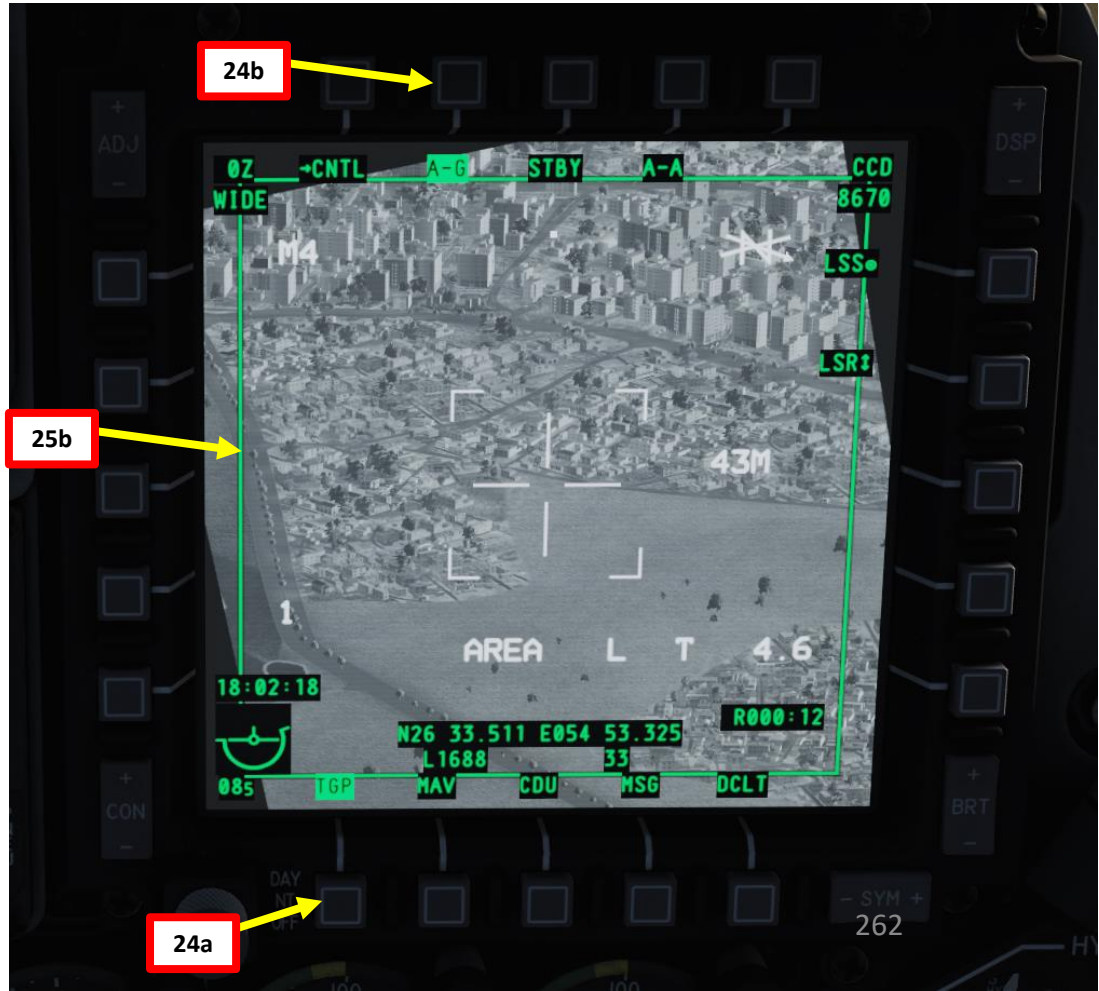
2.2 – MK-82AIR HIGH-DRAG UNGUIDED BOMBS
CCRP RELEASE MODE

D (OPTION 2):
DESIGNATE SPI (SENSOR POINT OF INTEREST) WITH TARGETING POD AS THE SOI (SENSOR OF INTEREST)

22. Press the Master Mode button until the CCRP HUD Mode is selected.
23. On AHCP (Armament HUD Control Panel), set TGP switch ON (UP) to power up the targeting pod.
24. Press the OSB (Option Select Button) next to TGP (Targeting Pod) to display the TGP Feed Page. Then, select the A-G (Air-to-Ground) Mode.
25. Press the Coolie Hat Switch LONG in the direction of the MFCD that displays your TGP feed (RIGHT since we have the TGP page on the right MFCD). This will set the TGP as the SOI (Sensor of Interest).



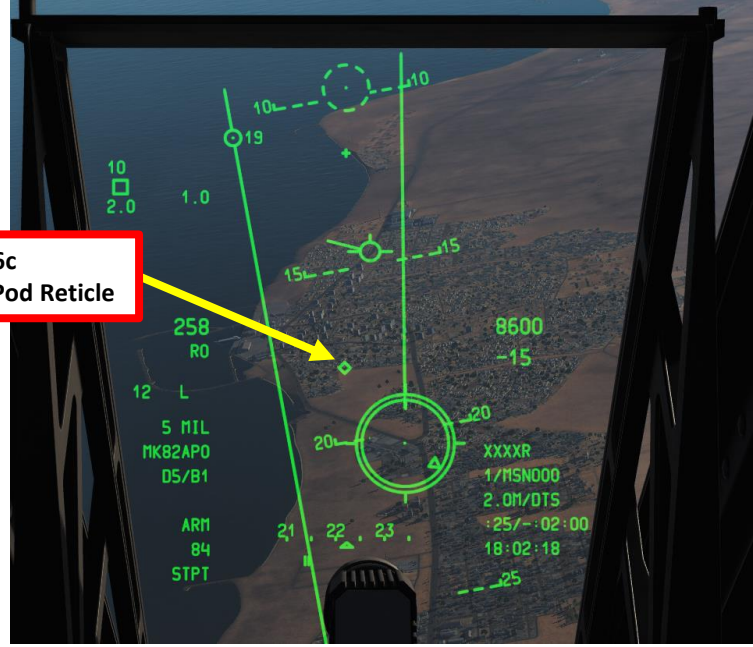


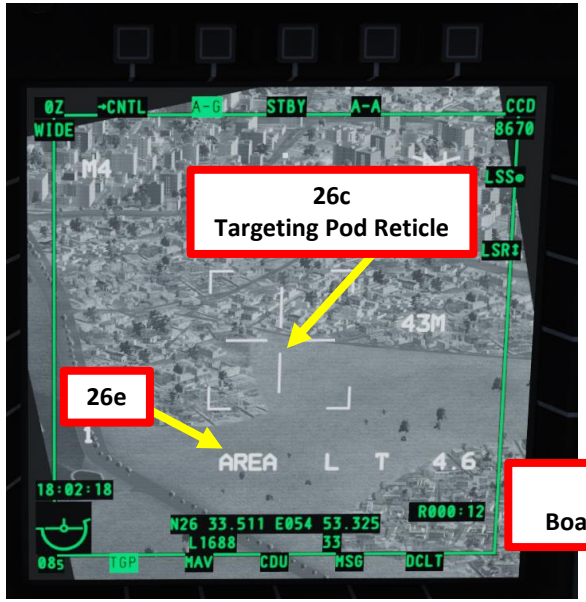


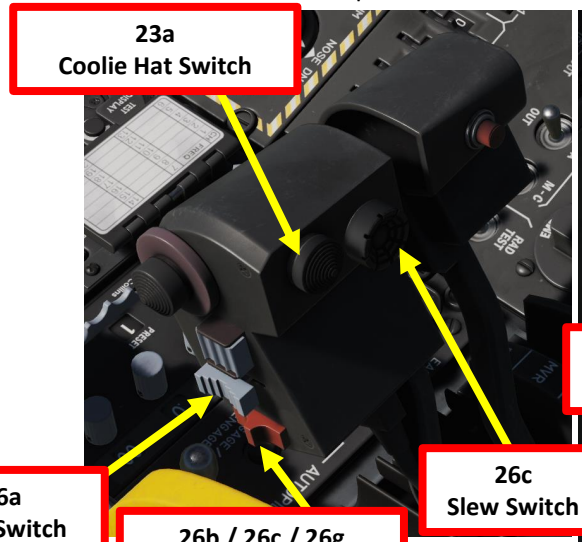
2.2 – MK-82AIR HIGH-DRAG UNGUIDED BOMBS
CCRP RELEASE MODE

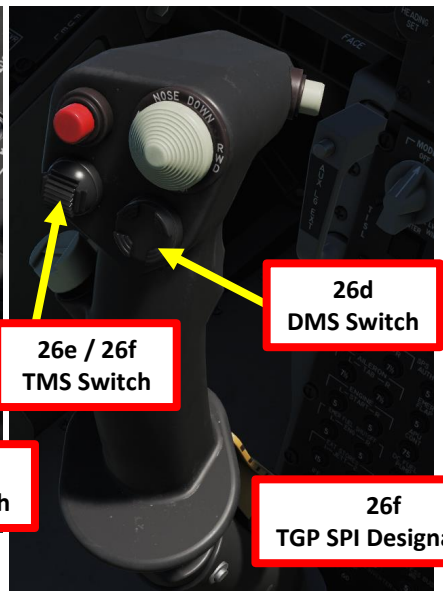
D (OPTION 2):
DESIGNATE SPI (SENSOR POINT OF INTEREST) WITH TARGETING POD AS THE SOI (SENSOR OF INTEREST)

26. Designate target with the Targeting Pod
    a) Select desired Video Mode with the Boat Switch
        - FWD: FLIR BHOT (Forward-Looking Infrared Black Hot)
        - MIDDLE: CCD (Charge Coupled Device/TV)
        - AFT: FLIR WHOT (Forward-Looking Infrared White Hot)
    b) Select Field-of-View Mode with the China Hat Switch
        - FWD SHORT toggles between WIDE and NARROW
    c) Use the Slew Control Switch UP/DOWN/LEFT/RIGHT to set the TGP reticle on the target.
        - Note: If you want to reset the TGP in front of you (boresight):
            - **A-10C LEGACY**: Press the China Hat Switch AFT SHORT
            - **A-10C II TANK KILLER EXPANSION**: In the TGP page, press the OSB next to B-S (Boresight Function)
    d) Press on the DMS (Data Management Switch) FWD/AFT SHORT to adjust Zoom Level.
    e) Press the TMS (Target Management System) switch FWD SHORT to track the target. This will toggle tracking modes between AREA TRACK (static target) and POINT TRACK (moving target).
    f) Press the TMS (Target Management System) switch FWD LONG to designate the TGP Sensor Point of Interest (SPI).
    g) Press the China Hat Switch FWD LONG to slave all sensors to the Sensor Point of Interest (SPI).
27. Verify on the Heads-Up Display that 5 MIL mode, CCIP release, MK-82APO profile and ARM status are displayed.





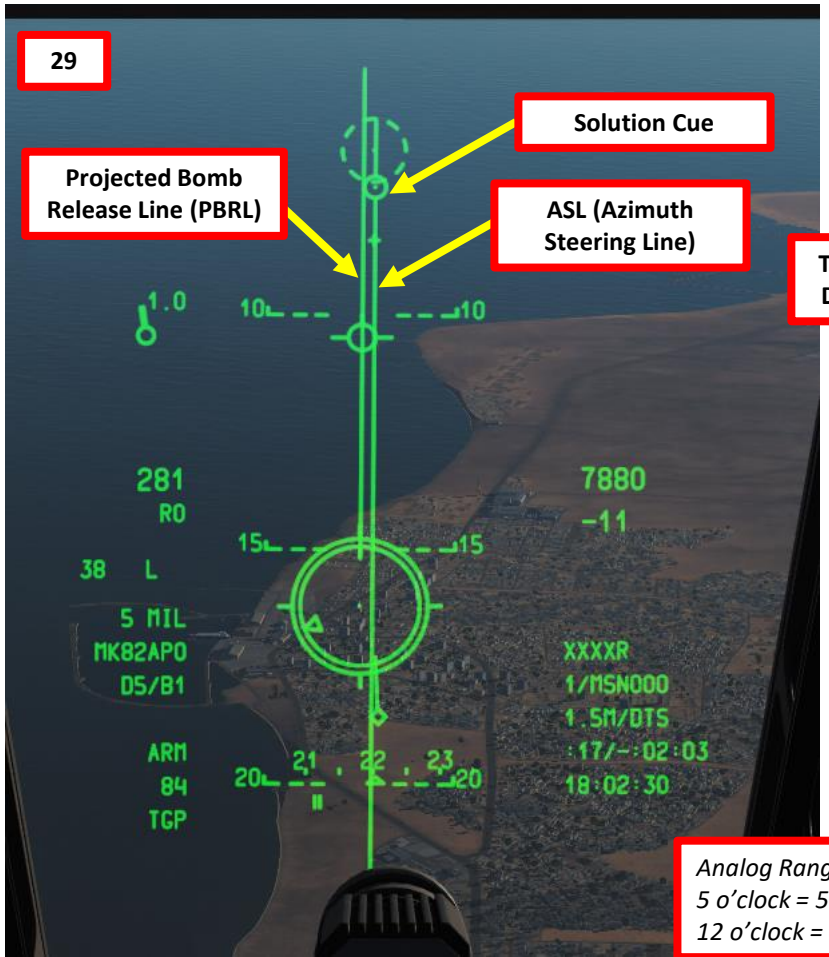


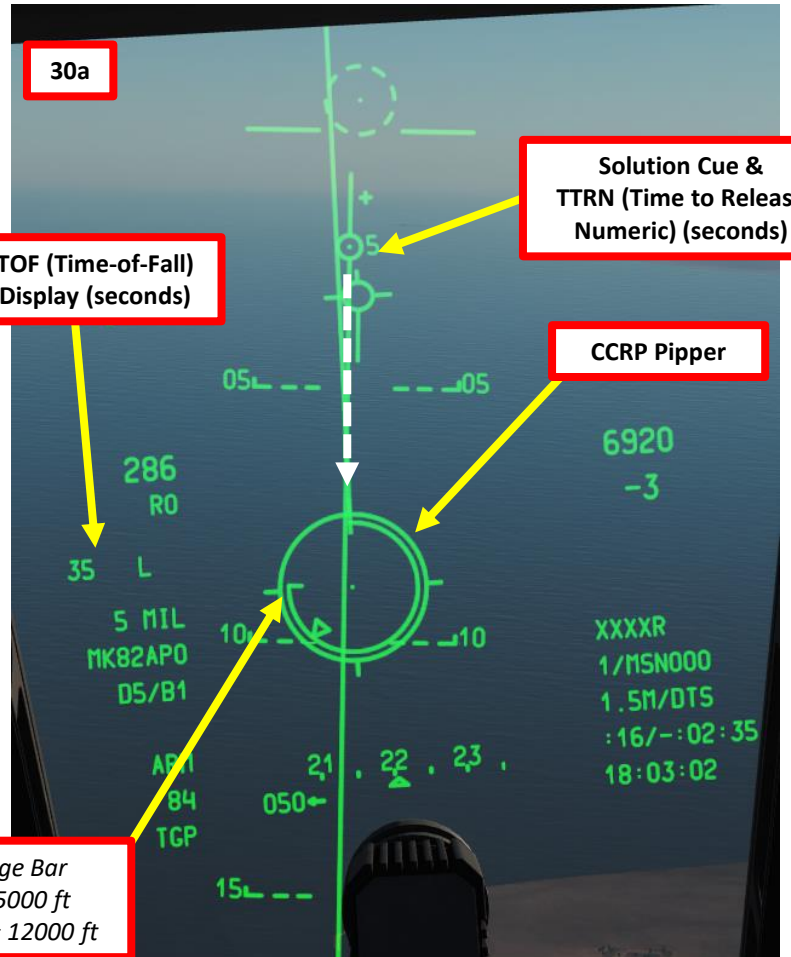


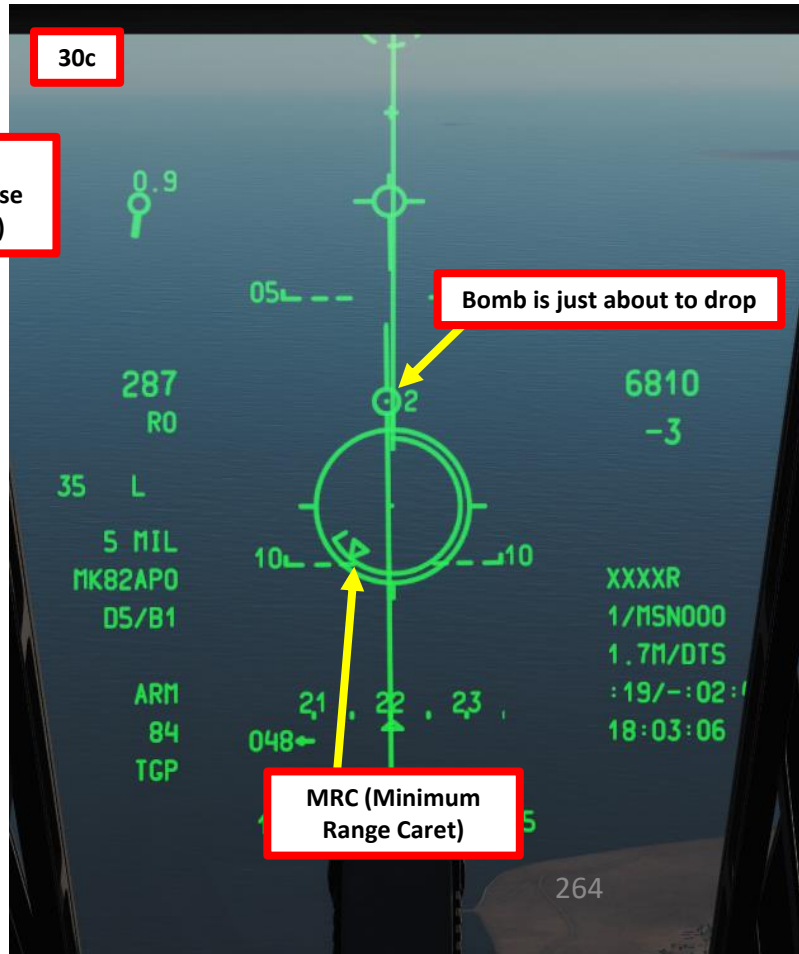
2.2 – MK-82AIR HIGH-DRAG UNGUIDED BOMBS CCRP RELEASE MODE

E: PERFORM ATTACK

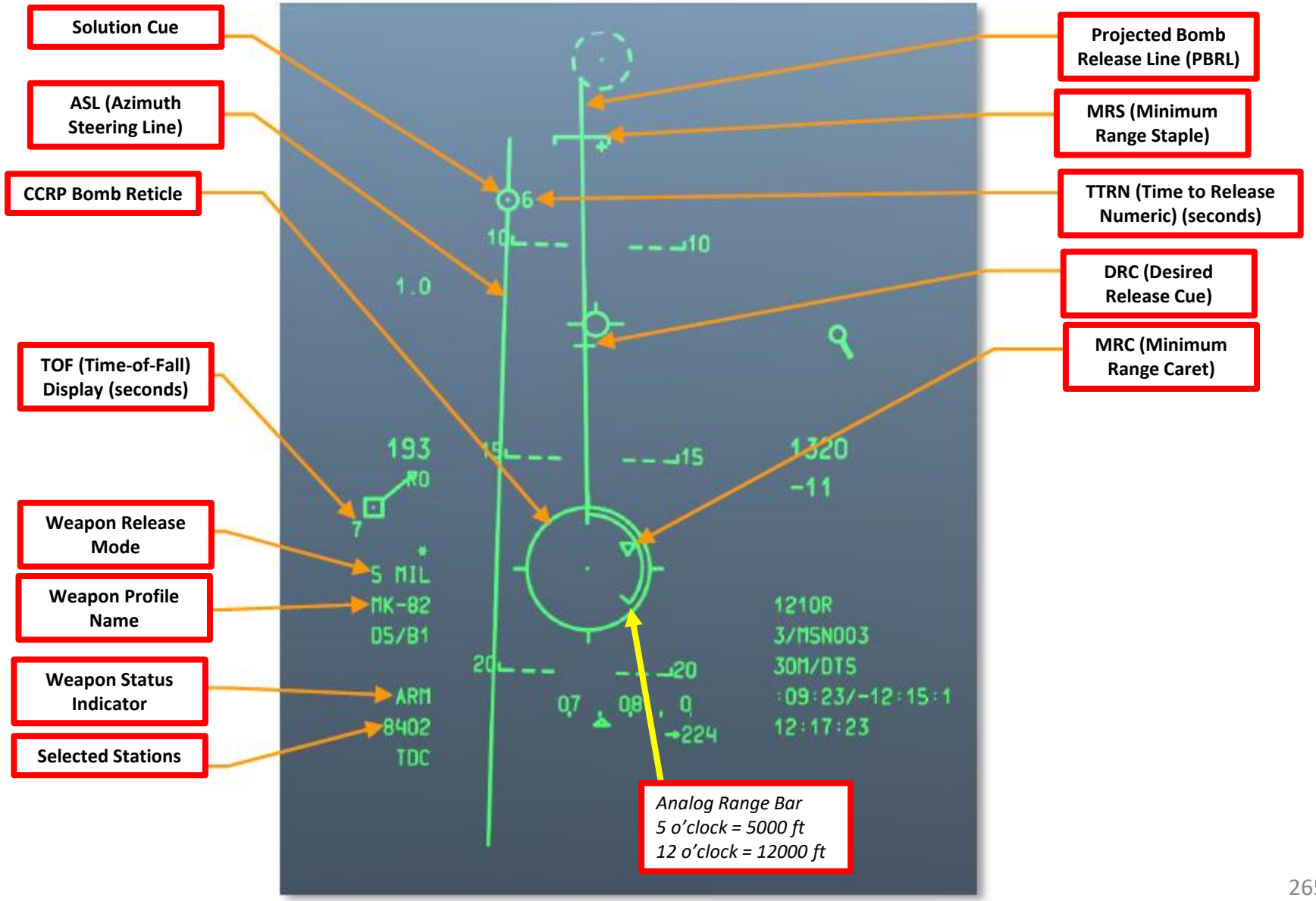
29. Fly level and maneuver the aircraft to align the CCRP Projected Bomb Release Line (PBRL) with the ASL. The CCRP pipper should lay along the ASL (Azimuth Steering Line).
30. At about 6 seconds on the TTRN, the Solution Cue will start to fall down the ASL. Press and hold down the Weapon Release button (RALT+SPACE) and maneuver the aircraft so that the Solution Cue falls through the CCRP pipper.
31. Bombs will automatically release once the Solution Cue falls through the CCRP pipper.







2.2 – MK-82AIR HIGH-DRAG UNGUIDED BOMBS
CCRP RELEASE MODE

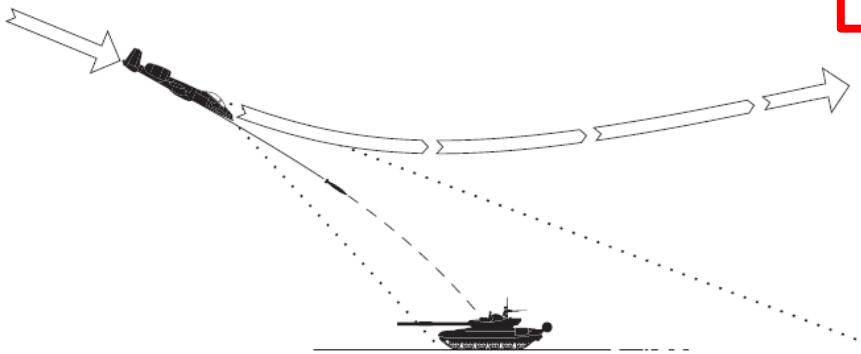


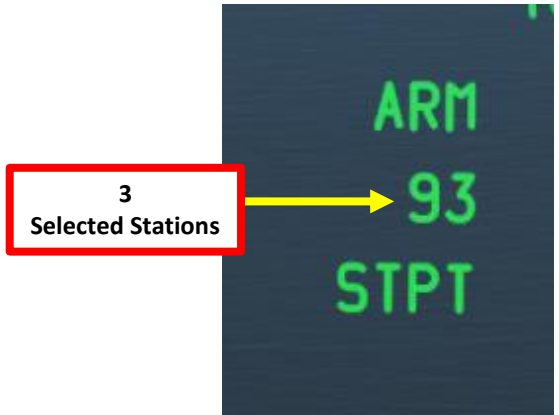
2.2 – MK-82AIR HIGH-DRAG UNGUIDED BOMBS
CCRP RELEASE MODE

2.3 – HYDRA 70 ROCKETS
CCIP RELEASE MODE

A: SELECT WEAPON

1. Set Master Arm Switch ON (UP)
2. Select DSMS (Digital Stores Management System) page
3. Select M-151 Hydra 70 Rockets (green when selected)
4. Select PROF (Weapon Profile) menu

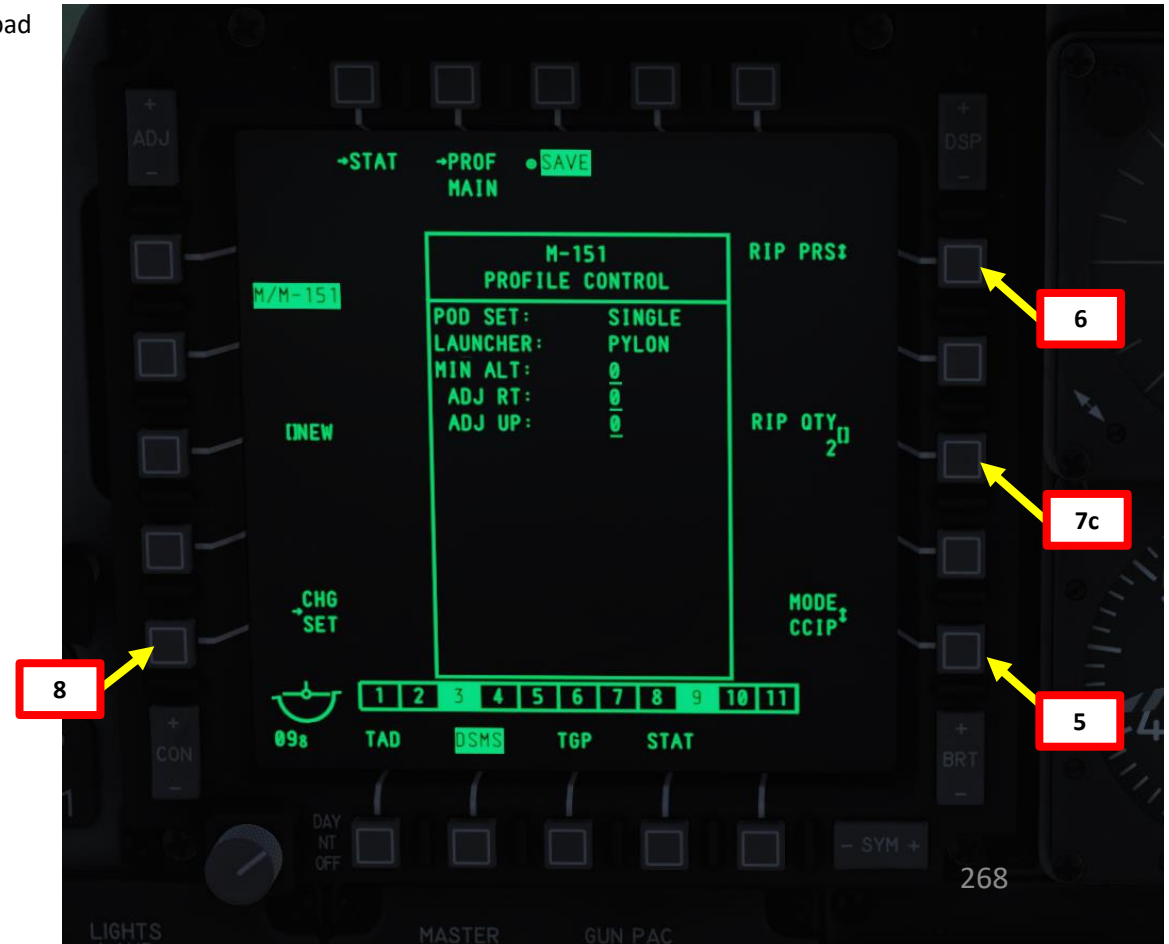




2.3 – HYDRA 70 ROCKETS CCIP RELEASE MODE

B: SET WEAPON PROFILE

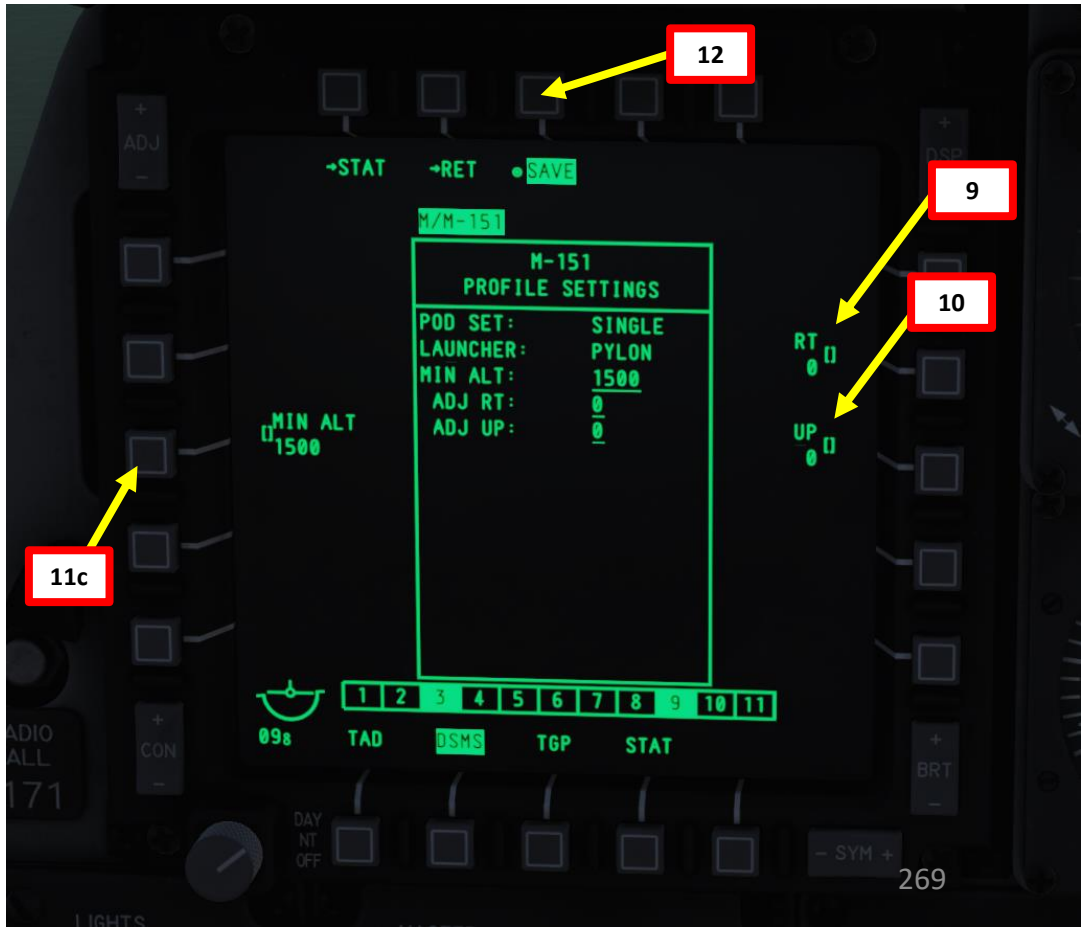
5. Set CCIP (Continuously Computed Impact Point) Mode
6. Set Release Type
    - SGL (Single): Single Rocket Launch
    - PRS (Pairs): Rockets launched in Pairs
    - RIP SGL (Ripple Single): Each press of the weapon release button will launch the set number of rockets set from the RIP QTY (Ripple Quantity) setting
    - RIP PRS (Ripple Pairs): Each press of the weapon release button will launch the number of rockets specified in the RIP PRS setting, in pairs
7. If required, set Rocket Ripple Quantity by typing the desired quantity on the UFC scratchpad (2), then pressing the OSB (Option Select Button) next to RIP QTY.
8. Select the OSB next to CHG SET (Change Settings) to modify rocket settings.



2.3 – HYDRA 70 ROCKETS
CCIP RELEASE MODE

B: SET WEAPON PROFILE

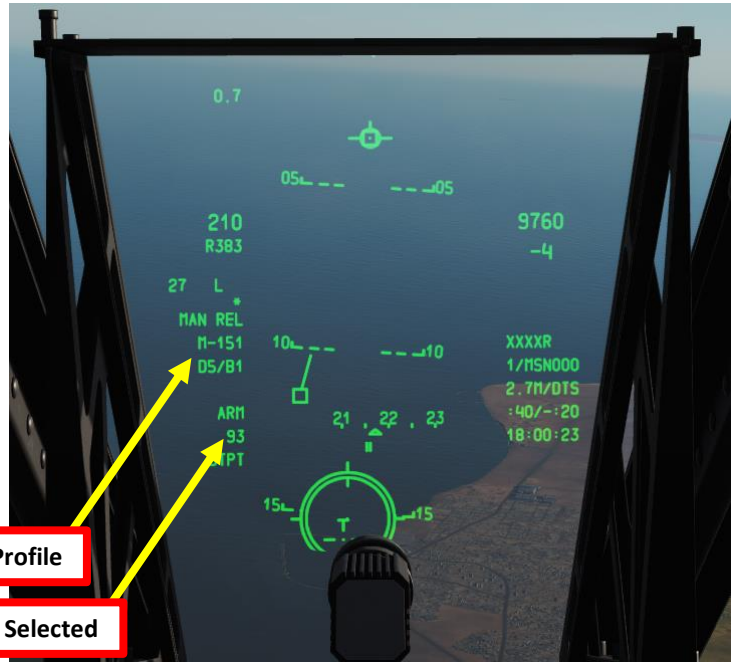
9. OPTIONAL: If using an horizontal offset (we aren't), enter Horizontal Offset value (in mils) on the UFC scratchpad, then press on the OSB next to RT (Right Adjustment). Value must be between -15 and +15 mils.
10. OPTIONAL: If using a vertical offset (we aren't), enter Vertical Offset value (in mils) on the UFC scratchpad, then press on the OSB next to UP (Upwards Adjustment). Value must be between -15 and +15 mils.
11. OPTIONAL: If you want to see Minimum Release Altitude cues on the Heads-Up Display, enter Minimum Altitude on the UFC scratchpad, then press on the OSB next to MIN ALT.
12. Press on the OSB next to SAVE to save Weapon Profile.

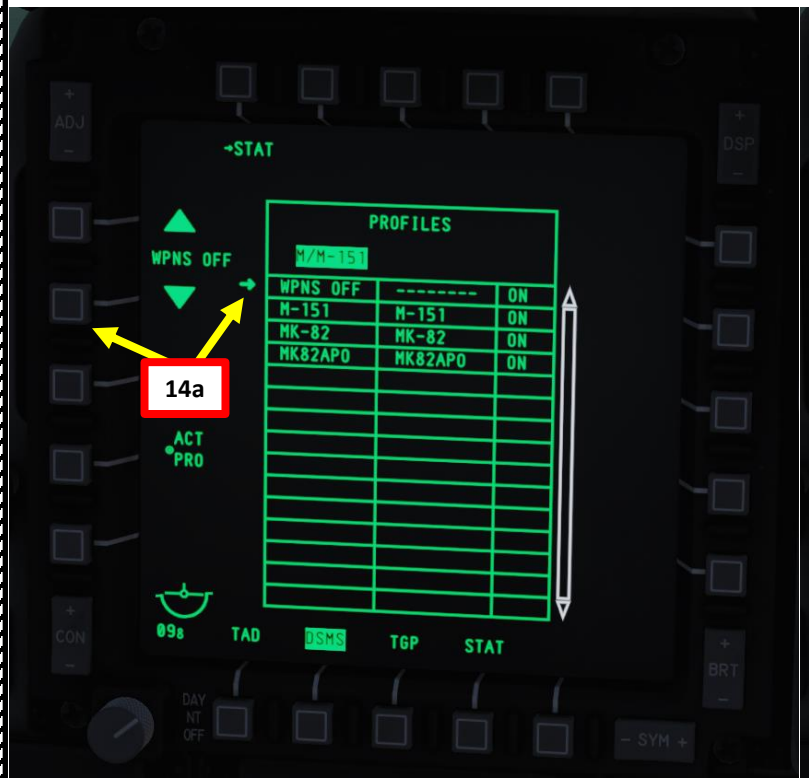


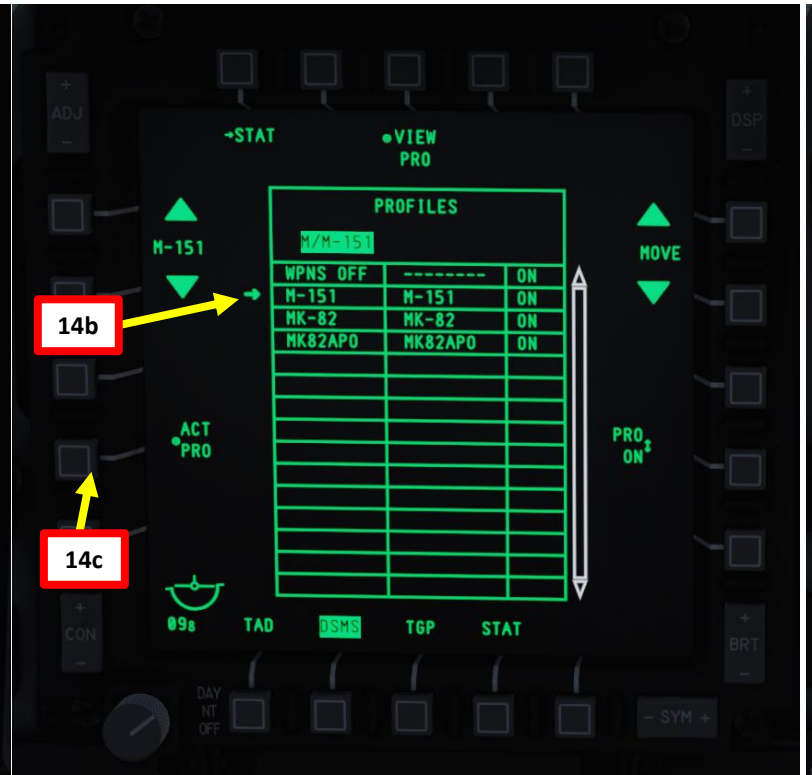
2.3 – HYDRA 70 ROCKETS
CCIP RELEASE MODE

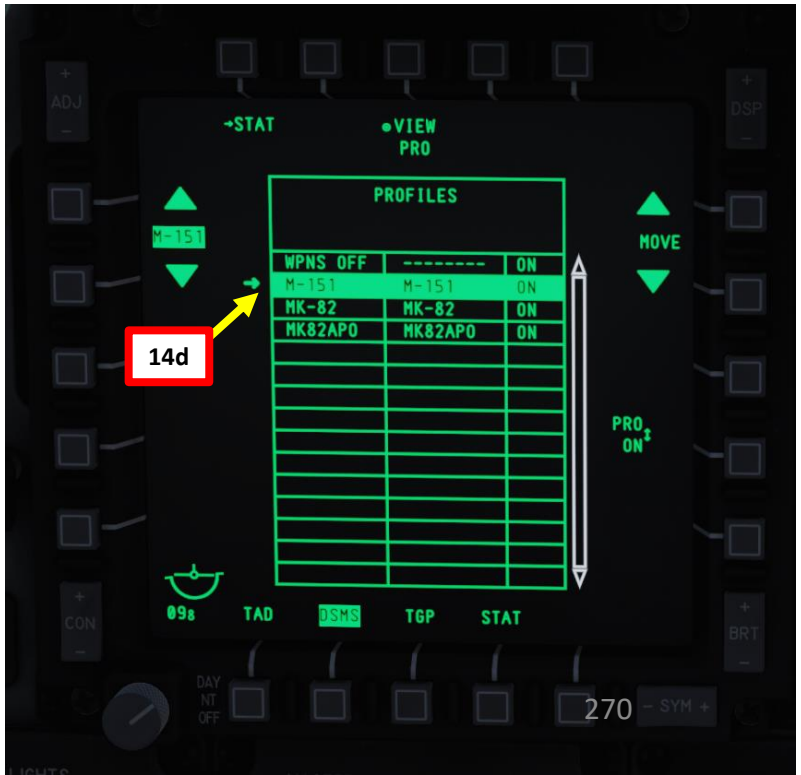
C: SELECT WEAPON PROFILE

13. Once weapon profile is saved, the DSMS page will showcase all different weapon profiles available.
14. Select M-151 profile by pressing the Option Select Button Selectors, then press on the OSB next to ACT PRO (Active Profile).
    - While HUD is SOI (Coolie Hat Switch UP), cycle between profiles and stations using the DMS (Data Management Switch) left or right.
15. The M-151 Profile will be displayed on the Heads-Up Display.





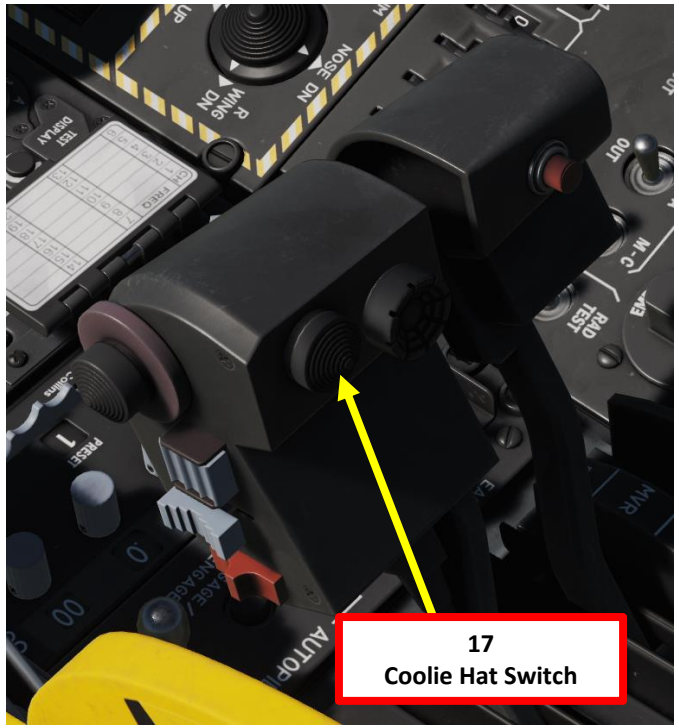




2.3 – HYDRA 70 ROCKETS
CCIP RELEASE MODE

D: PERFORM ATTACK

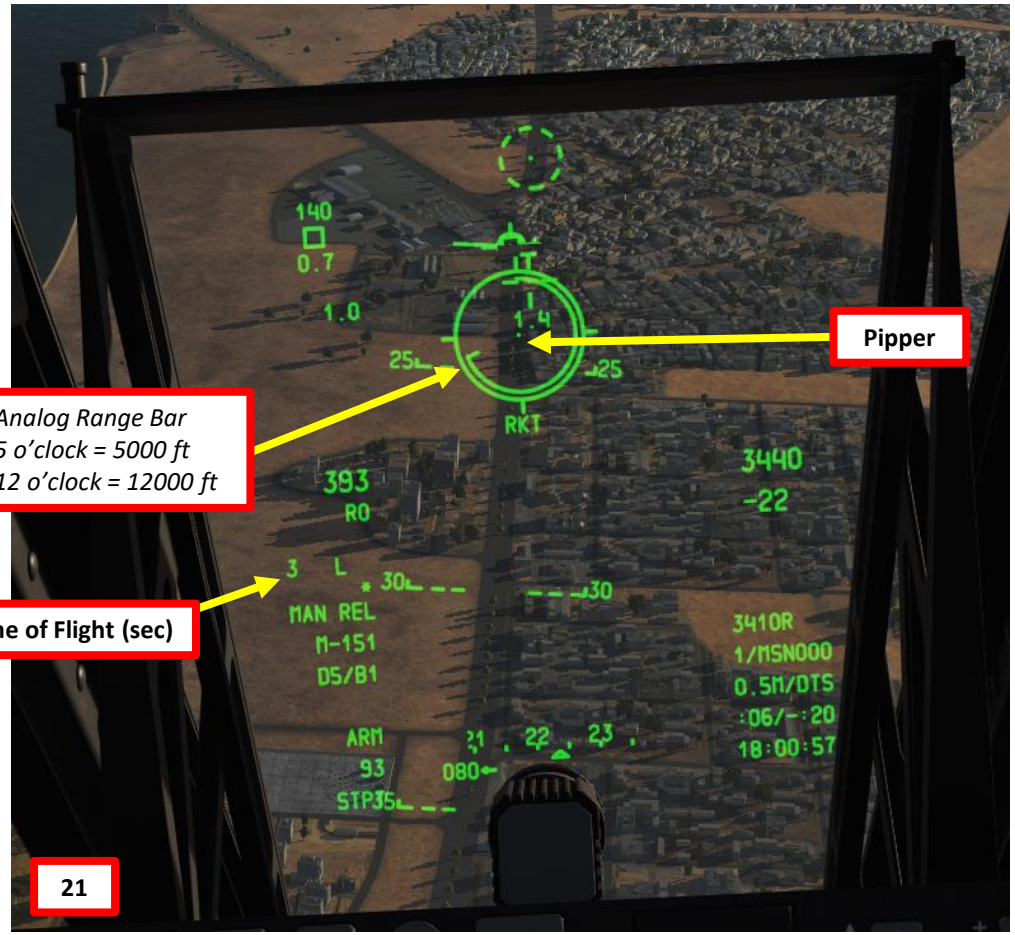
16. Press the Master Mode button until the CCIP HUD Mode is selected.
17. Press Coolie Hat UP Short to set the Heads-Up Display as the SOI (Sensor of Interest). Asterisk will indicate HUD is SOI.
18. Verify on the Heads-Up Display that MAN REL mode, CCIP release, M-151 profile and ARM status are displayed.



2.3 – HYDRA 70 ROCKETS
CCIP RELEASE MODE

D: PERFORM ATTACK

19. Perform a shallow dive between 10 and 45 deg from at least 10000 ft.
20. A CCIP Rocket Reticle & Pipper will appear when you are not yet close enough to the target
21. When the slant range to target is less than 2 nm, the range numeric under the CCIP reticle is removed and the analog range bar within the reticle starts to unwind. Place the center of the CCIP Reticle on the target.
22. At a slant range of around 1 nm, hold down the Weapon Release button (RALT+SPACE) to launch rockets.



2.3 – HYDRA 70 ROCKETS
CCIP RELEASE MODE

2.4 – GAU-8 GUN (AIR-TO-GROUND)

2.4.1 – INTRODUCTION

The GAU-8/A Avenger 30 mm gun is the bread and butter of the A-10. Using seven barrels in a rotating Gatling-type system, a very high rate of fire can be achieved without excessive barrel heating. This is because as one barrel fires the other six are briefly cooling down. Each of the seven barrels acts as an individual 30 mm cannon with its own breech and bolt, these are all joined around a single rotor along a common axis using a hydraulic motor.

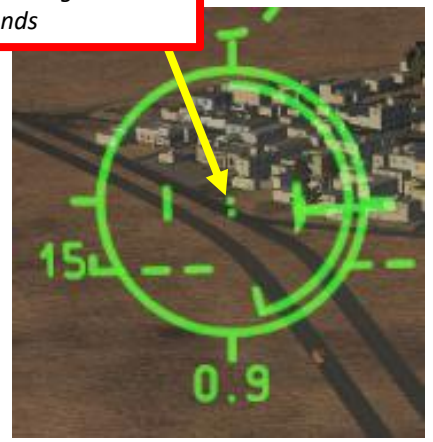
2.4 – GAU-8 GUN (AIR-TO-GROUND)
2.4.1 – INTRODUCTION: AMMUNITION

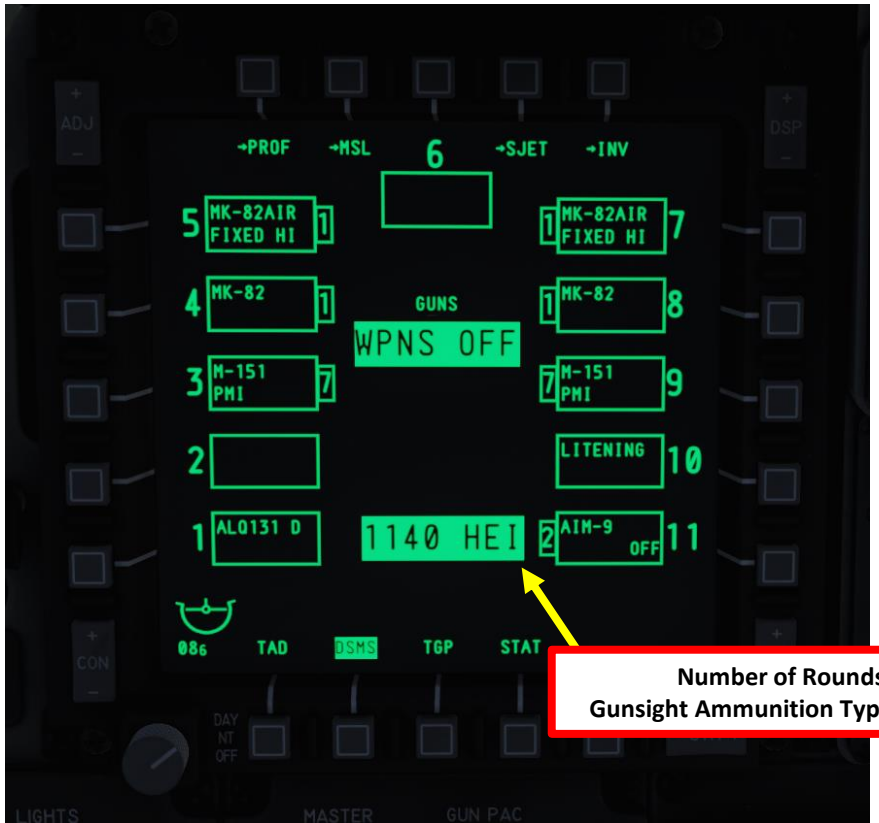
The GAU-8 gun can carry three types of ammunition:

- **Combat Mix (CM)**. One PGU-13 High Explosive Incendiary (HEI) for every five rounds of PGU-14 Armor Piercing Incendiary (API) rounds. The API round uses Depleted Uranium (DU). This is the ammunition of choice for armored vehicles and can destroy a tank out to 21,600 ft.
- **High Explosive Incendiary (HEI)**. This load exclusively uses the PGU-13 (HEI) round.
- **Target Practice (TP)**. Inert warhead round version used for training.

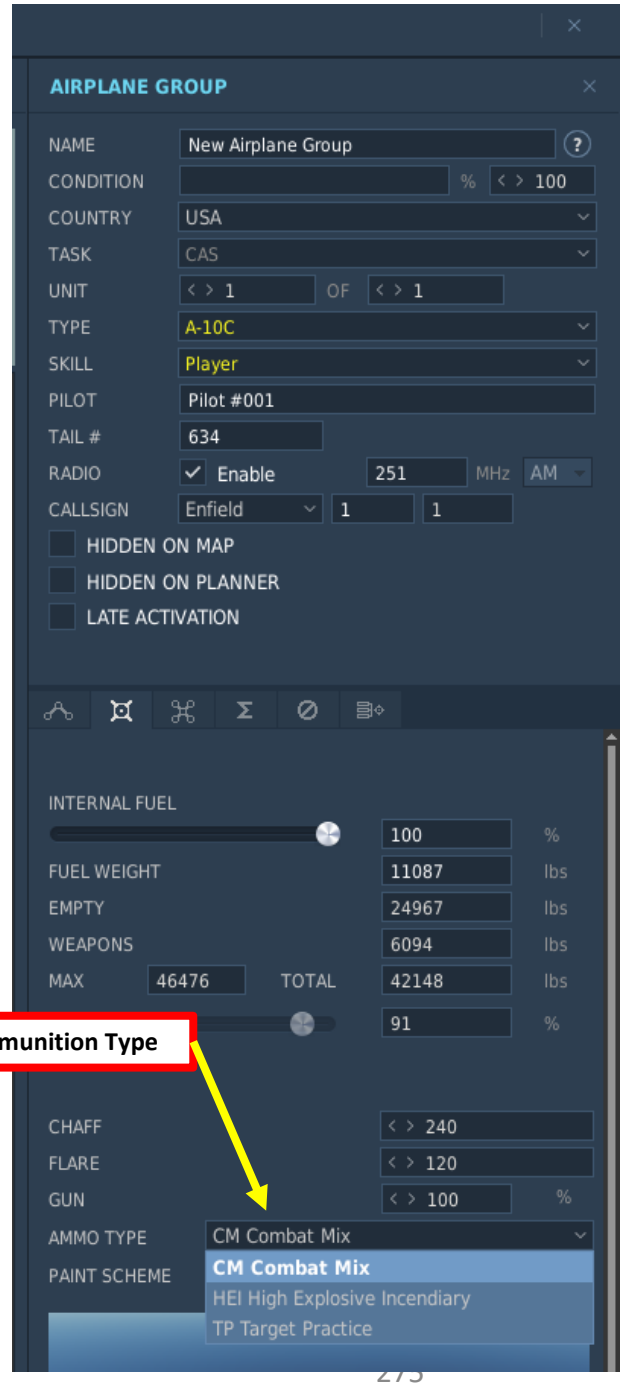
Ammunition types can be set via the Mission Editor. The IFFCC (Integrated Flight & Fire Control Computer) Test Menu can adjust the gunsight reticle properties based on the ammunition type.

Gun CCIP Pipper
Upper Dot: Impact point of armor-piecing rounds
Lower Dot: Impact point of HEI rounds





Number of Rounds & Gunsight Ammunition Type Property



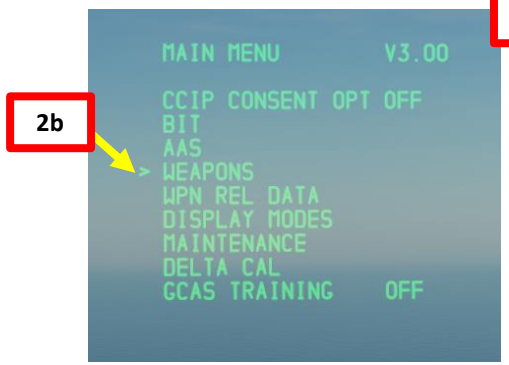
Ammunition Type

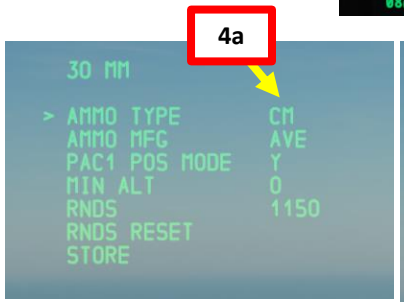
2.4 – GAU-8 GUN (AIR-TO-GROUND)

2.4.1 – INTRODUCTION: AMMUNITION

If we have a specific ammunition type (i.e. HEI) loaded, we can modify the gunsight ammunition type property through the IFFCC (Integrated Flight & Fire Control Computer) Test Menu since different ammunition types have different effective ranges.

1. Set IFFCC (Integrated Flight & Fire Control Computer) to TEST (MIDDLE) position by Left Clicking on the switch.
2. Use SEL rocker switch to select WEAPONS menu, then press ENT on the UFC scratchpad.
3. Select 30MM menu by pressing ENT on the UFC scratchpad.
4. In the "AMMO TYPE" field, press the DATA rocker switch to toggle between CM (Combat Mix), HEI (High Explosive Indenciary) and TP (Target Practice).
5. Once the desired ammo type is selected, select STORE menu with the SEL rocker switch, then press ENT on the UFC scratchpad.
6. Select EXIT with the SEL rocker switch, then press ENT on the UFC scratchpad.
7. Set IFFCC switch to ON (UP) position by Right Clicking on the Switch.
8. The DSMS (Digital Stores Management System) page and HUD (Heads-Up Display) will both display the selected ammunition type.





2.4 – GAU-8 GUN (AIR-TO-GROUND)

2.4.1 – INTRODUCTION: RETICLES

The gun can use four gunsight modes. These can be cycled using DMS (Data Management Switch) Left or Right Short when the HUD is SOI (Sensor of Interest).

- **CCIP Reticle**: Provides the most accurate firing solution.
- **CCIP Cross**: Simplified CCIP reticle but almost just as accurate
- **4/8/12 Reticle**: Less accurate than CCIP reticles, the top dot represents a 4000 ft slant range, the middle dot a 8000 ft slant range, and the bottom dot a 12000 ft slant range. Less accurate than other reticle types, but useful in case you can't get CCIP solution computed due to inaccurate elevation data (CCIP INVALID HUD message. Which indicates that the target is at an elevation higher than the aircraft).
- **4000 ft Wind Corrected Cross**: Cross is set for a 4000 ft wind corrected slant range. Less accurate than other reticle types, but useful in case you can't get CCIP solution computed due to inaccurate elevation data (CCIP INVALID HUD message. Which indicates that the target is at an elevation higher than the aircraft).

CCIP Reticle

CCIP Cross

4/8/12 Reticle

4000 ft Wind Corrected Cross Reticle

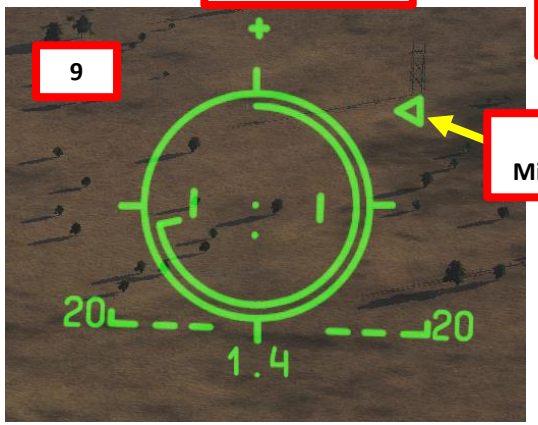
2.4 – GAU-8 GUN (AIR-TO-GROUND)

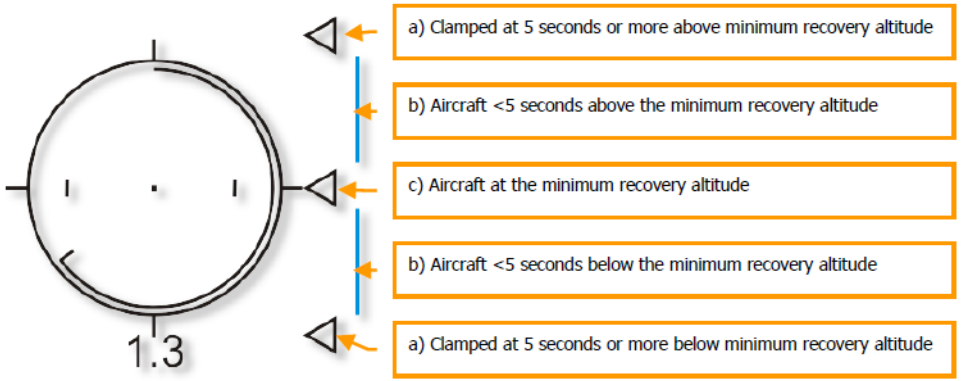
2.4.1 – INTRODUCTION: RETICLE MINIMUM ALTITUDE

If a MIN ALT (Minimum Altitude to fire the guns safely) other than 0 has been entered in the IFFCC 30 MM menu, the Minimum Range Cue indicator will appear to the right of the reticle. The MIN ALT setting is calibrated to when the cue is at the 3 o'clock position of the reticle.

To modify a Minimum Altitude through the IFFCC (Integrated Flight & Fire Control Computer) Test Menu:

1. Set IFFCC (Integrated Flight & Fire Control Computer) to TEST (MIDDLE) position by Left Clicking on the switch.
2. Use SEL rocker switch to select WEAPONS menu, then press ENT on the UFC scratchpad.
3. Select 30MM menu by pressing ENT on the UFC scratchpad.
4. Use SEL rocker switch to select MIN ALT menu.
5. In the "MIN ALT" field, press the DATA rocker switch to increment MIN ALT value until you reach the desired value.
6. Once the minimum altitude is set, select STORE menu with the SEL rocker switch, then press ENT on the UFC scratchpad.
7. Select EXIT with the SEL rocker switch, then press ENT on the UFC scratchpad.
8. Set IFFCC switch to ON (UP) position by Right Clicking on the Switch.
9. The CCIP Reticle will then display the Minimum Range Cue.

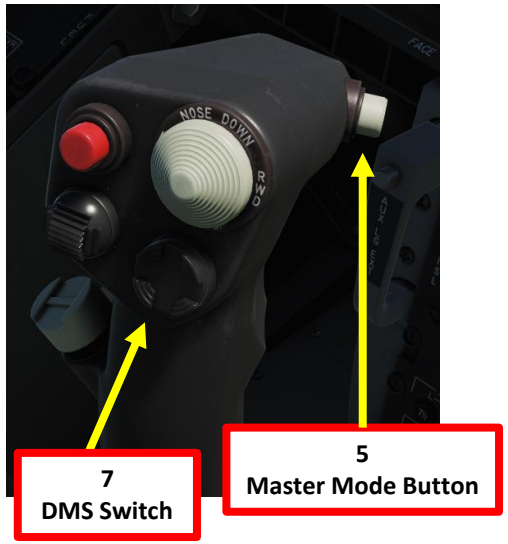


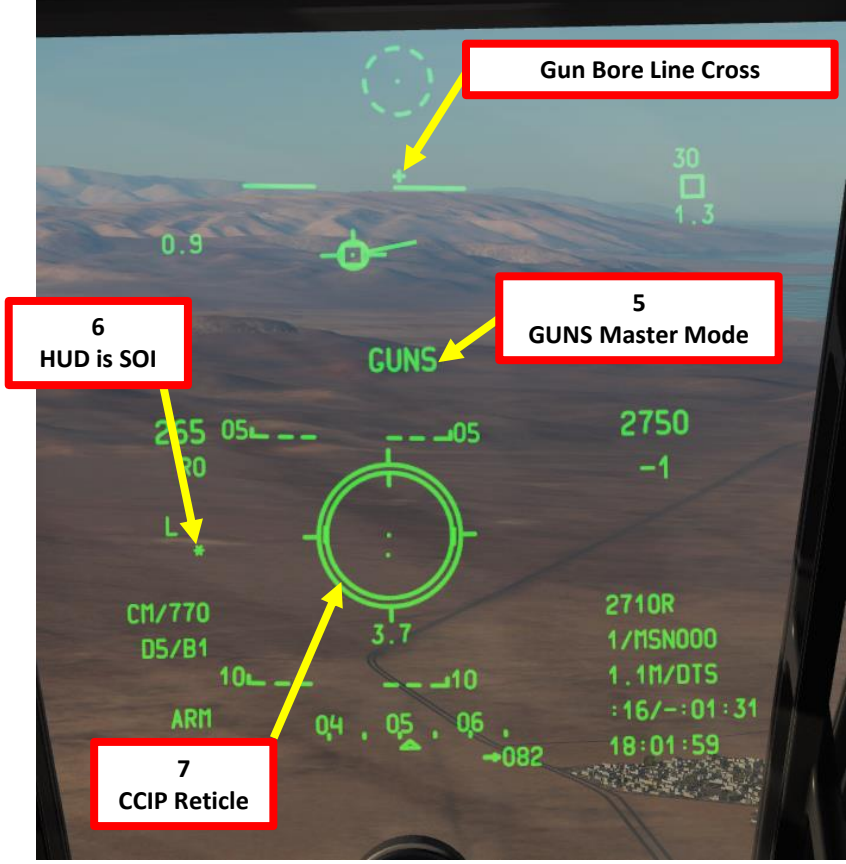


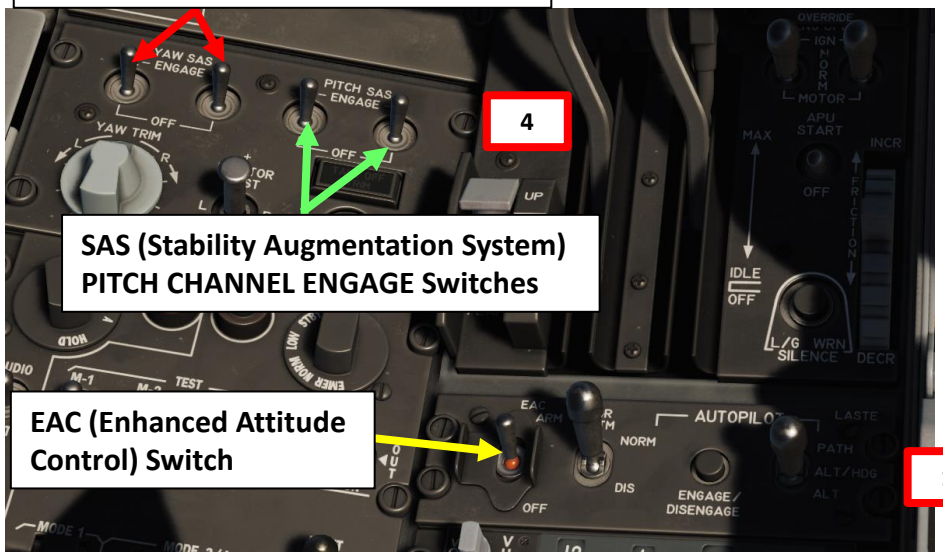
2.4 – GAU-8 GUN (AIR-TO-GROUND)

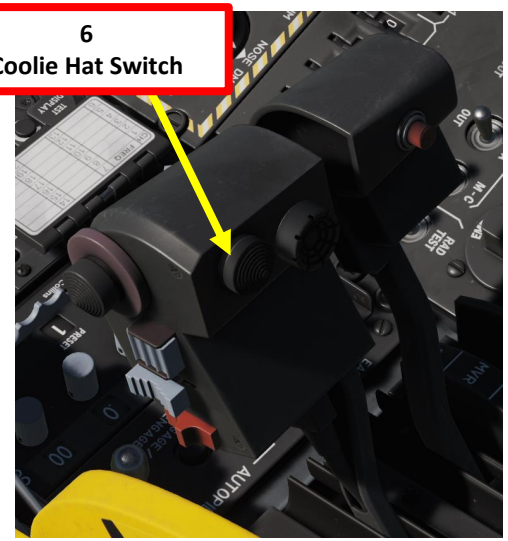
2.4.2 – CCIP RETICLE

1. Set Master Arm Switch ON (UP)
2. Set GUN/PAC (Precision Attitude Correction) Switch to ARM (UP)
3. Confirm that GUN READY indication is visible
4. To use the PAC (Precision Attitude Correction), make sure the EAC (Enhanced Attitude Control) and PITCH and YAW SAS (Stability Augmentation System) switches are ON.
5. Press the Master Mode button until the GUNS HUD Mode is selected.
6. Press Coolie Hat UP Short to set the Heads-Up Display as the SOI (Sensor of Interest). Asterisk will indicate HUD is SOI.
7. Press the DMS (Data Management Switch) LEFT or RIGHT to cycle between Gun Modes until the Gun CCIP Reticle is visible.









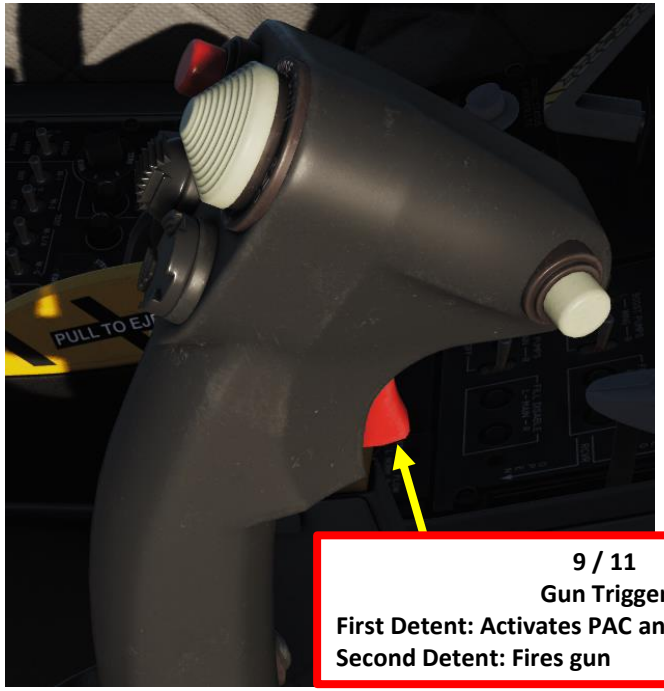
2.4 – GAU-8 GUN (AIR-TO-GROUND)

2.4.2 – CCIP RETICLE

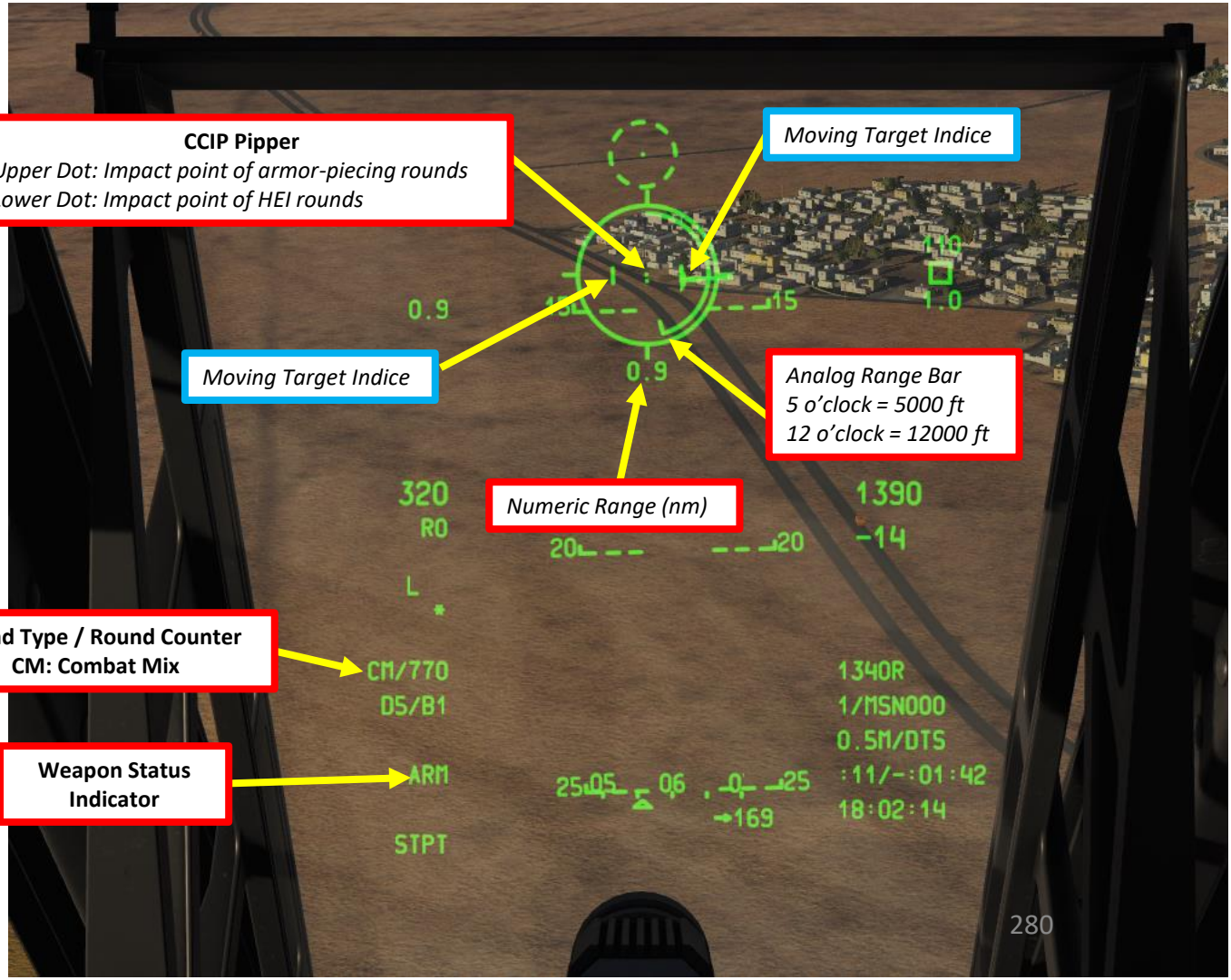
8. Put target under reticle
9. Partially depress gun trigger (first detent) to activate PAC and stabilize flight
10. Wait until target slant range is 0.7 nm
11. Depress trigger (second detent) to fire a short 1-second gun burst

Note:
*If the target is moving, you may want to use the **moving target indices** on the CCIP Gun Reticle. They assume lead for a moving target at a constant speed of 20 knots perpendicular. For example: if a target is moving left to right at an estimated 10 knots, place target half way between the pipper and left moving target indices before firing.*

GUNS: best used at 0.5 - 2 mile slant range
- keep to 0.5-0.8 and prefer from behind for tanks
- 1.2 mile for lightly armoured
- 1.5 mile for unarmoured
- high angle = less dispersion (best for armour)
- low angle = more dispersion (good for infantry)



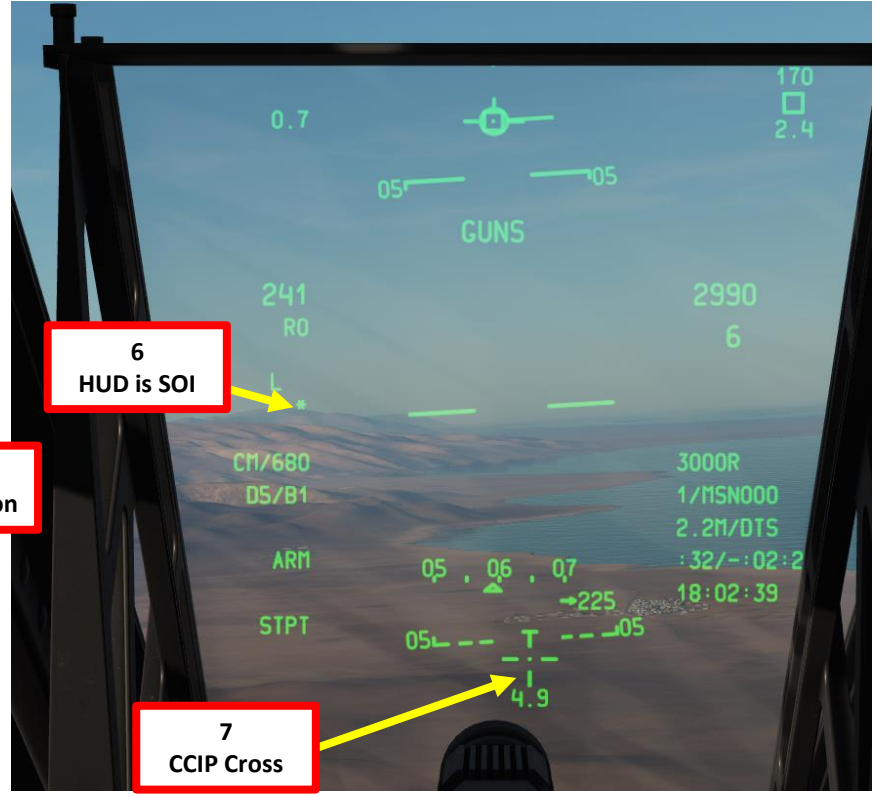
9 / 11
Gun Trigger
First Detent: Activates PAC and stabilizes flight
Second Detent: Fires gun

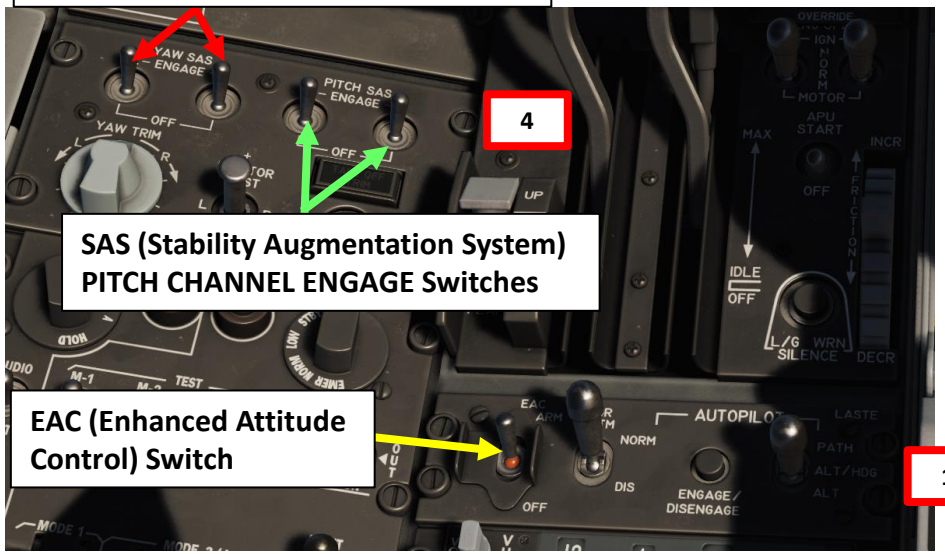


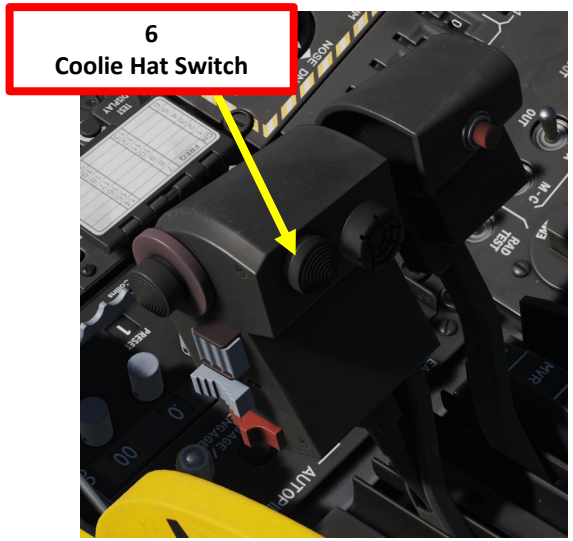
2.4 – GAU-8 GUN (AIR-TO-GROUND)

2.4.3 – CCIP CROSS

1. Set Master Arm Switch ON (UP)
2. Set GUN/PAC (Precision Attitude Correction) Switch to ARM (UP)
3. Confirm that GUN READY indication is visible
4. To use the PAC (Precision Attitude Correction), make sure the EAC (Enhanced Attitude Control) and PITCH and YAW SAS (Stability Augmentation System) switches are ON.
5. Press the Master Mode button until the GUNS HUD Mode is selected.
6. Press Coolie Hat UP Short to set the Heads-Up Display as the SOI (Sensor of Interest). Asterisk will indicate HUD is SOI.
7. Press the DMS (Data Management Switch) LEFT or RIGHT to cycle between Gun Modes until the Gun CCIP Cross Reticle is visible.



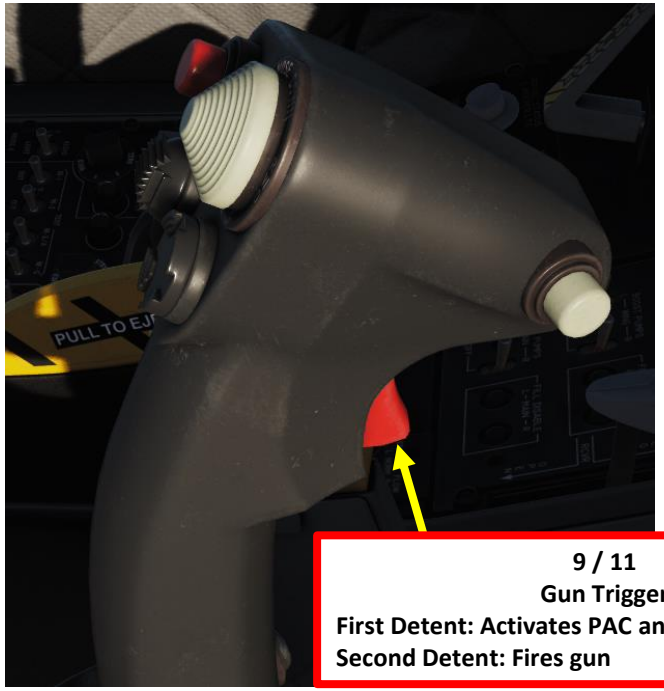




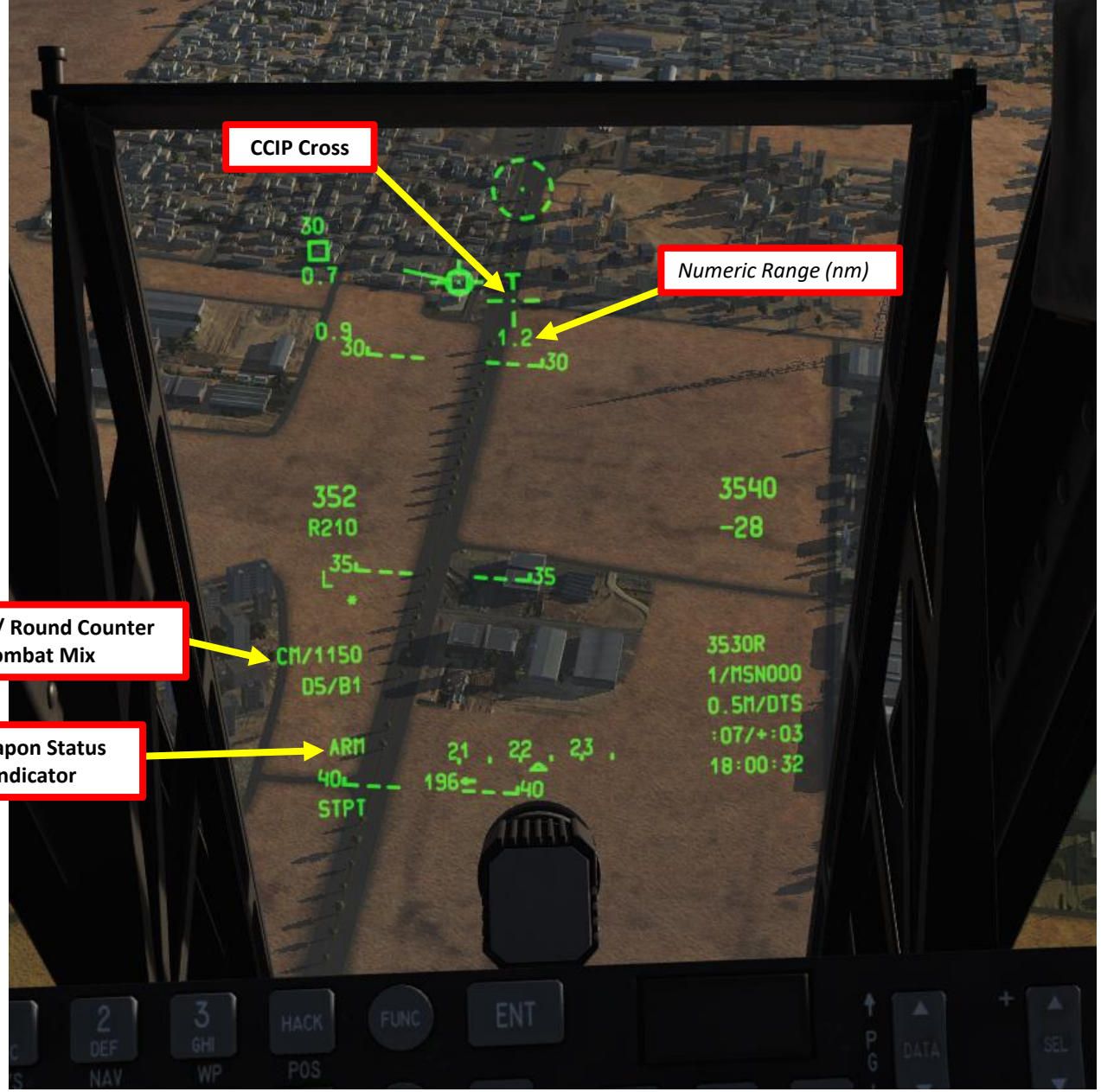
2.4 – GAU-8 GUN (AIR-TO-GROUND)
2.4.3 – CCIP CROSS

8. Put target under reticle
9. Partially depress gun trigger (first detent) to activate PAC and stabilize flight
10. Wait until target slant range is 0.7 nm
11. Depress trigger (second detent) to fire a short 1-second gun burst

GUNS: best used at 0.5 - 2 mile slant range
- keep to 0.5-0.8 and prefer from behind for tanks
- 1.2 mile for lightly armoured
- 1.5 mile for unarmoured
- high angle = less dispersion (best for armour)
- low angle = more dispersion (good for infantry)

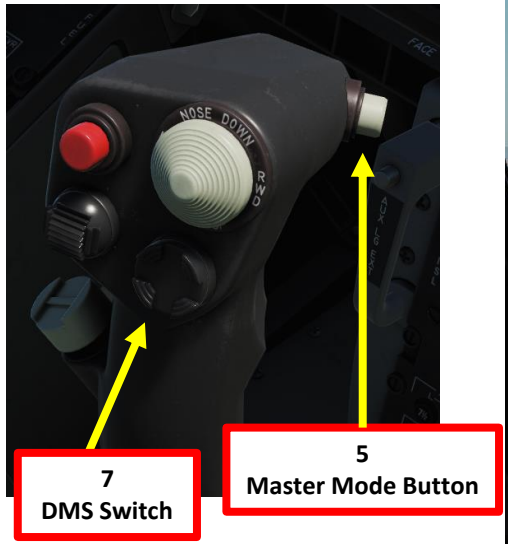


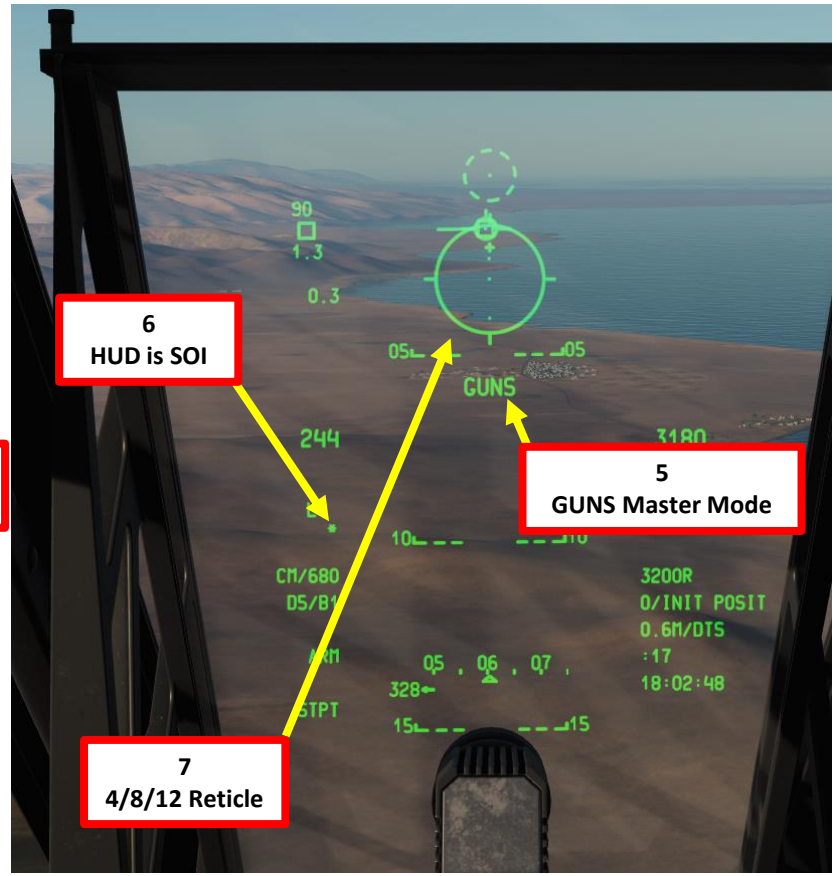
9 / 11
Gun Trigger
First Detent: Activates PAC and stabilizes flight
Second Detent: Fires gun

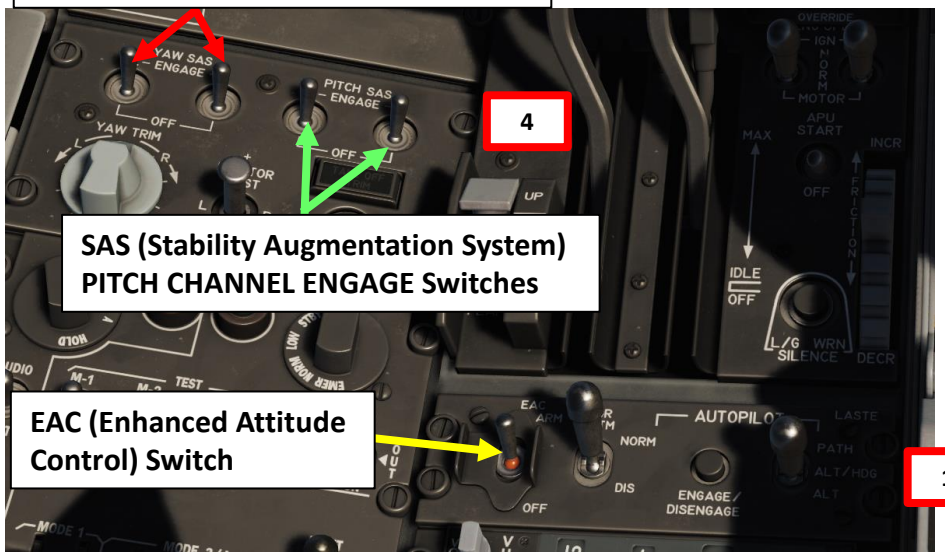


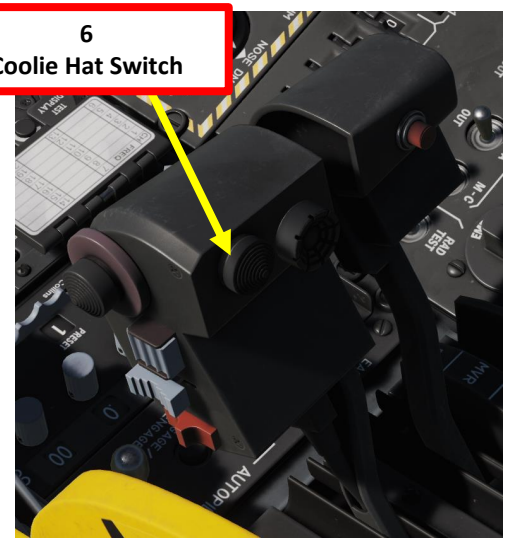
2.4 – GAU-8 GUN (AIR-TO-GROUND)
2.4.4 – 4/8/12 RETICLE

1. Set Master Arm Switch ON (UP)
2. Set GUN/PAC (Precision Attitude Correction) Switch to ARM (UP)
3. Confirm that GUN READY indication is visible
4. To use the PAC (Precision Attitude Correction), make sure the EAC (Enhanced Attitude Control) and PITCH and YAW SAS (Stability Augmentation System) switches are ON.
5. Press the Master Mode button until the GUNS HUD Mode is selected.
6. Press Coolie Hat UP Short to set the Heads-Up Display as the SOI (Sensor of Interest). Asterisk will indicate HUD is SOI.
7. Press the DMS (Data Management Switch) LEFT or RIGHT to cycle between Gun Modes until the Gun 4/8/12 Reticle is visible.





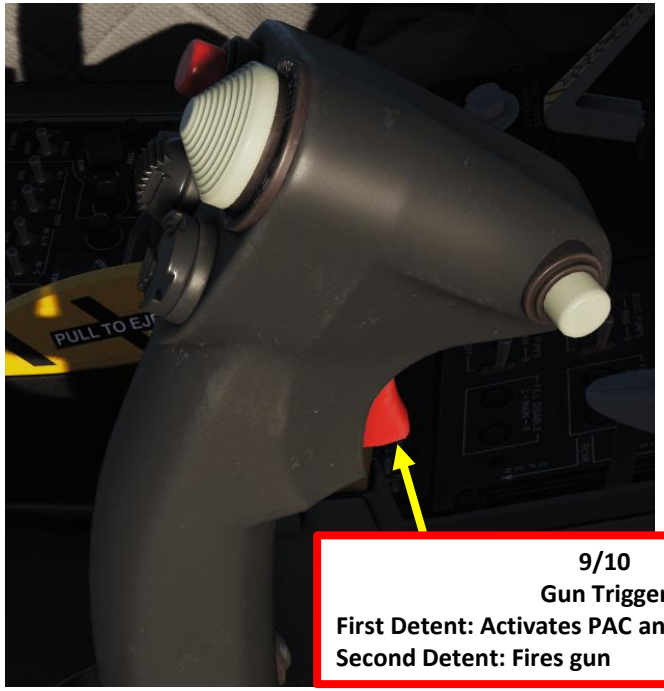




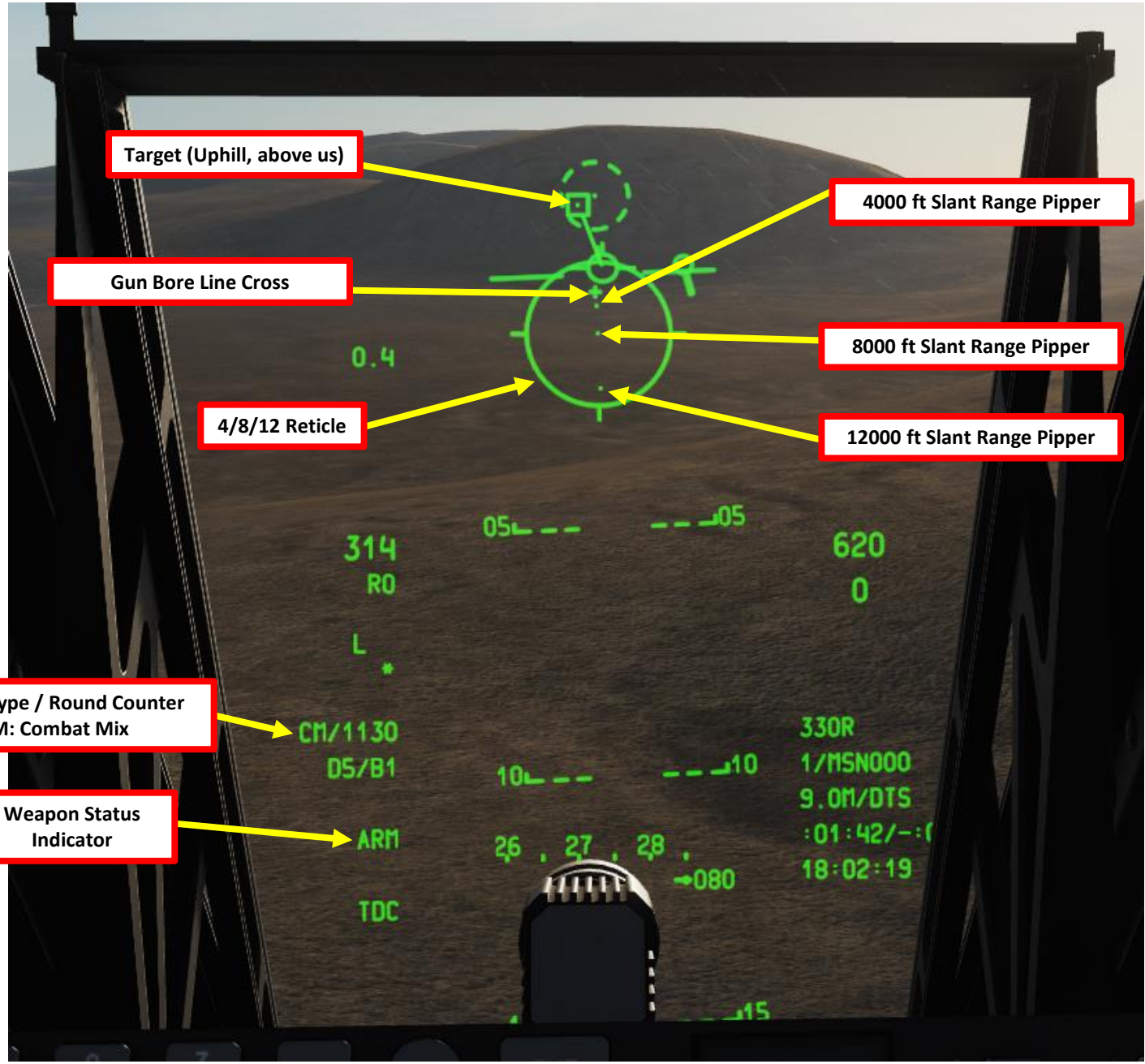
2.4 – GAU-8 GUN (AIR-TO-GROUND)
2.4.4 – 4/8/12 RETICLE

8. We generally use the 4/8/12 reticle for targets that are above our current altitude (on a sloped hill for instance). Evaluate your target's distance, then put target under pipper of the desired range.
9. Partially depress gun trigger (first detent) to activate PAC and stabilize flight
10. When you are in range and the corresponding Range Pipper is on the target, depress trigger (second detent) to fire a short 1-second gun burst

GUNS: best used at 0.5 - 2 mile slant range
- keep to 0.5-0.8 and prefer from behind for tanks
- 1.2 mile for lightly armoured
- 1.5 mile for unarmoured
- high angle = less dispersion (best for armour)
- low angle = more dispersion (good for infantry)

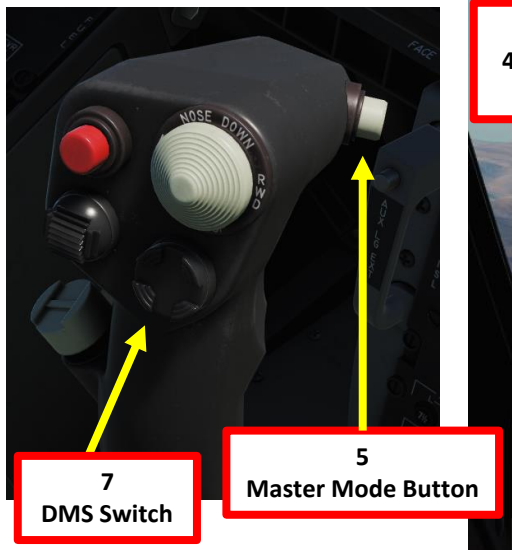


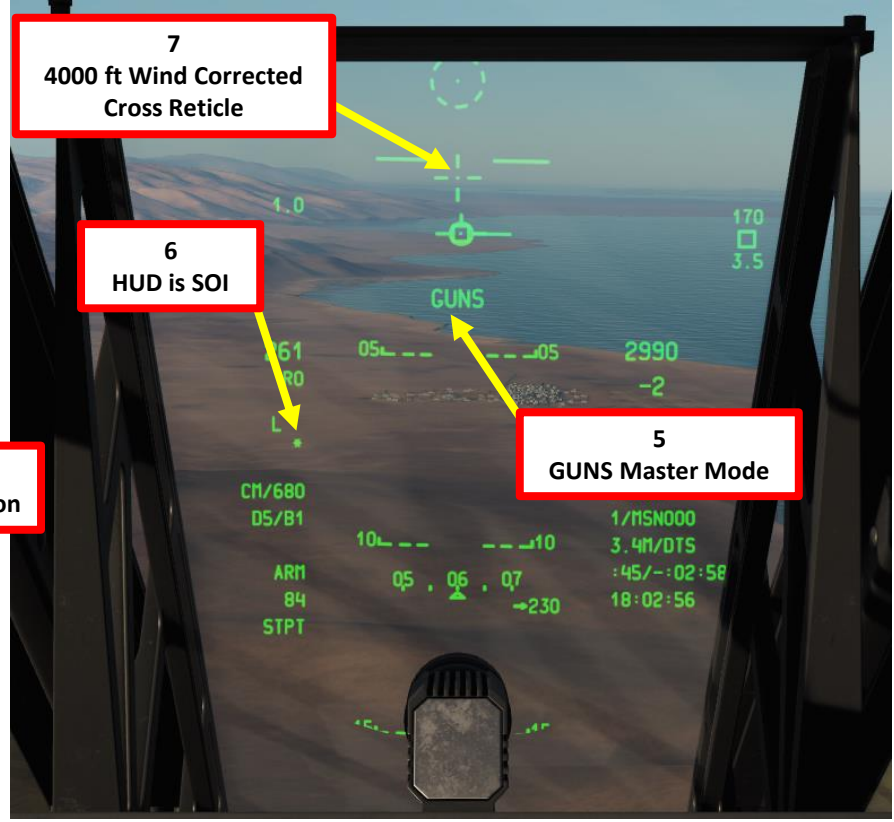
9/10
Gun Trigger
First Detent: Activates PAC and stabilizes flight
Second Detent: Fires gun



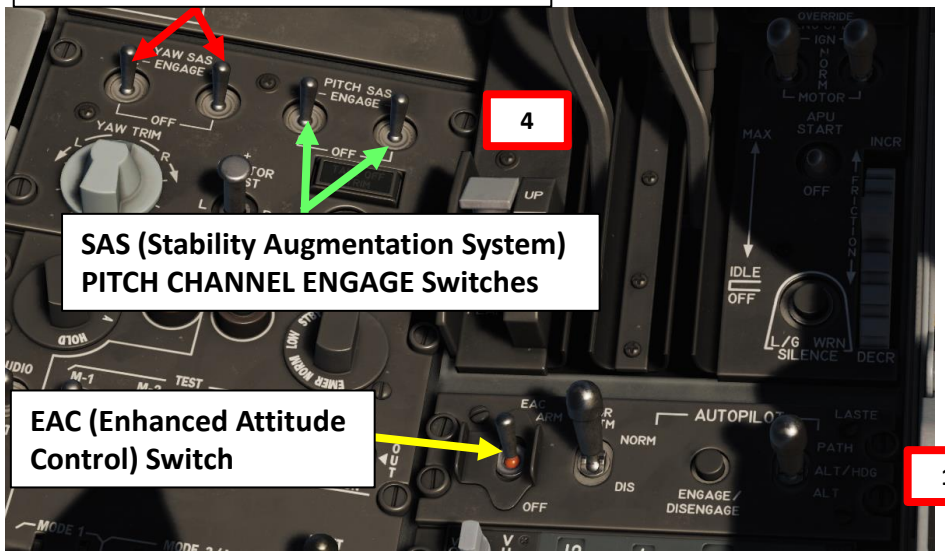
2.4 – GAU-8 GUN (AIR-TO-GROUND)
2.4.5 – 4000 FT WIND CORRECTED CROSS

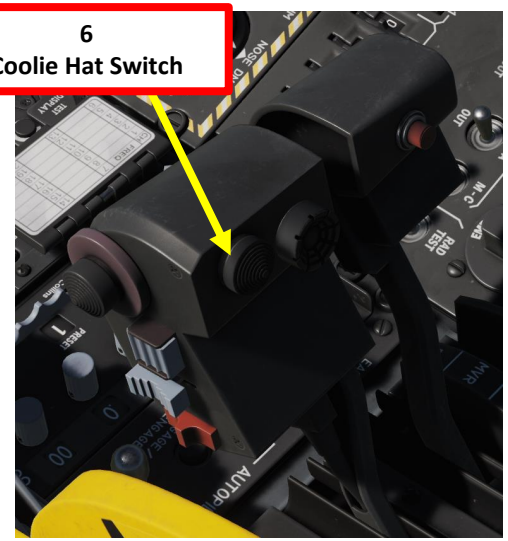
1. Set Master Arm Switch ON (UP)
2. Set GUN/PAC (Precision Attitude Correction) Switch to ARM (UP)
3. Confirm that GUN READY indication is visible
4. To use the PAC (Precision Attitude Correction), make sure the EAC (Enhanced Attitude Control) and PITCH and YAW SAS (Stability Augmentation System) switches are ON.
5. Press the Master Mode button until the GUNS HUD Mode is selected.
6. Press Coolie Hat UP Short to set the Heads-Up Display as the SOI (Sensor of Interest). Asterisk will indicate HUD is SOI.
7. Press the DMS (Data Management Switch) LEFT or RIGHT to cycle between Gun Modes until the Gun 4000 Ft Wind Corrected Cross Reticle is visible.





SAS (Stability Augmentation System) YAW CHANNEL ENGAGE Switches

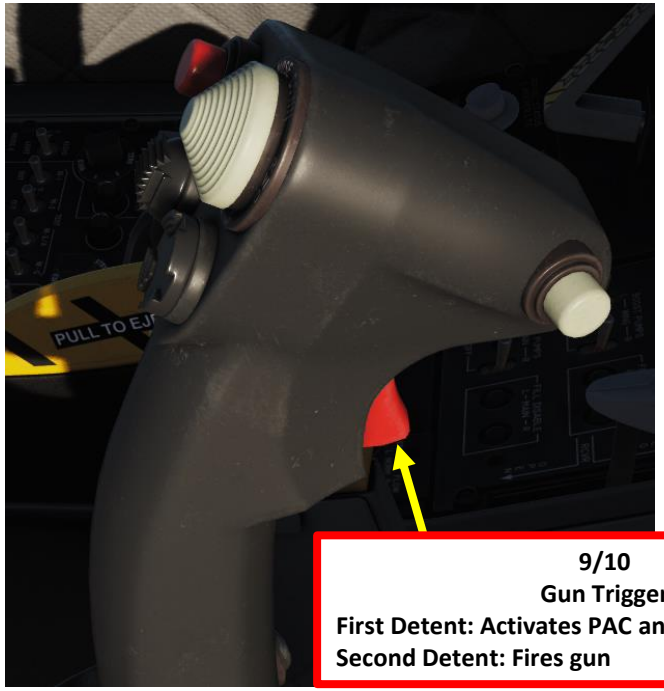




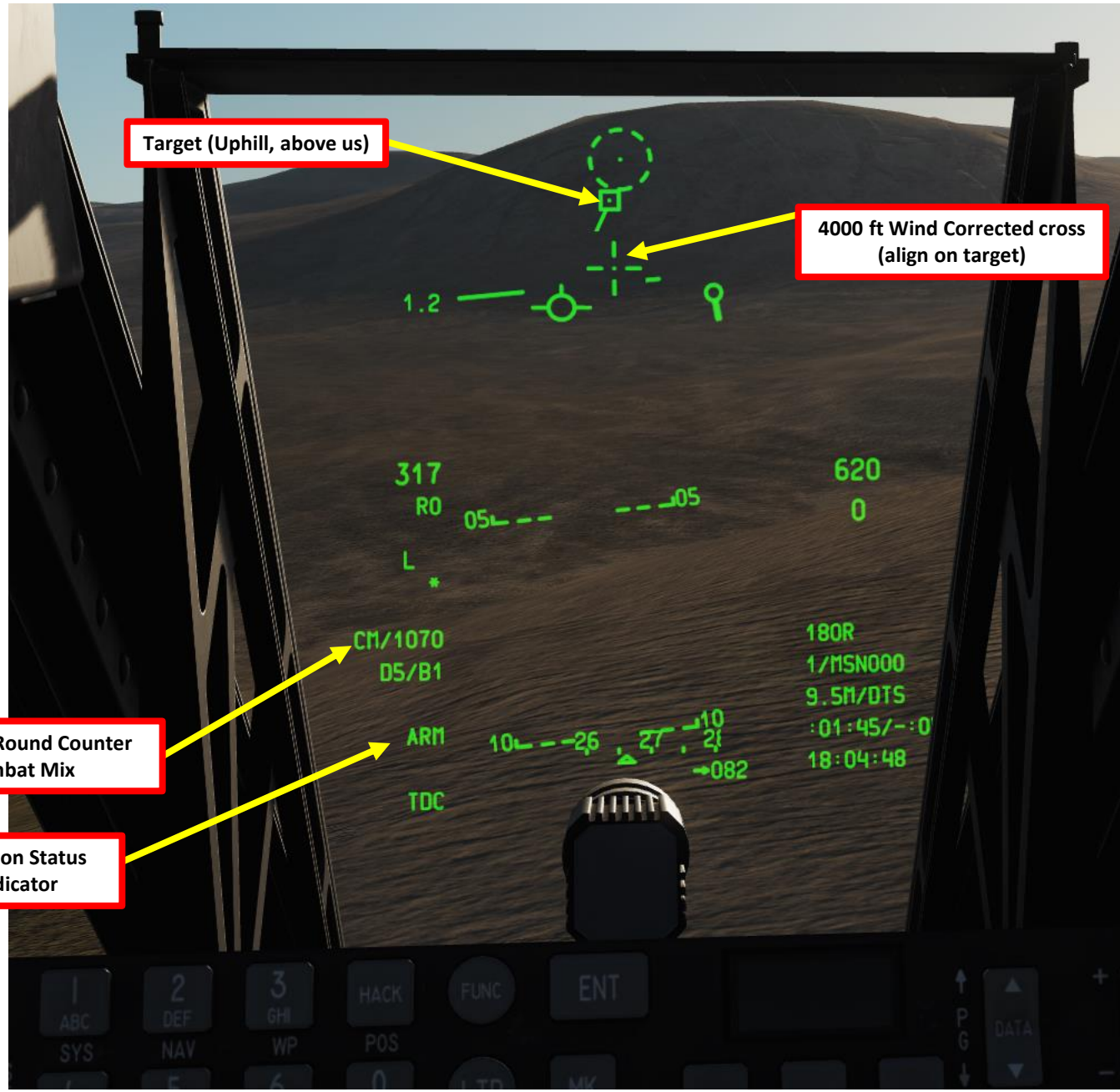
2.4 – GAU-8 GUN (AIR-TO-GROUND)
2.4.5 – 4000 FT WIND CORRECTED CROSS

8. We generally use the 4000 ft cross for targets that are above our current altitude (on a sloped hill for instance). Evaluate your target's distance, then put target under 4000 ft cross.
9. Partially depress gun trigger (first detent) to activate PAC and stabilize flight
10. When you are in range and the corresponding Range Pipper is on the target, depress trigger (second detent) to fire a short 1-second gun burst

GUNS: best used at 0.5 - 2 mile slant range
- keep to 0.5-0.8 and prefer from behind for tanks
- 1.2 mile for lightly armoured
- 1.5 mile for unarmoured
- high angle = less dispersion (best for armour)
- low angle = more dispersion (good for infantry)



9/10
Gun Trigger
First Detent: Activates PAC and stabilizes flight
Second Detent: Fires gun



2.4 – GAU-8 GUN (AIR-TO-GROUND)

2.5 – GBU-38 JDAM (JTAC COORDINATES)

The JTAC (Joint Terminal Attack Controller) is the radio operator that finds targets for you and requests air strikes. He is the main line of communication between the grunts on the ground and yourself. Here is an example by Ranger79: https://youtu.be/riIChrLLJqY?list=LLKDCQ2Y6CtqCjKceXO1J6hg

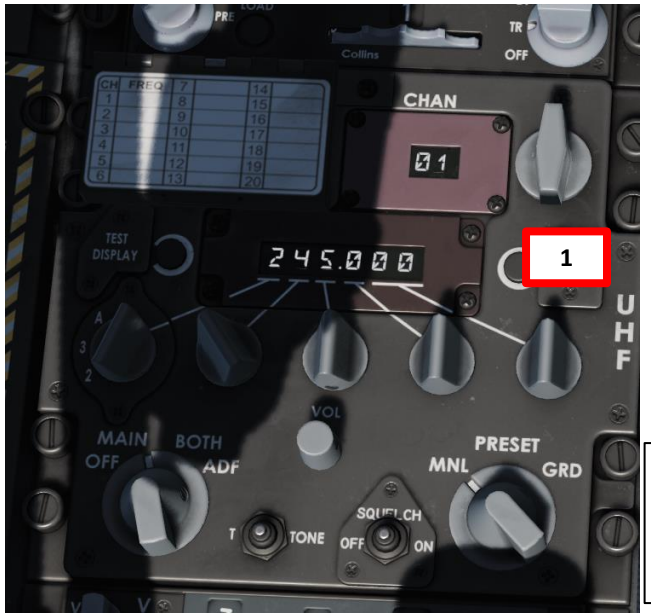
Performing a successful JDAM (Joint Directed Attack Munition) strike with the help of a JTAC is done in the following manner:

A. Find the JTAC radio frequency and request a fire mission. Then, enter coordinates in the CDU (Control Display Unit) for a new waypoint.
B. Set up a weapon profile, select it and arm the GBU-38 JDAM
C. Designate the waypoint with the target coordinates entered earlier as the SPI (Sensor Point of Interest)
D. Perform the attack and launch the JDAM, which will home on the target by itself.

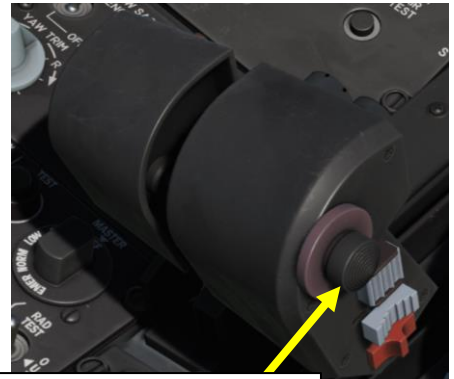
2.5 – GBU-38 JDAM (JTAC COORDINATES)

A: ENTER JTAC TARGET COORDINATES

1. Set required JTAC frequency (UHF 245.00 MHz).
2. Press “HOTAS MIC SWITCH DOWN” to communicate on UHF radio and select JTAC – Axeman11 (F4) in radio menu.
3. Select “CHECK-IN 15 MIN” (F1)
4. You will contact the JTAC and give him your altitude and ordnance available, plus your time available on station.
5. JTAC will answer “Type 3 in effect” and ask you when you are ready to receive a 9-line.
6. Select “READY TO COPY” (F1) to receive 9-line.
7. The JTAC will give you the 9-line and ask you when you are ready for remarks.
8. Select “READY TO COPY REMARKS” (F1)
9. JTAC will give you remarks.
10. Select “9-LINE READBACK” to repeat the information you have been given and confirm it with the JTAC.
11. JTAC will confirm your readback, send you a JTAC transmission and clear you to engage target.



1



2a

Microphone Switch
- *FWD: Transmits on VHF Radio 1 (AM)*
- *AFT: Transmits on VHF Radio 2 (FM)*
- *DOWN: Transmits on UHF Radio*

CB UHF
Main
F1. Wingman...
F2. Flight...
F3. Second Element...
F4. JTAC - Axeman11...
F5. ATC...
F8. Ground Crew...
F12. Exit

2b

CB UHF
2. Main. JTAC - Axeman11
F1. Check-in 15 min
F2. Check-in 30 min
F3. Check-in 45 min
F4. Check-in 60 min
F11. Previous Menu
F12. Exit

3

PLAYER: Axeman 1-1, this is Enfield 1-1, 1 x A-10
DQ1596 at 6000
I have: GBU-38, GBU-31, 1150 x gun
Time on station is 0 + 15
Available for tasking. What do you have for us?

4

5 JTAC (Axeman11): Enfield 1-1, this is Axeman 1-1, type 3 in effect. Advise when ready for 9-line

CB UHF
Axeman11. JTAC. Ready for 9-line
F1. Ready to copy
F2. Check out
F11. Parent Menu
F12. Exit

6

PLAYER: ready to copy
JTAC (Axeman11): line is as follows
1, 2, 3 N/A
[4. Elevation:]23 feet MSL
[5. Target:]truck
[6. Coordinates:]DQ083998
[7.]No mark, 0
[8. Friendlies:]southeast 800
[9.]Egress west

7a

7b JTAC (Axeman11): advise when ready for remarks and further talk-on

CB UHF
Axeman11. JTAC. Ready for remarks
F1. Ready to copy remarks
F2. Check out
F11. Parent Menu
F12. Exit

8

9 PLAYER: ready to copy remarks
JTAC (Axeman11):
use GBU-38

CB UHF
Axeman11. JTAC. 9-line readback
F1. 9-line readback
F2. Check out
F11. Parent Menu
F12. Exit

10a

10b PLAYER: 23, DQ083998
JTAC (Axeman11): readback correct

JTAC (Axeman11): Enfield 1-1, standby data
JTAC (Axeman11): Enfield 1-1, CLEARED TO ENGAGE

11

2.5 – GBU-38 JDAM (JTAC COORDINATES)

What is a CAS (Close Air Support) 9-line and why is it important? The goal of a 9-line is to provide you as much information as concisely as possible.

9-line

Line 1: IP/BP – Initial Point/Battle Position (N/A in our case)
Line 2: Heading from the IP to the Target (N/A in our case)
Line 3: Distance from the IP/BP to target (N/A in our case)
Line 4: Target elevation – 23 feet above Mean Sea Level (MSL)
Line 5: Target description: Truck.
Line 6: Target location: Grid coordinates of target (UTM coordinates DQ083998)
Line 7: Target Mark Type: No Mark
Line 8: Location of Friendlies: JTAC located 800 meters Southeast of Target
Line 9: Egress semi-cardinal direction when departing from target: West

PLAYER: ready to copy
JTAC (Axeman11): line is as follows
1, 2, 3 N/A
[4. Elevation:]23 feet MSL
[5. Target:]truck
[6. Coordinates:]DQ083998
[7.]No mark, 0
[8. Friendlies:]southeast 800
[9.]Egress west

Remarks

Remarks generally include information about troops in contact or danger close, SEAD support in effect, hazards, weather or other threats. In our case, the JTAC wants us to use GBU-38 JDAMs.

PLAYER: ready to copy remarks
JTAC (Axeman11):
use GBU-38

JTAC TASKING:

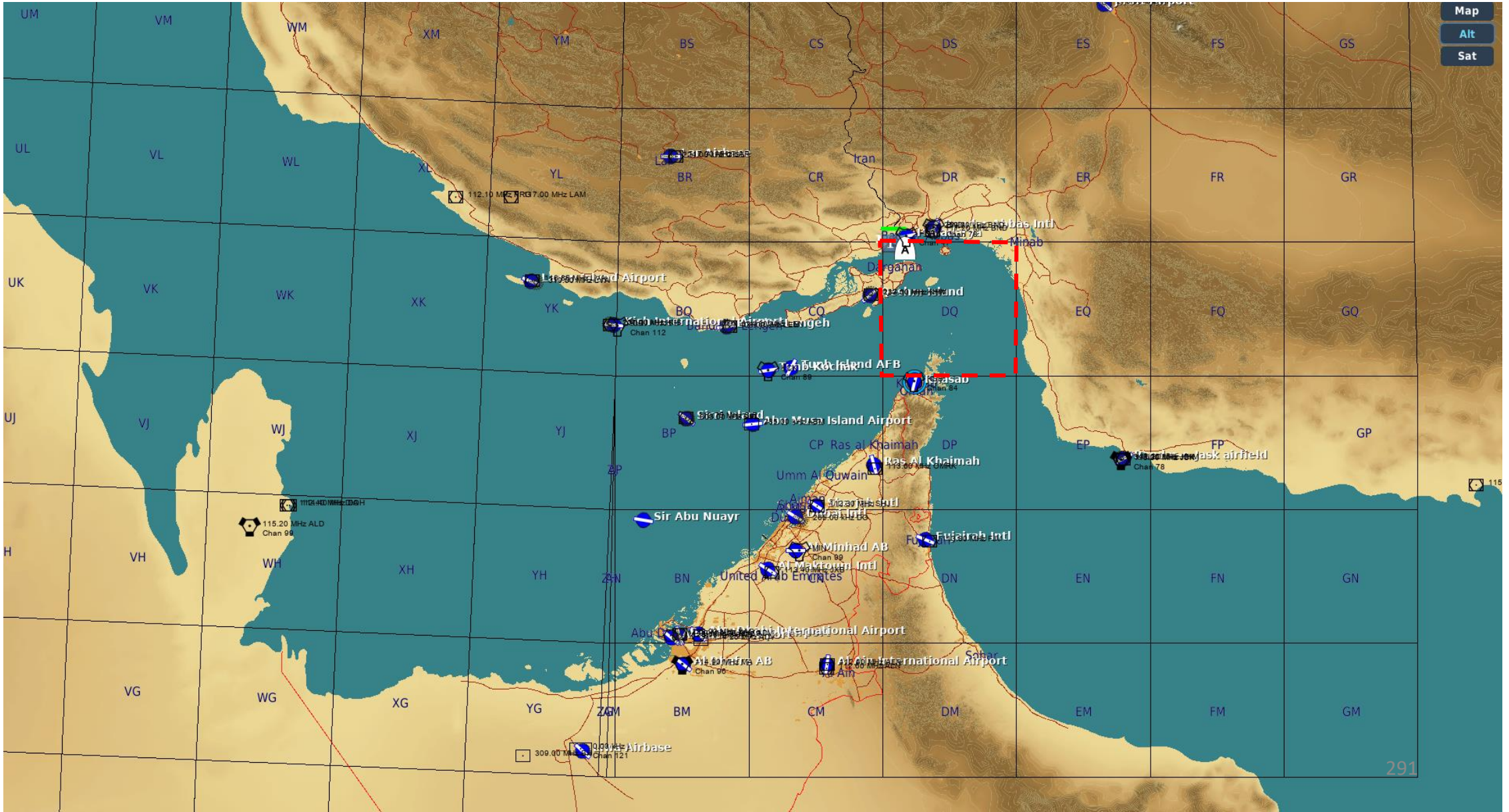
When the JTAC mentions “Standby Data”, a **NEW TASKING** transmission is sent to the MSG (Message) page.

- Click on the OSB next to **MSG** to access the Message page.
- Click on the OSB next to **ACK** (Acknowledge) to clear the caution.

JTAC (Axeman11): Enfield 1-1, standby data
JTAC (Axeman11): Enfield 1-1, CLEARED TO ENGAGE

2.5 – GBU-38 JDAM (JTAC COORDINATES)

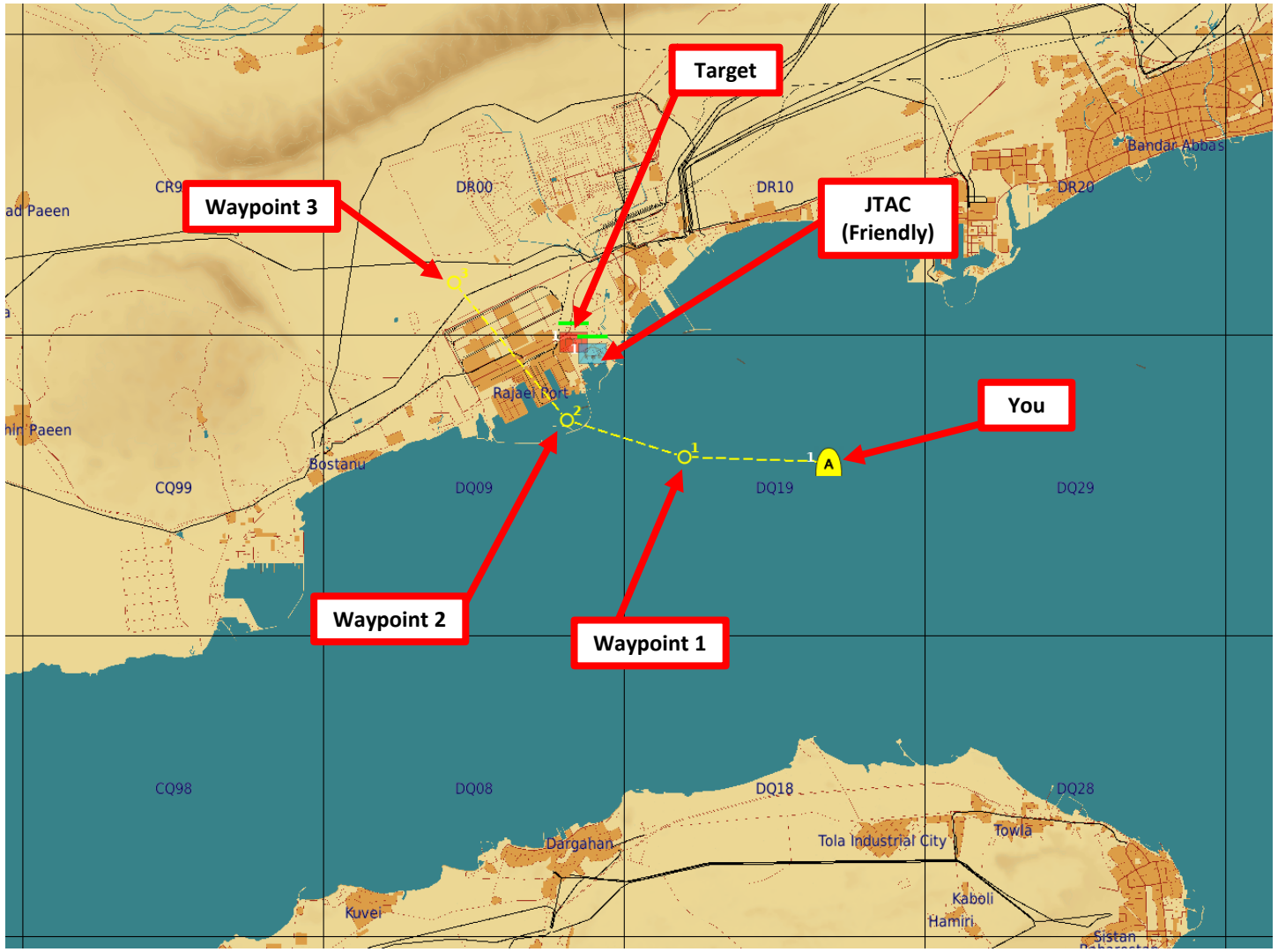
The target coordinates given to us by the JTAC, which are given in “UTM” (Universal Transverse Mercator) format.



2.5 – GBU-38 JDAM (JTAC COORDINATES)

We have currently 3 existing waypoints. We will create a 4th waypoint with the target in "UTM" (Universal Transverse Mercator) format. The UTM coordinates of the target are **DQ083998**.

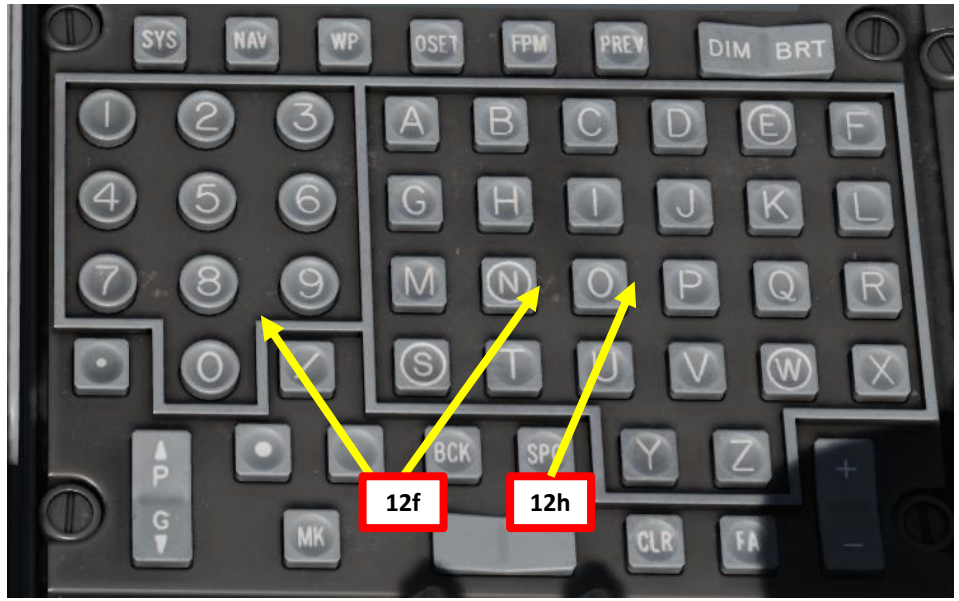
PLAYER: 23, DQ083998
JTAC (Axeman11): readback correct

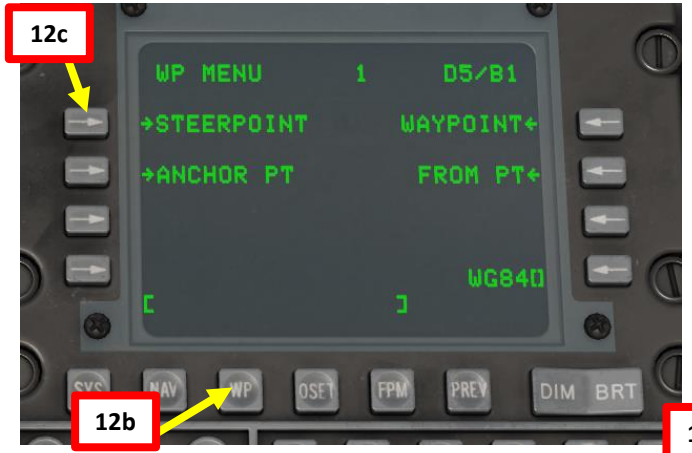


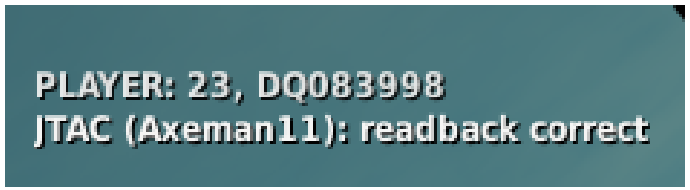
2.5 – GBU-38 JDAM (JTAC COORDINATES)

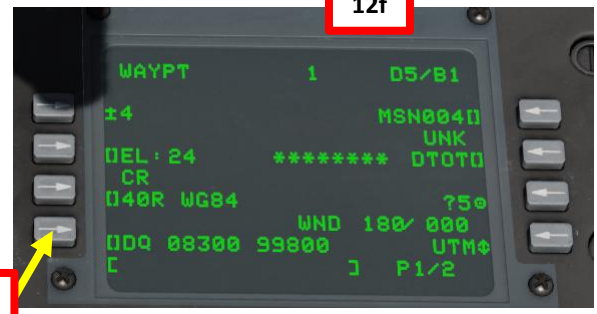
A: ENTER JTAC TARGET COORDINATES

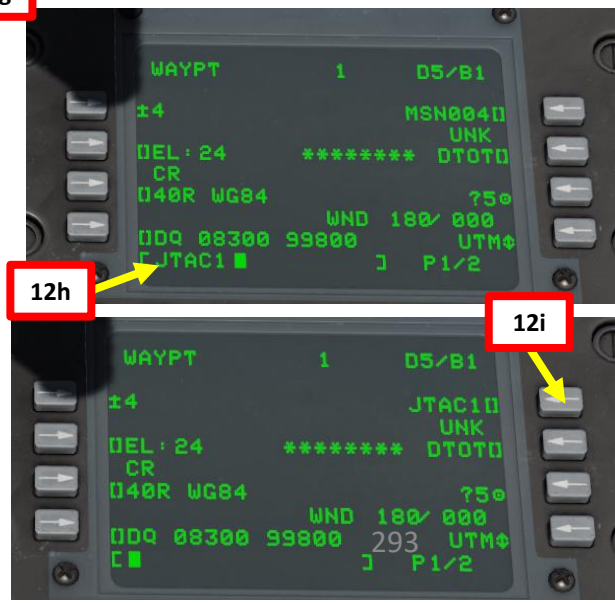
12. Enter target coordinates in CDU (Control Display Unit)
    a) Set STEER PT selector to MISSION and PAGE selector to OTHER
    b) Select WP (Waypoint) FSK (Function Select Key)
    c) Select LSK (Line Select Key) next to STEERPOINT
    d) Select LSK next to ?4 to create Waypoint 4.
    e) Select LSK next to L/L to toggle the coordinate format to UTM
    f) On CDU keypad, enter target coordinates given by the JTAC: "**DQ083998**".
    g) Select LSK next to DQ coordinates to modify Waypoint 4 coordinates with the ones you just entered.
    h) On CDU keypad, enter name of the waypoint (we will call it "JTAC1").
    i) Select LSK next to MSN004 to rename Waypoint 4.
    j) And that's it! Waypoint 4 is now created with the coordinates provided by the JTAC.







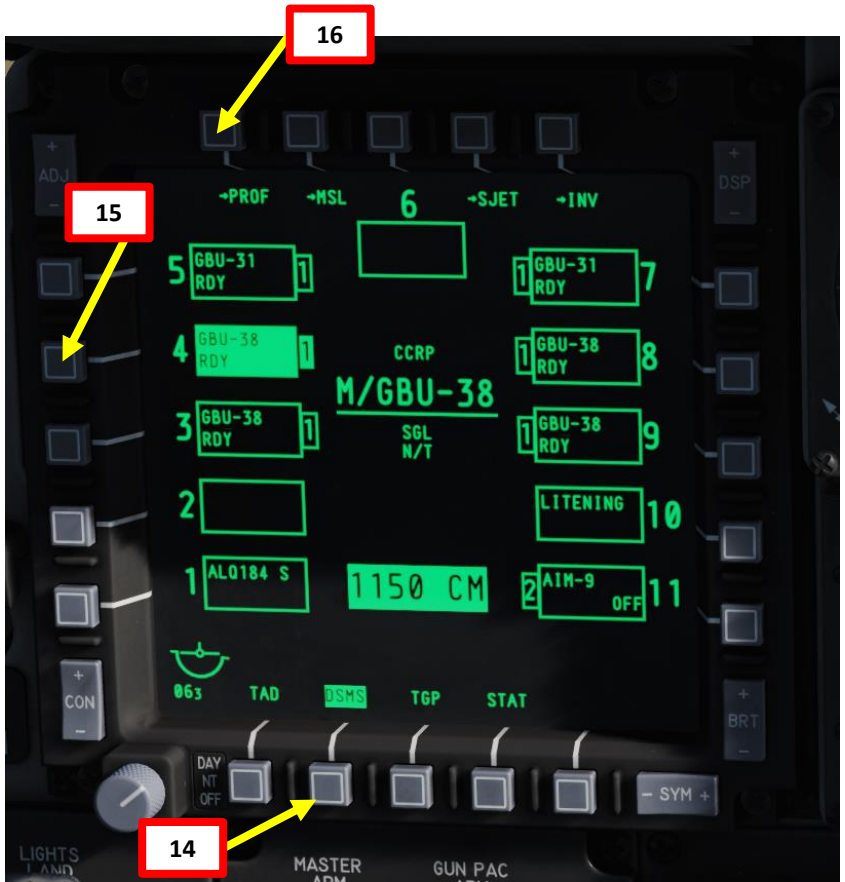


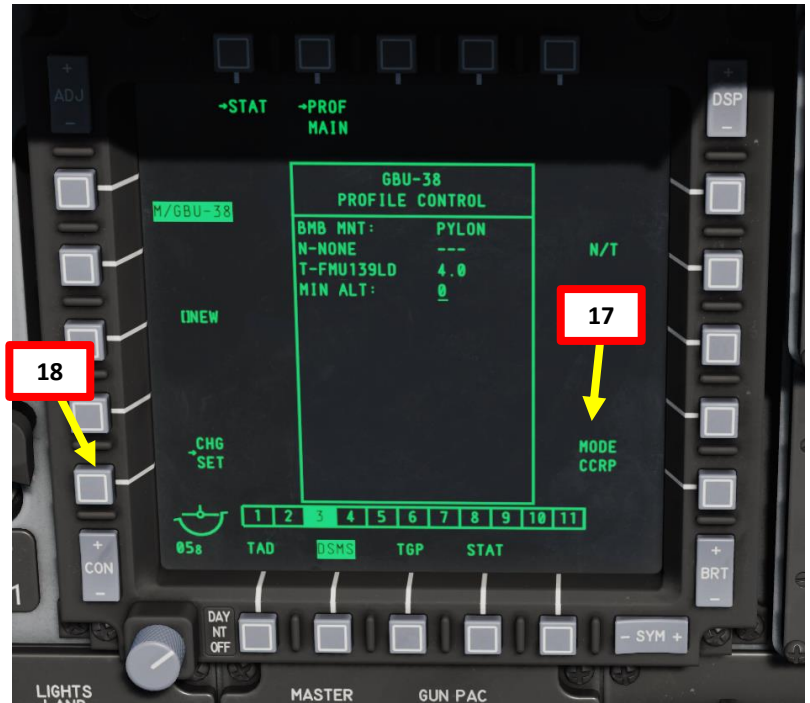


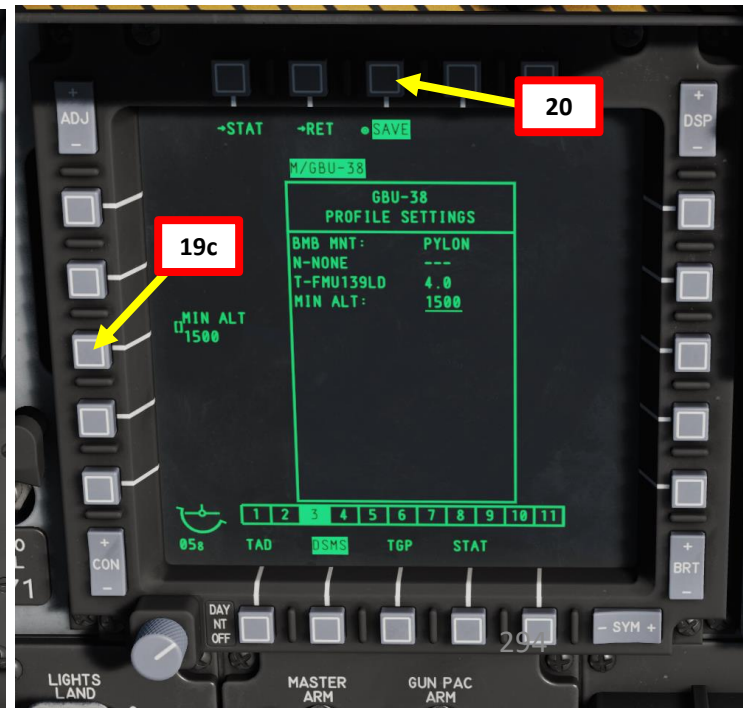
2.5 – GBU-38 JDAM (JTAC COORDINATES)

B: SET WEAPON PROFILE, SELECT PROFILE & SELECT WEAPON

13. Set Master Arm Switch ON (UP)
14. Select DSMS (Digital Stores Management System) page
15. Select GBU-38 Bomb (green when selected)
16. Select PROF (Weapon Profile) menu
17. CCRP (Continuously Computed Release Point) Mode is the only selectable mode
18. Select the OSB next to CHG SET (Change Settings) to modify bomb settings.
19. OPTIONAL: If you want to see Minimum Release Altitude cues on the Heads-Up Display, enter Minimum Altitude on the UFC scratchpad, then press on the OSB next to MIN ALT.
20. Press on the OSB next to SAVE to save Weapon Profile.



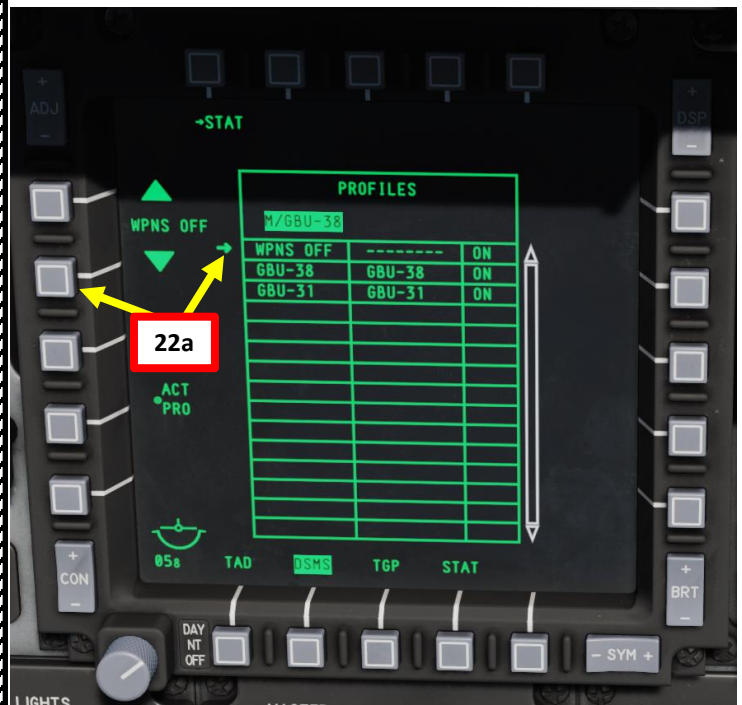


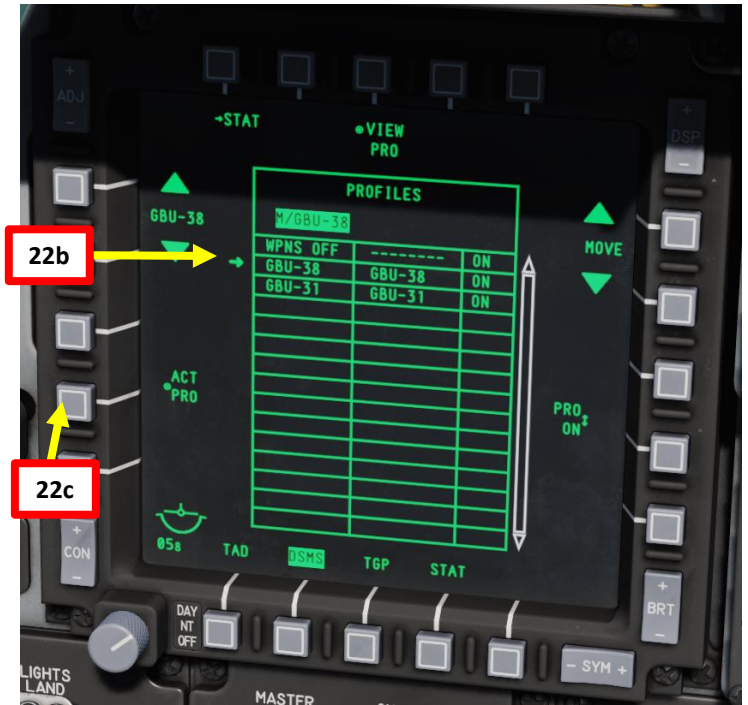


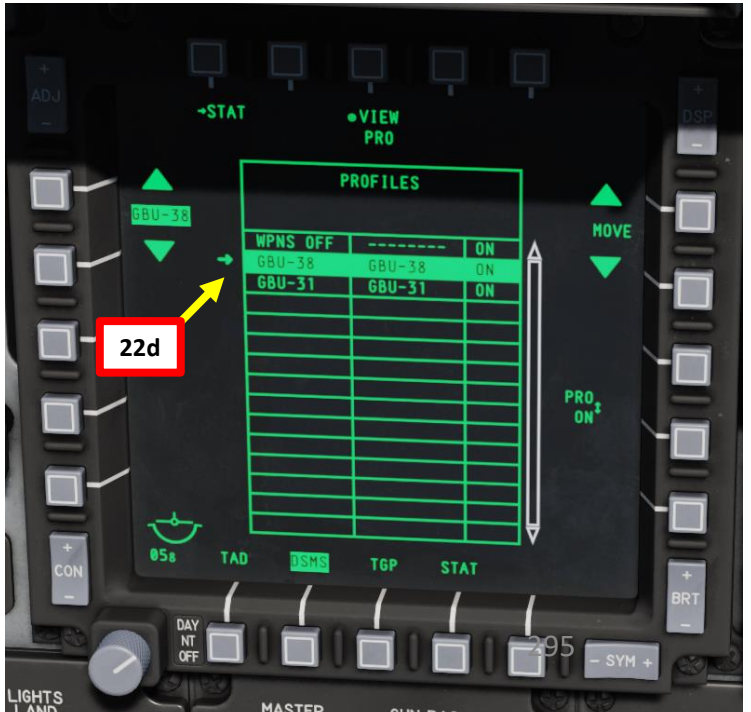
2.5 – GBU-38 JDAM (JTAC COORDINATES)

B: SET WEAPON PROFILE, SELECT PROFILE & SELECT WEAPON

21. Once weapon profile is saved, the DSMS page will showcase all different weapon profiles available.
22. Select GBU-38 profile by pressing the Option Select Button Selectors, then press on the OSB next to ACT PRO (Active Profile).
    - While HUD is SOI (Coolie Hat Switch UP), cycle between profiles and stations using the DMS (Data Management Switch) left or right.
23. The GBU-38 Profile will be displayed on the Heads-Up Display.



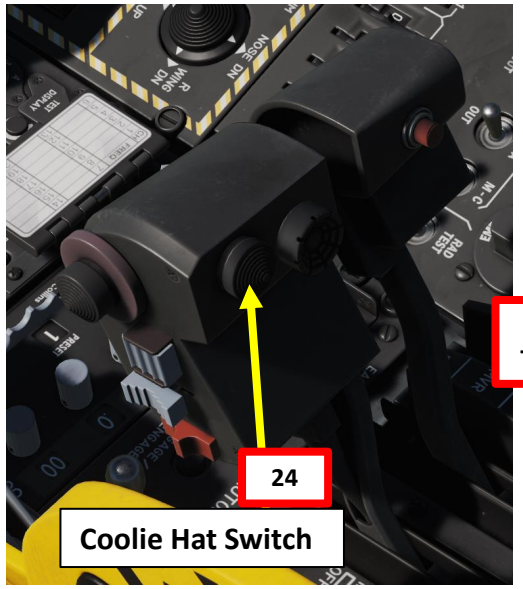




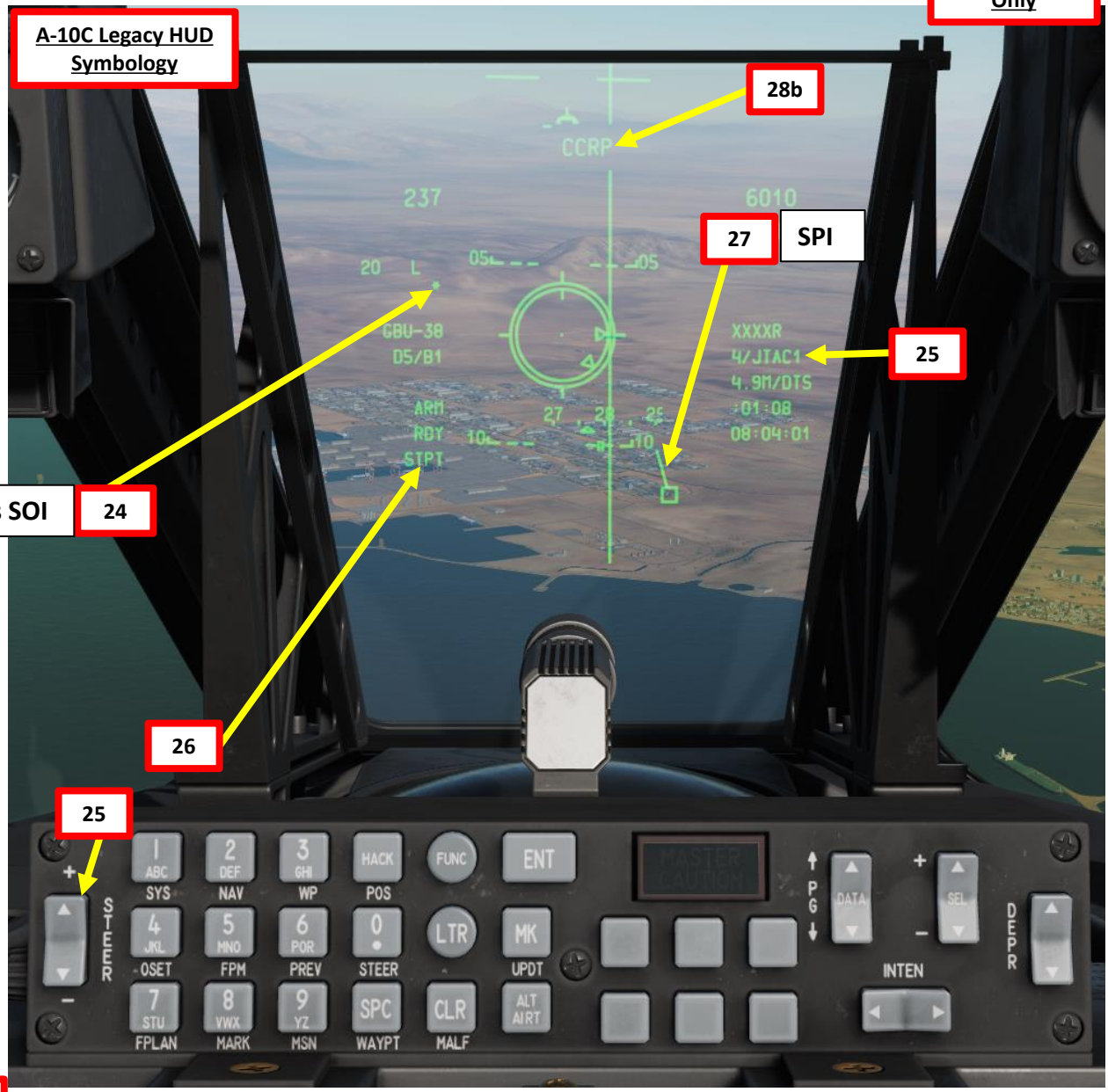
2.5 – GBU-38 JDAM (JTAC COORDINATES) (A-10C LEGACY SYMBOLOGY)

C: SELECT TARGET WAYPOINT & SET IT AS SPI (SENSOR POINT OF INTEREST)

24. Press Coolie Hat Switch UP to set Heads-Up Display as the SOI (Sensor of Interest)
25. Select Waypoint 4/JTAC1 using the STEER rocker switch or the DMS (Data Management Switch) UP/DOWN.
26. If STPT is not the SPI (Sensor Point of Interest), press the TMS (Target Management System) Switch AFT LONG to set the current selected steerpoint (4/JTAC1) as the SPI.
27. With Steerpoint 4/JTAC1 set as the Sensor Point of Interest, we can now perform the JDAM strike
28. Press the Master Mode button until the CCRP HUD Mode is selected.



A-10C Legacy Only

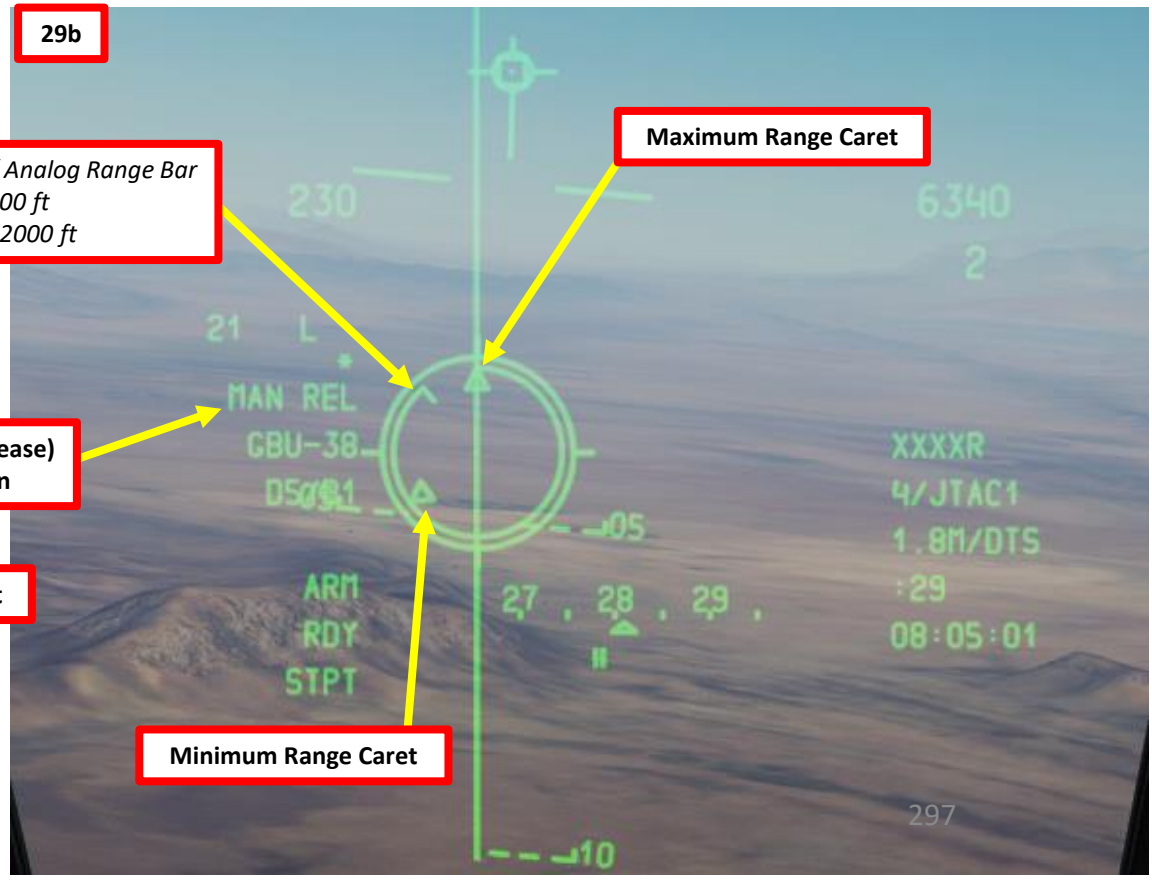


2.5 – GBU-38 JDAM (JTAC COORDINATES) (A-10C LEGACY SYMBOLOGY)

D: PERFORM ATTACK

29. From an altitude of at least 5000 ft (optimal between 10000 and 15000 ft), fly level and maneuver the aircraft to align the middle of the CCRP reticle with the ASL.
30. When you are at the Maximum Range, the Release Cue will move from the 12 o'clock position of the CCRP Reticle counter clockwise.
31. When the Release Cue is between the Maximum Range Caret and the Minimum Range Caret, MAN REL will appear in the In Range Indication field.
32. Press and hold down the Weapon Release button (RALT+SPACE) until JDAM is released.
33. The JDAM will home on the target coordinates by itself, guided by its own embedded GPS.

A-10C Legacy Only



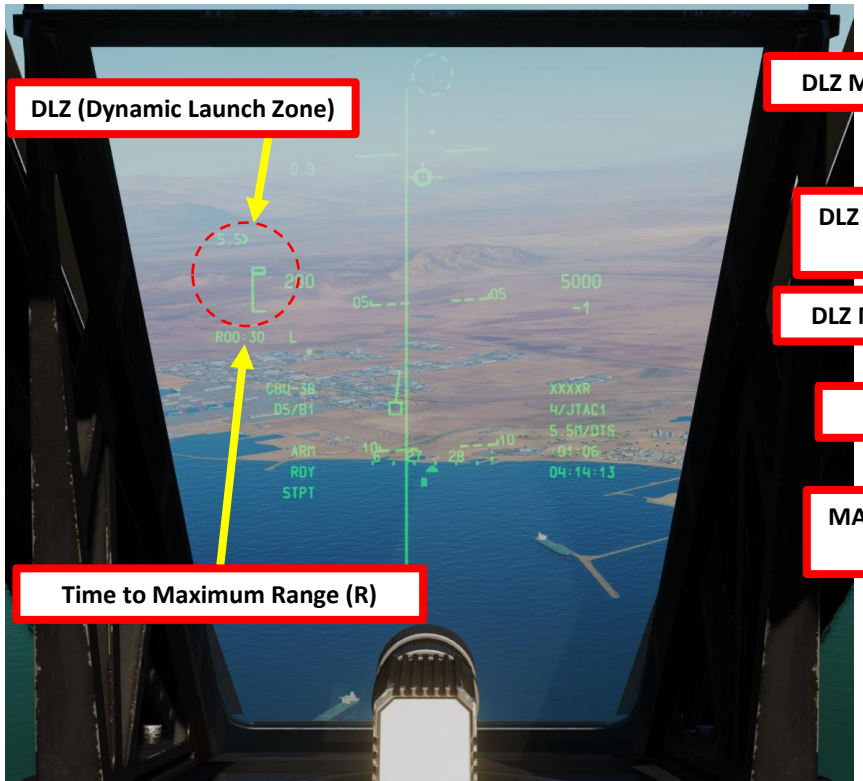
2.5 – GBU-38 JDAM (JTAC COORDINATES)

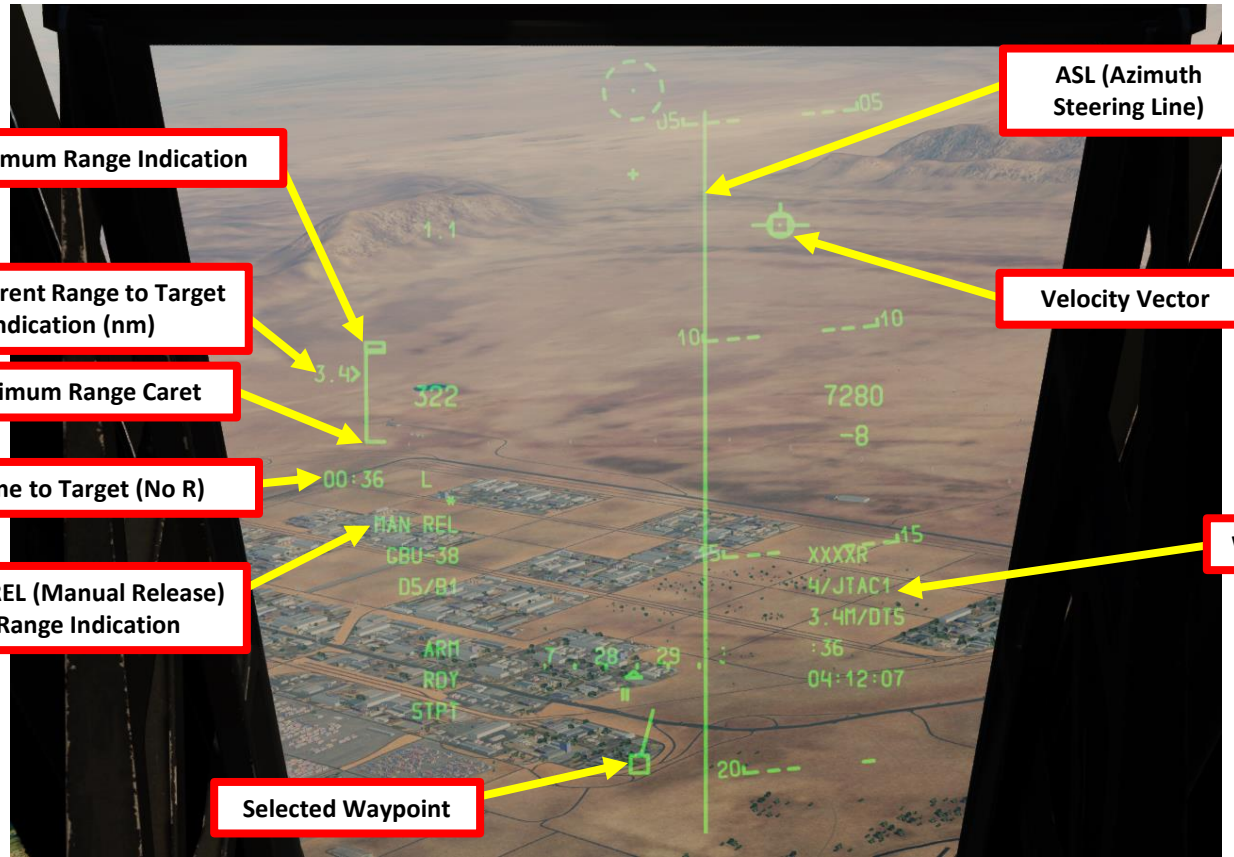
(A-10C II TANK KILLER SYMBOLOGY)

D: PERFORM ATTACK

29. From an altitude of at least 5000 ft (optimal between 10000 and 15000 ft), fly level and maneuver the aircraft to align the velocity vector with the ASL.
30. The DLZ (Dynamic Launch Zone) current range and caret indication will move down from above the DLZ.
31. Once the current range caret is between the maximum and minimum range indication on the DLZ, the weapon may be released. MAN REL will appear in the In Range Indication field.
32. Press and hold down the Weapon Release button (RALT+SPACE) until JDAM is released.
33. The JDAM will home on the target coordinates by itself, guided by its own embedded GPS.

A-10C II Tank Killer Expansion Only



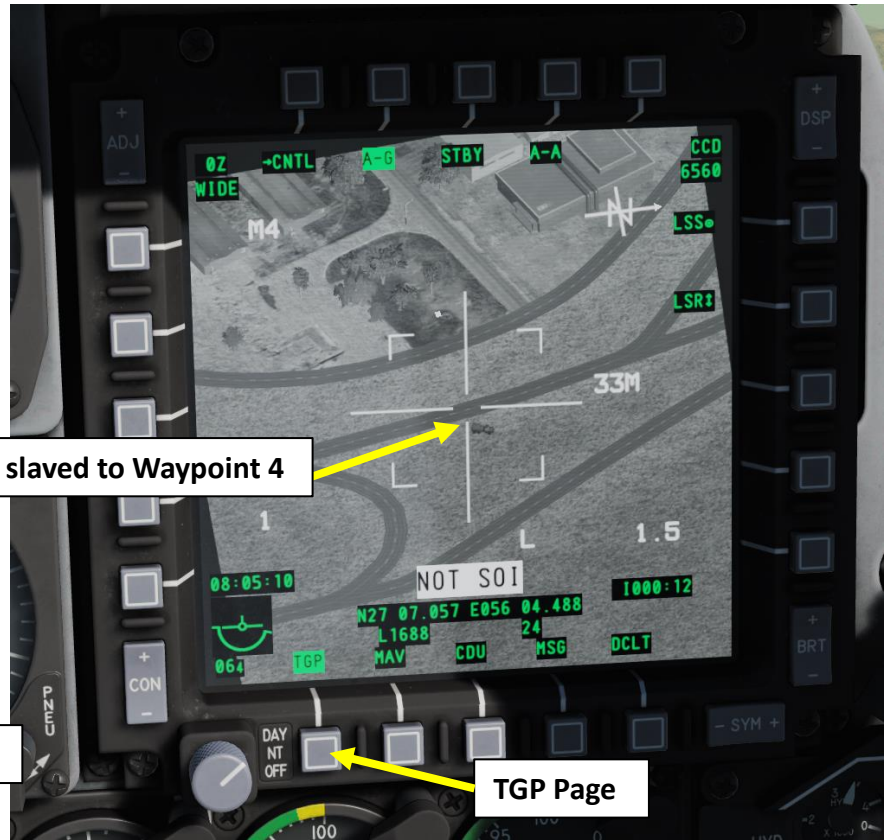


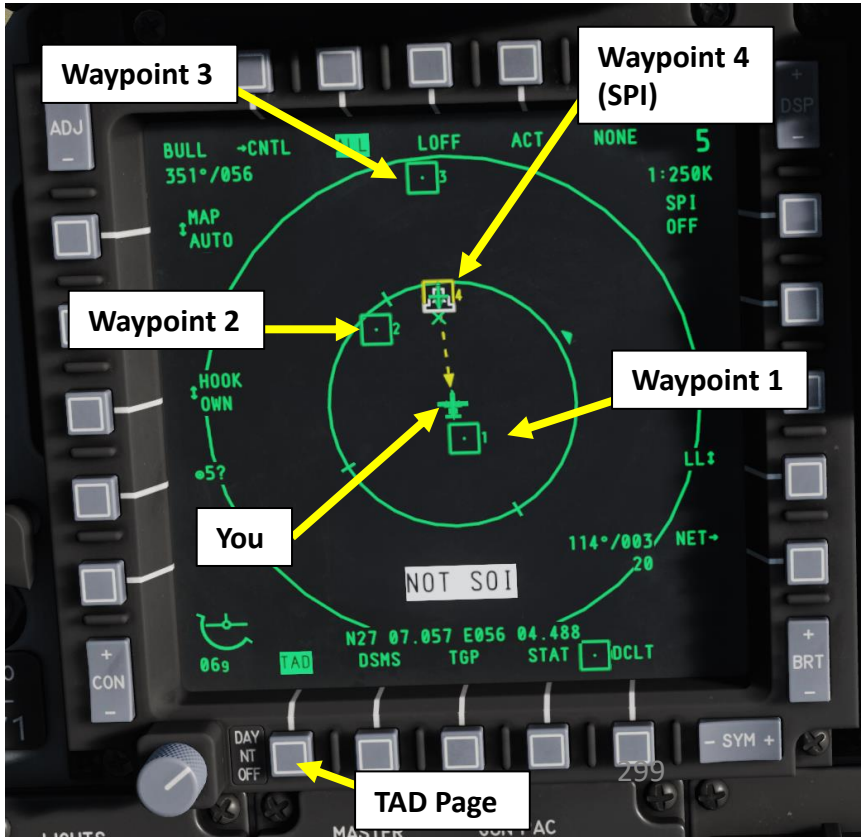
2.5 – GBU-38 JDAM (JTAC COORDINATES)

NOTE:

Launching a JDAM at blind coordinates is not recommended; you should always make sure to have a visual look at the target before you decide to bomb it back to the stone age.

Before performing the attack run, press the **China Hat Switch FWD LONG to slave all sensors to the SPI** (Sensor Point of Interest), which is the Steerpoint 4/JTAC1. The targeting pod will be slaved to the steerpoint (allowing you to give the target a proper look) and the TAD (Tactical Awareness Display) will display where the target point is in relationship to other waypoints.





2.6 – GBU-38 JDAM (TARGETING POD)

The JDAM can home on a target designated by a targeting pod. Here is a great video by Bunyap showcasing this functionality: https://youtu.be/aaFdAbODqzQ

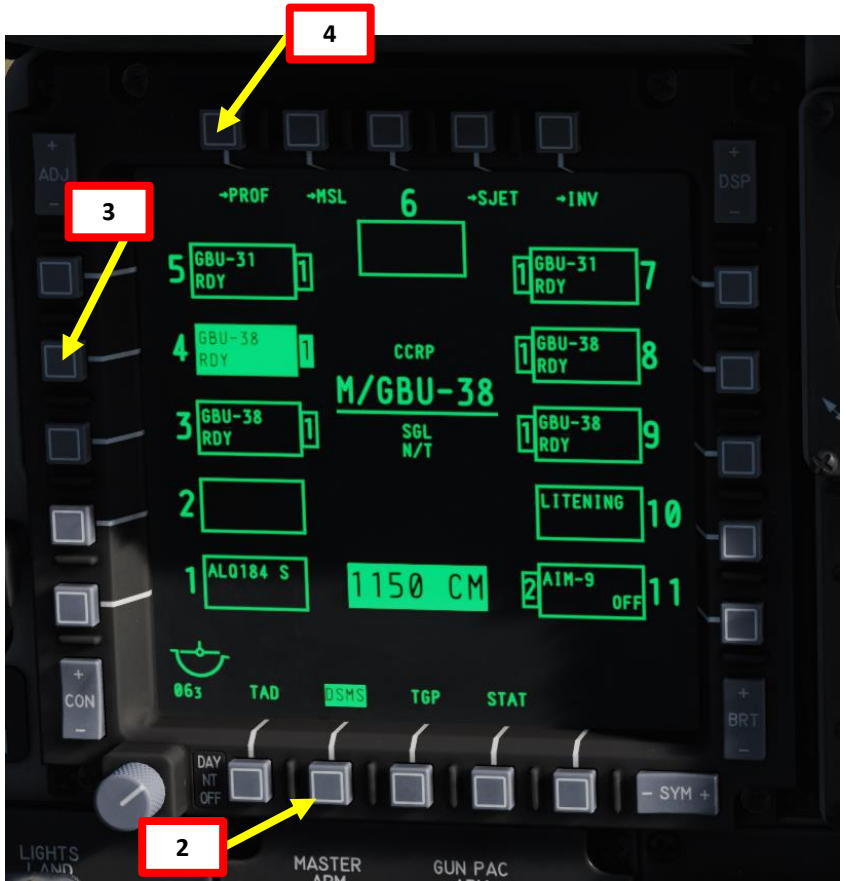
Here is the best method to use this:

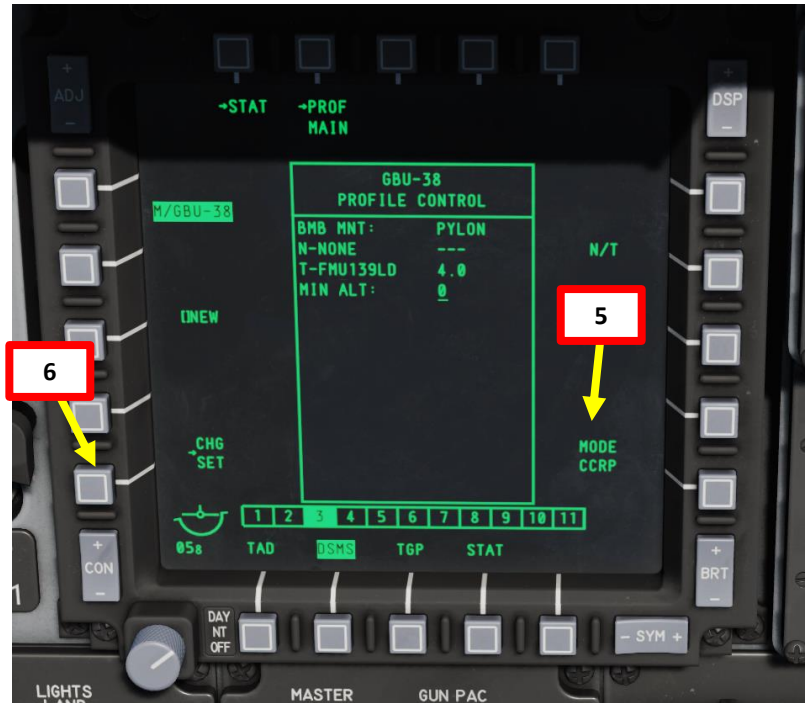
A. Set up a weapon profile, select it and arm the GBU-38 JDAM.
B. Designate the target with the targeting pod and use the ranging laser to get an accurate range. Then, create markpoint.
C. Set markpoint as the SPI (Sensor Point of Interest).
D. Perform the attack and launch the JDAM, which will home on the target designated by the targeting pod.

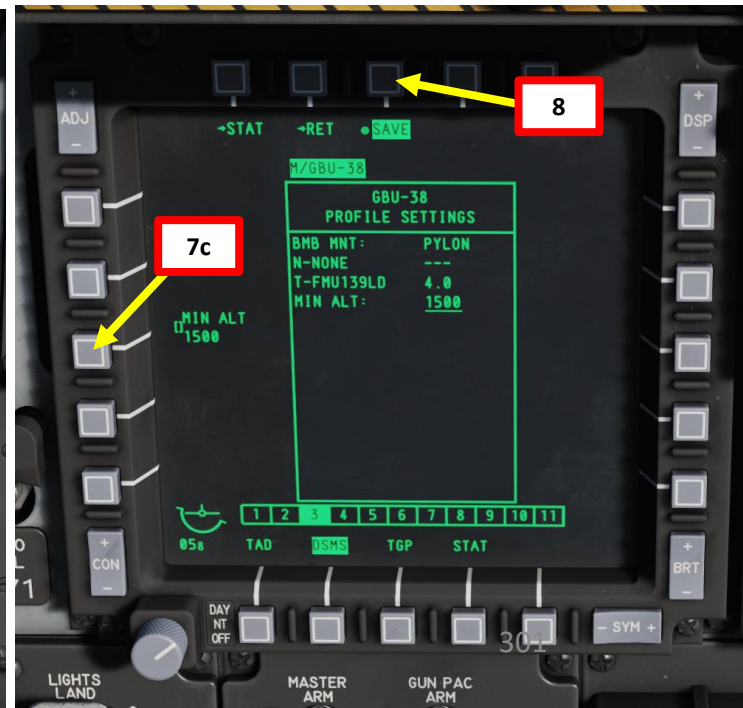
2.6 – GBU-38 JDAM (TARGETING POD)

A: SET WEAPON PROFILE, SELECT PROFILE & SELECT WEAPON

1. Set Master Arm Switch ON (UP)
2. Select DSMS (Digital Stores Management System) page
3. Select GBU-38 Bomb (green when selected)
4. Select PROF (Weapon Profile) menu
5. CCRP (Continuously Computed Release Point) Mode is the only selectable mode
6. Select the OSB next to CHG SET (Change Settings) to modify bomb settings.
7. OPTIONAL: If you want to see Minimum Release Altitude cues on the Heads-Up Display, enter Minimum Altitude on the UFC scratchpad, then press on the OSB next to MIN ALT.
8. Press on the OSB next to SAVE to save Weapon Profile.



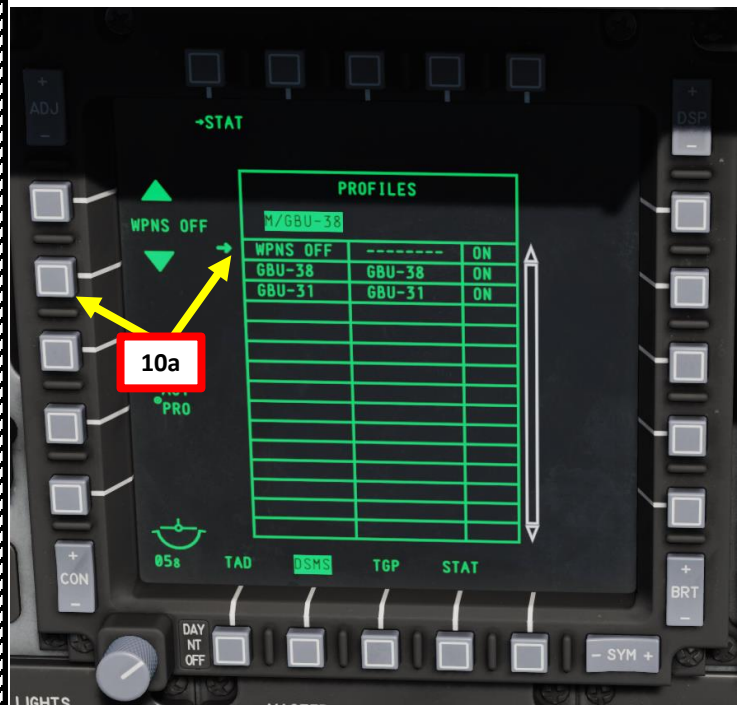


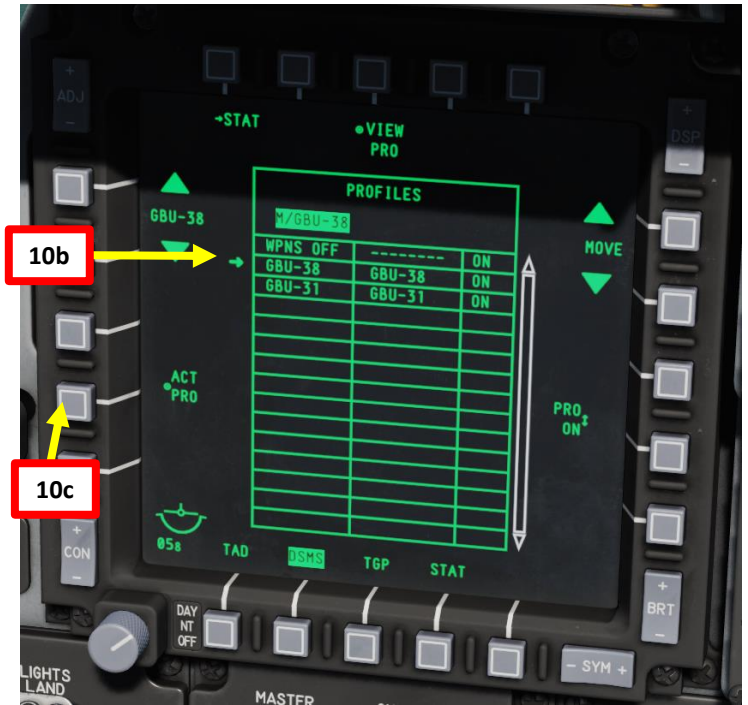


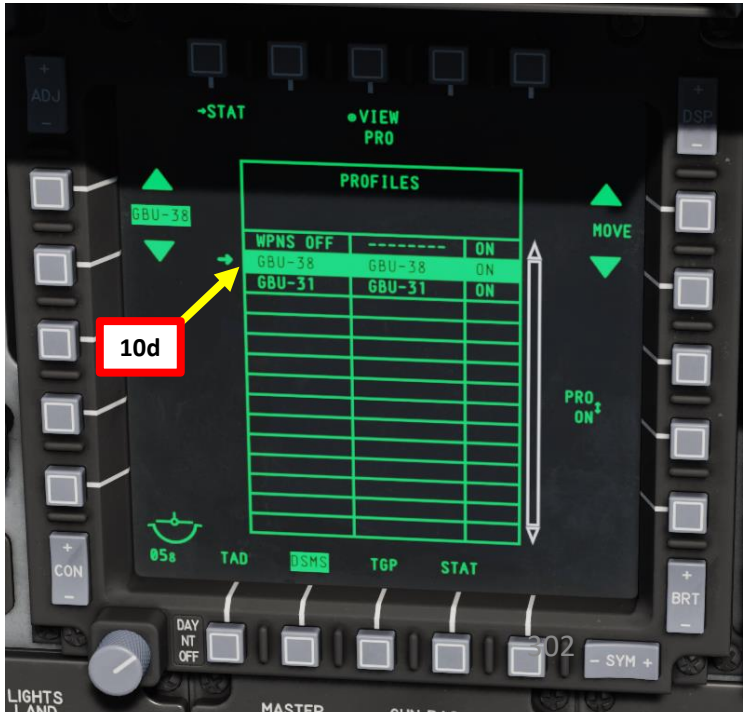
2.6 – GBU-38 JDAM (TARGETING POD)

A: SET WEAPON PROFILE, SELECT PROFILE & SELECT WEAPON

9. Once weapon profile is saved, the DSMS page will showcase all different weapon profiles available.
10. Select GBU-38 profile by pressing the Option Select Button Selectors, then press on the OSB next to ACT PRO (Active Profile).
    - While HUD is SOI (Coolie Hat Switch UP), cycle between profiles and stations using the DMS (Data Management Switch) left or right.
11. The GBU-38 Profile will be displayed on the Heads-Up Display.



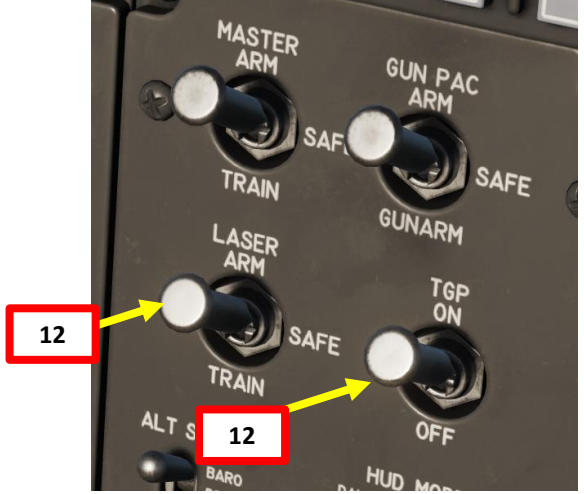


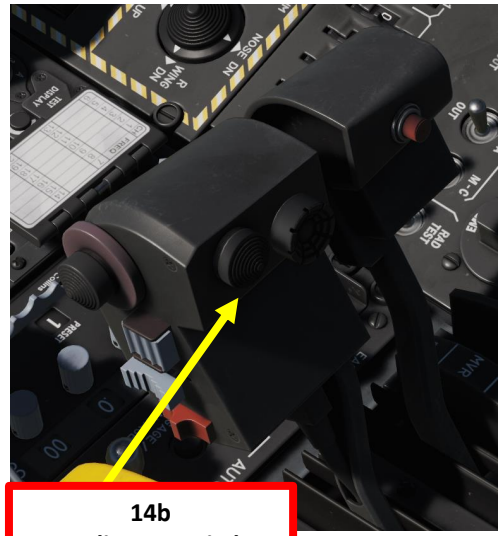


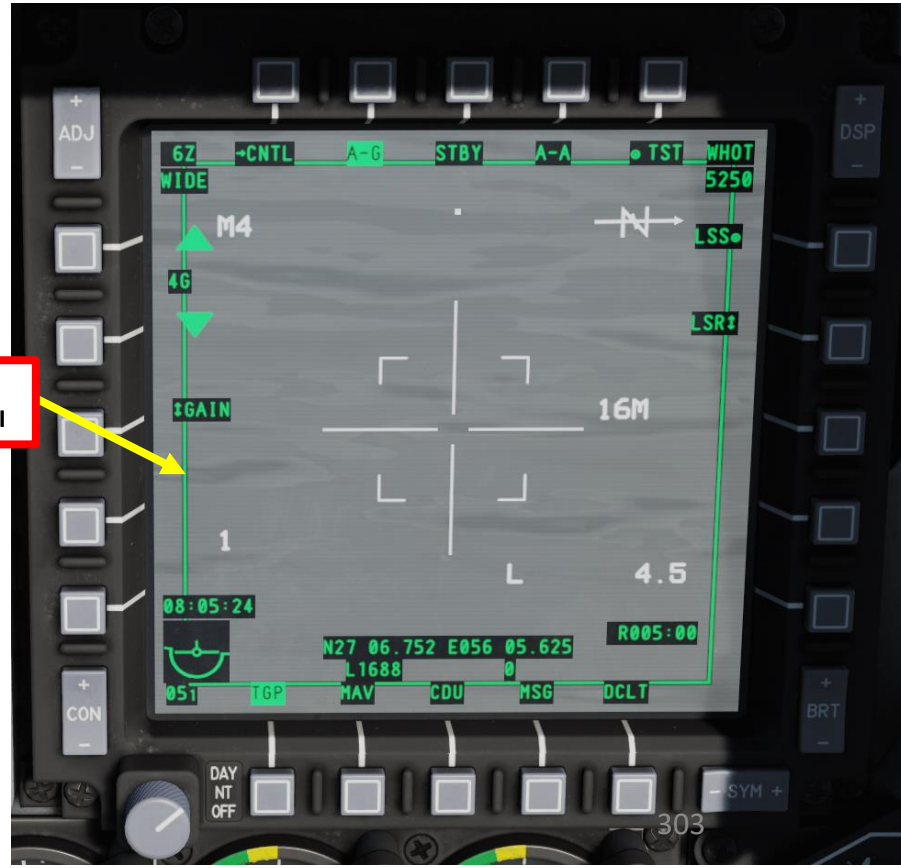
2.6 – GBU-38 JDAM (TARGETING POD)

B: DESIGNATE TARGET WITH TARGETING POD & CREATE MARKPOINT

12. On AHCP (Armament HUD Control Panel), set TGP switch ON (UP) to power up the targeting pod. Set the LASER ARM switch to ARM (ON) as well.
13. Press the OSB (Option Select Button) next to TGP (Targeting Pod) to display the TGP Feed Page. Then, select the A-G (Air-to-Ground) Mode.
14. Press the Coolie Hat Switch LONG in the direction of the MFCD that displays your TGP feed (RIGHT since we have the TGP page on the right MFCD). This will set the TGP as the SOI (Sensor of Interest).



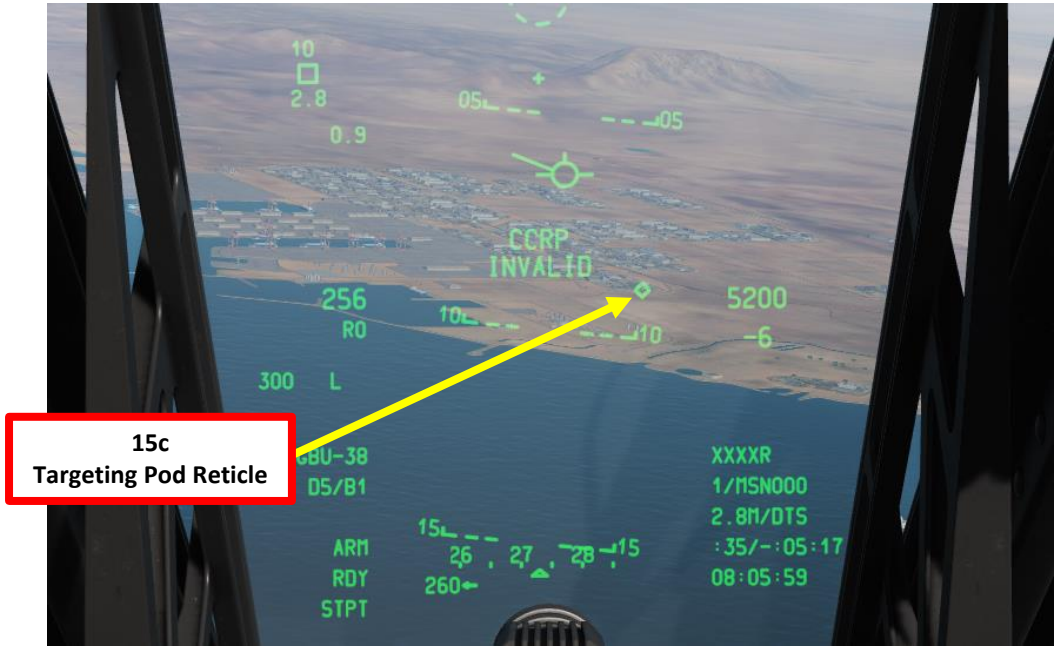


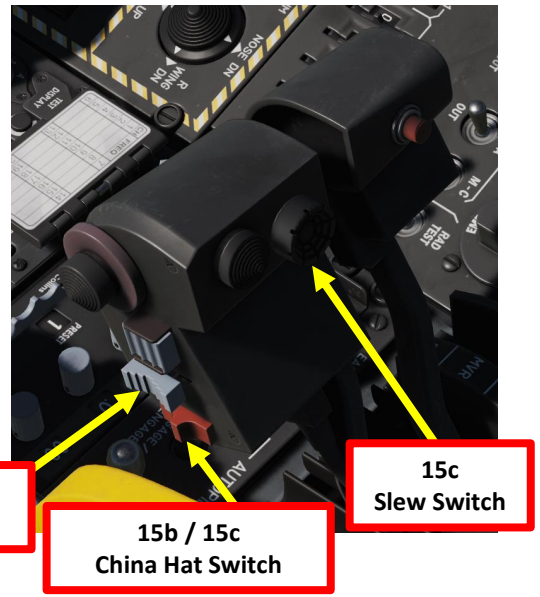


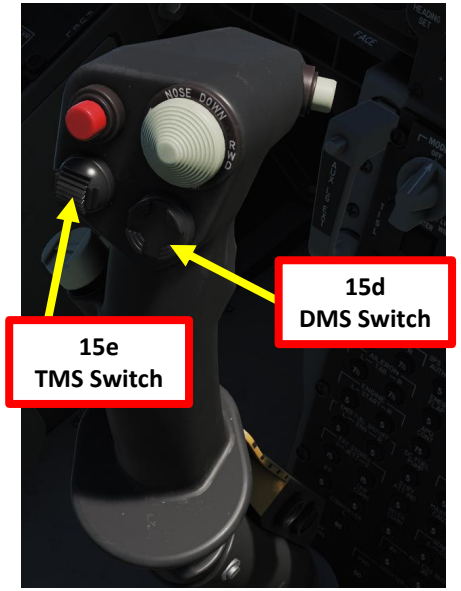
2.6 – GBU-38 JDAM (TARGETING POD)

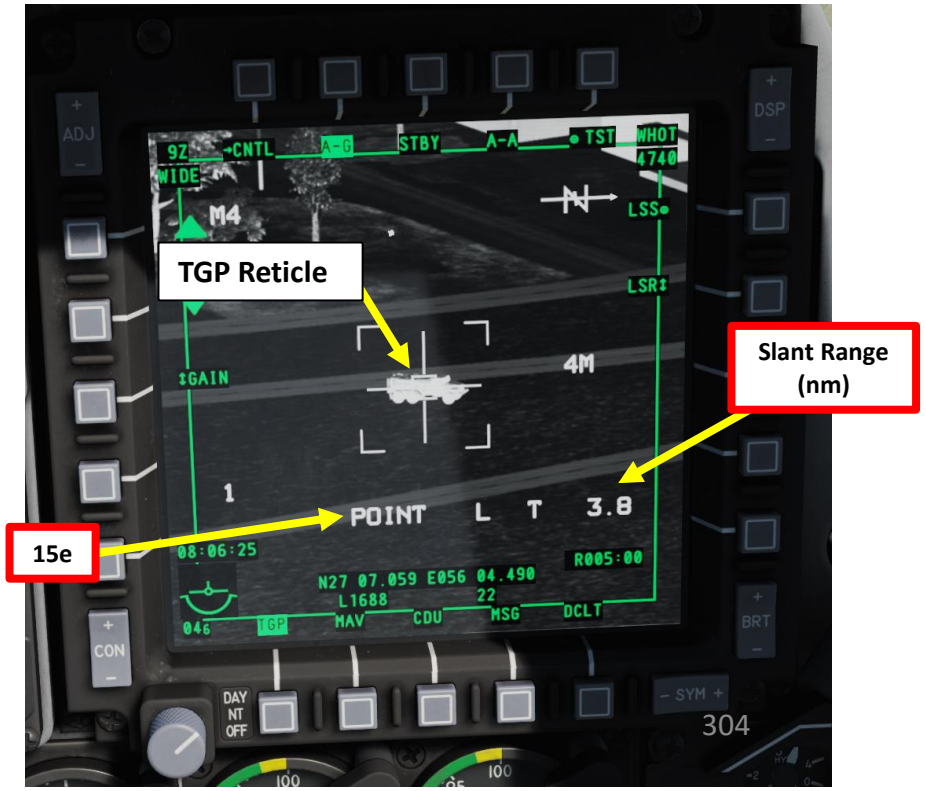
B: DESIGNATE TARGET WITH TARGETING POD & CREATE MARKPOINT

15. Designate target with the Targeting Pod
    a) Select desired Video Mode with the Boat Switch
        - FWD: FLIR BHOT (Forward-Looking Infrared Black Hot)
        - MIDDLE: CCD (Charge Coupled Device/TV)
        - AFT: FLIR WHOT (Forward-Looking Infrared White Hot)
    b) Select Field-of-View Mode with the China Hat Switch
        - FWD SHORT toggles between WIDE and NARROW
    c) Use the Slew Control Switch UP/DOWN/LEFT/RIGHT to set the TGP reticle on the target.
        - Note: If you want to reset the TGP in front of you (boresight):
            - **A-10C LEGACY**: Press the China Hat Switch AFT SHORT
            - **A-10C II TANK KILLER EXPANSION**: In the TGP page, press the OSB next to B-S (Boresight Function)
    d) Press on the DMS (Data Management Switch) FWD/AFT SHORT to adjust Zoom Level.
    e) Press the TMS (Target Management System) switch FWD SHORT to track the target. This will toggle tracking modes between AREA TRACK (static target) and POINT TRACK (moving target).





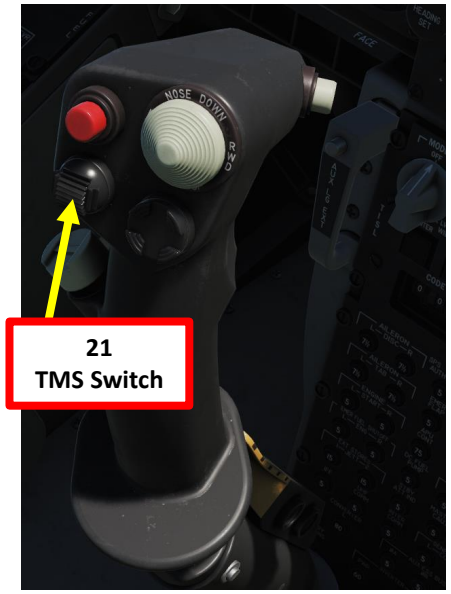


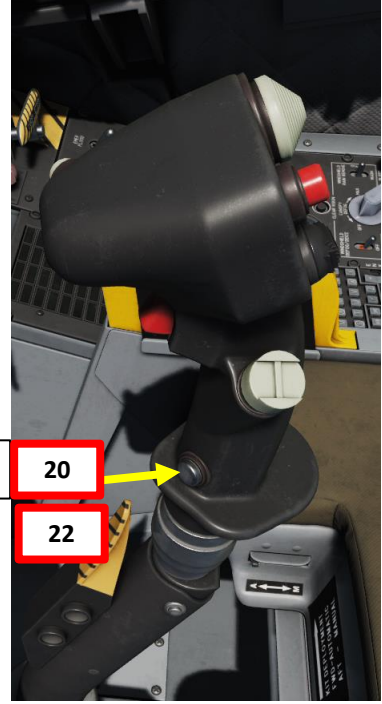


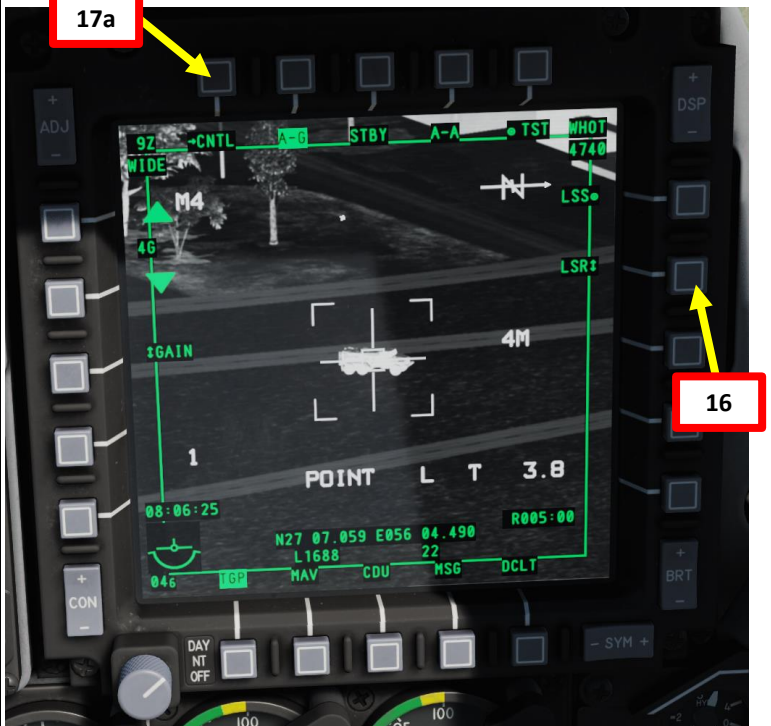
2.6 – GBU-38 JDAM (TARGETING POD)

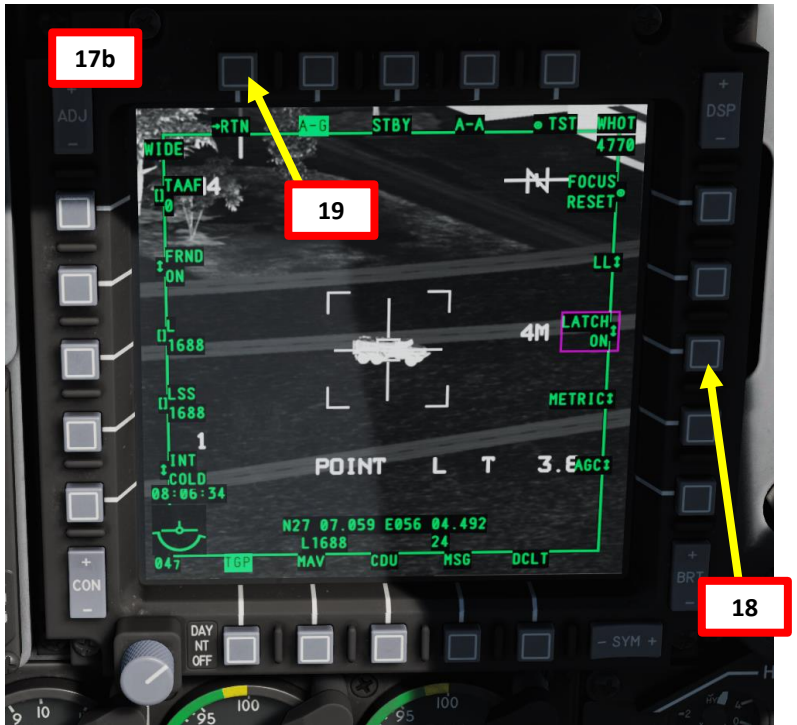
B: DESIGNATE TARGET WITH TARGETING POD & CREATE MARKPOINT

16. Select desired Laser Designator Mode (LSR) with OSB.
17. Press the OSB next to CNTL to enter the TGP AG Control Page.
18. Select desired LATCH mode with OSB (LATCH ON means the laser is latched once fired by pressing the Nosewheel Steering Button). We will choose LATCH OFF.
19. Press OSB next to RTN (Return) to go back to Main TGP page.
20. Press the Nosewheel Steering Button ("Insert" binding) to fire laser.
21. While laser is firing, press TMS (Target Management System) RIGHT SHORT to create a markpoint based on the target position identified by the reticle and the range computed by laser ranging.
22. Press the Nosewheel Steering Button ("Insert" binding) to stop firing laser.





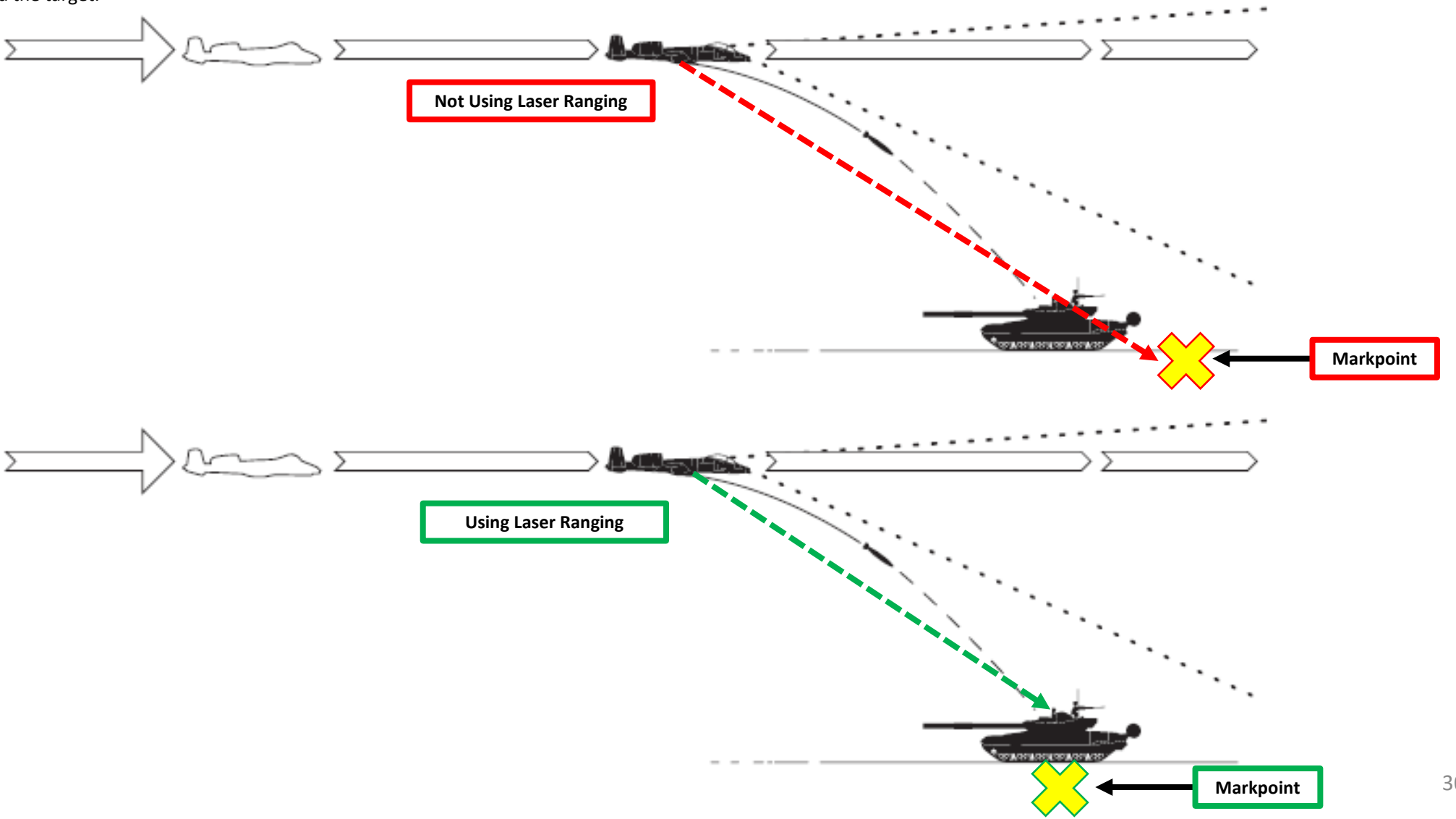




2.6 – GBU-38 JDAM (TARGETING POD)

B: DESIGNATE TARGET WITH TARGETING POD & CREATE MARKPOINT

Note: the reason why we use laser ranging WHILE designating the markpoint is that failing to do so will create a markpoint behind the target since the TGP reticle will point on the ground spot behind the target.

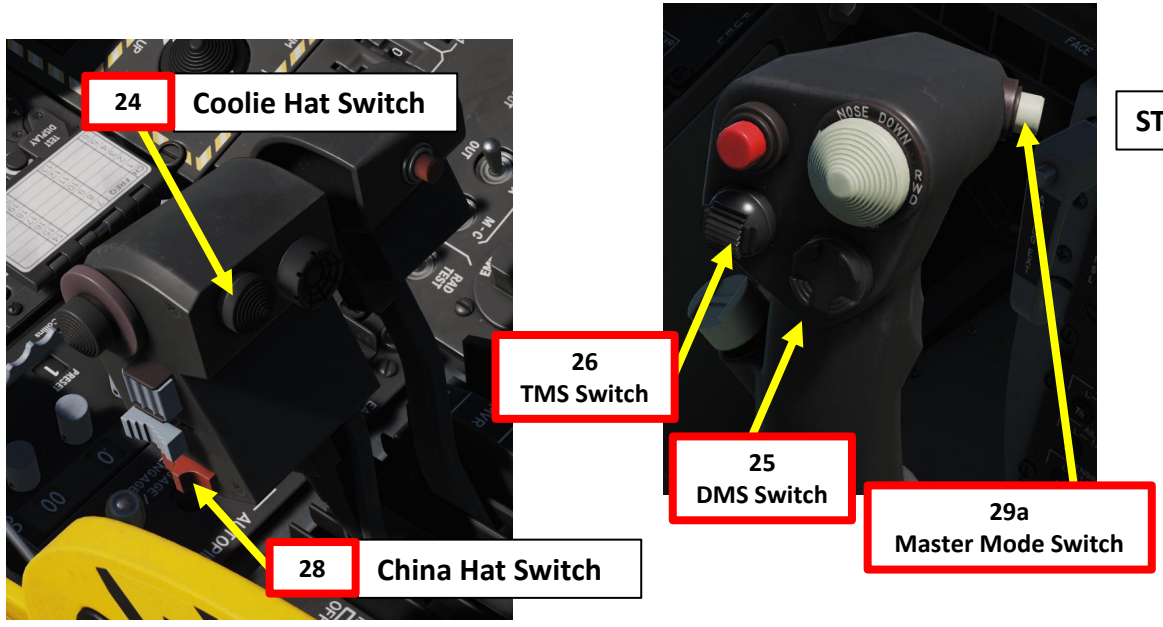


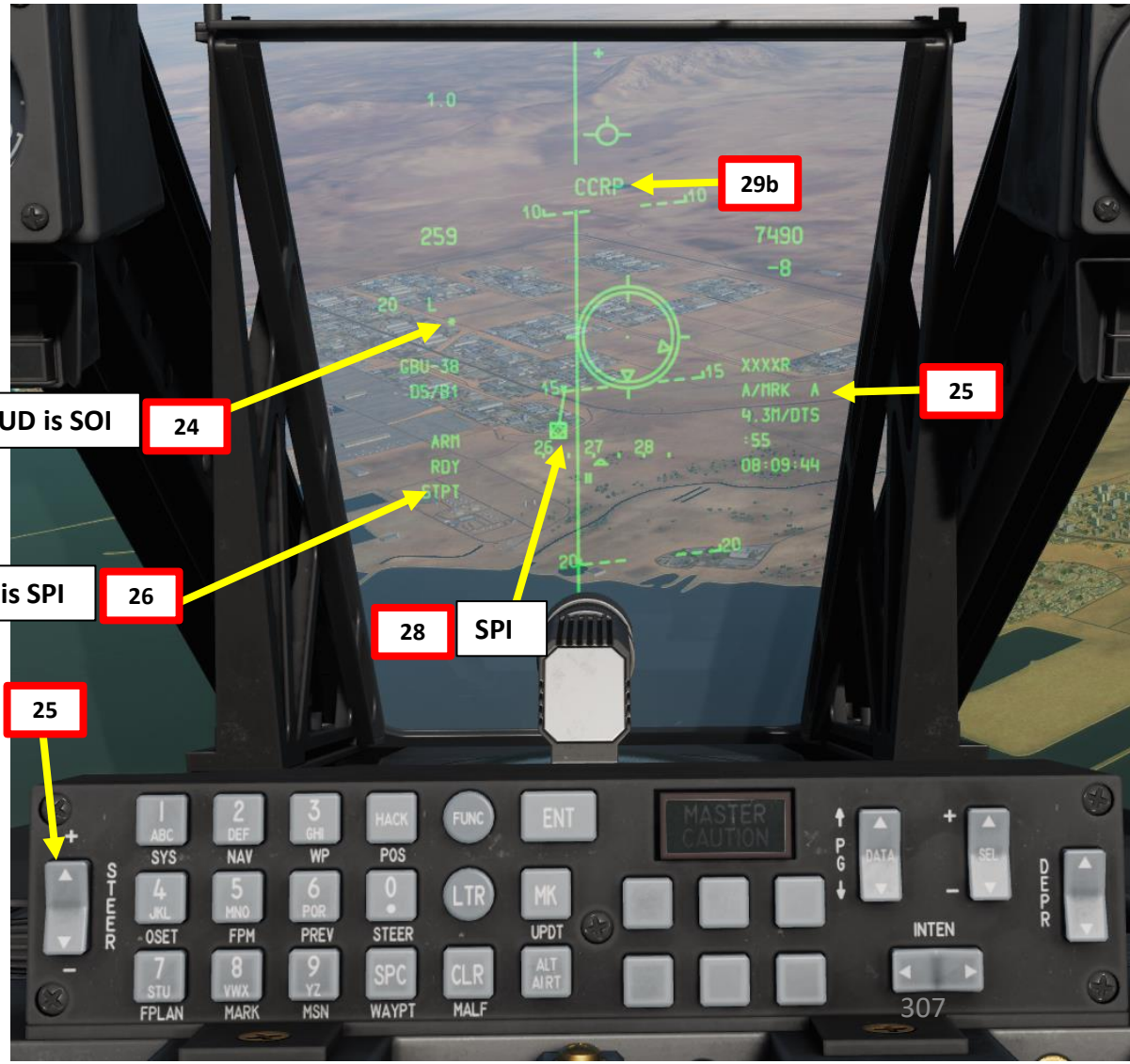
2.6 – GBU-38 JDAM (TARGETING POD)

C: SET MARKPOINT AS SPI (SENSOR POINT OF INTEREST)

23. Set STEER PT selector to MARK (Markpoint) and PAGE selector to OTHER
24. Press Coolie Hat Switch UP to set Heads-Up Display as the SOI (Sensor of Interest)
25. Select Steerpoint A/MRK A (Markpoint A) using the STEER rocker switch or the DMS (Data Management Switch) UP/DOWN.
26. If STPT is not the SPI (Sensor Point of Interest), press the TMS (Target Management System) Switch AFT LONG to set the current selected steerpoint (A/MRK A) as the SPI.
27. With Steerpoint MRK A set as the Sensor Point of Interest, we can now perform the JDAM strike
28. Press the China Hat Switch FWD LONG to slave all sensors to the Sensor Point of Interest (SPI).
29. Press the Master Mode button until the CCRP HUD Mode is selected.

- Note for the **A-10C II TANK KILLER EXPANSION**: steps 23 to 26 can be performed by pressing TMS RIGHT LONG instead.



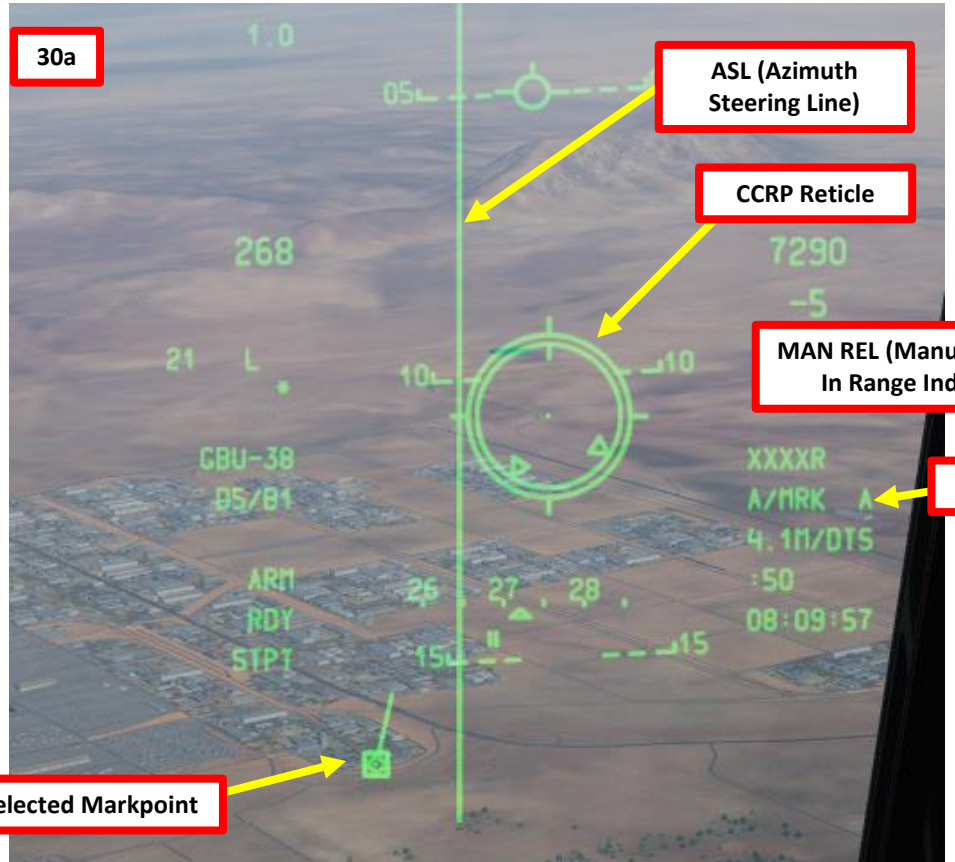


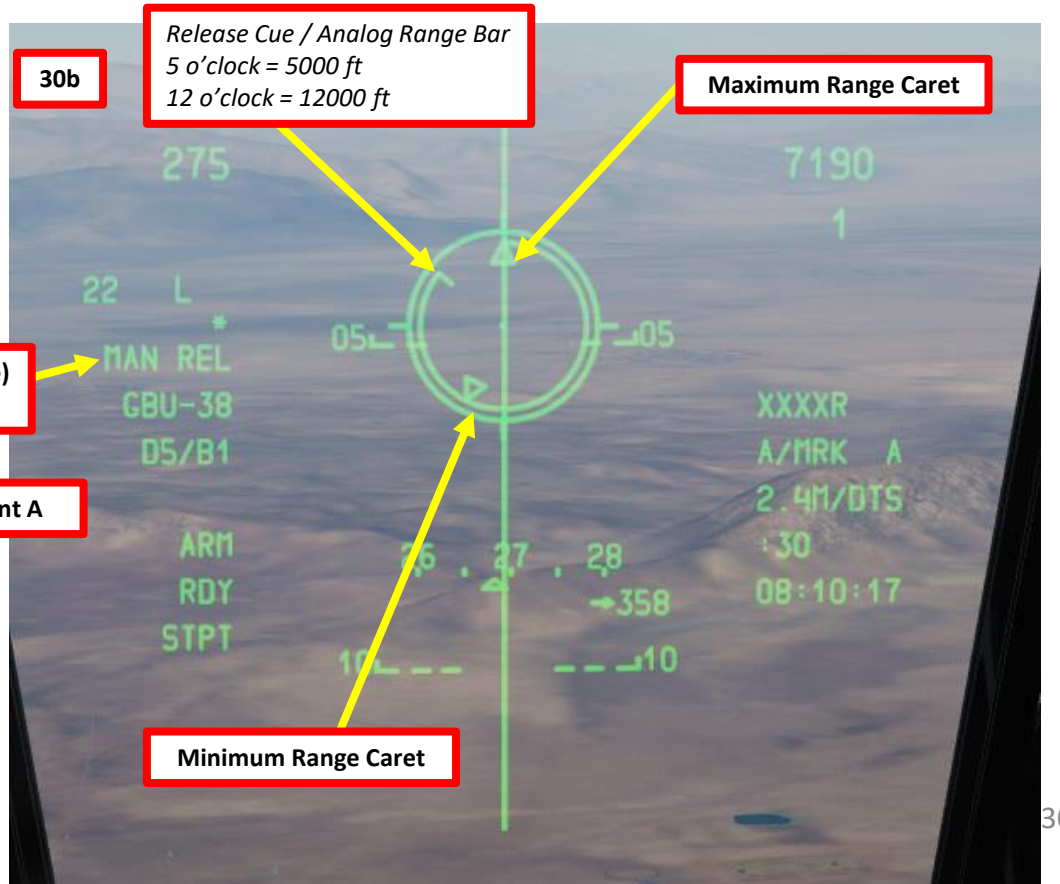
2.6 – GBU-38 JDAM (TARGETING POD)
(A-10C LEGACY SYMBOLOGY)

D: PERFORM ATTACK

30. From an altitude of at least 5000 ft (optimal between 10000 and 15000 ft), fly level and maneuver the aircraft to align the middle of the CCRP reticle with the ASL.
31. When you are at the Maximum Range, the Release Cue will move from the 12 o'clock position of the CCRP Reticle counter clockwise.
32. When the Release Cue is between the Maximum Range Caret and the Minimum Range Caret, MAN REL will appear in the In Range Indication field.
33. Press and hold down the Weapon Release button (RALT+SPACE) until JDAM is released.
34. The JDAM will home on the target coordinates by itself, guided by its own embedded GPS.

A-10C Legacy Only





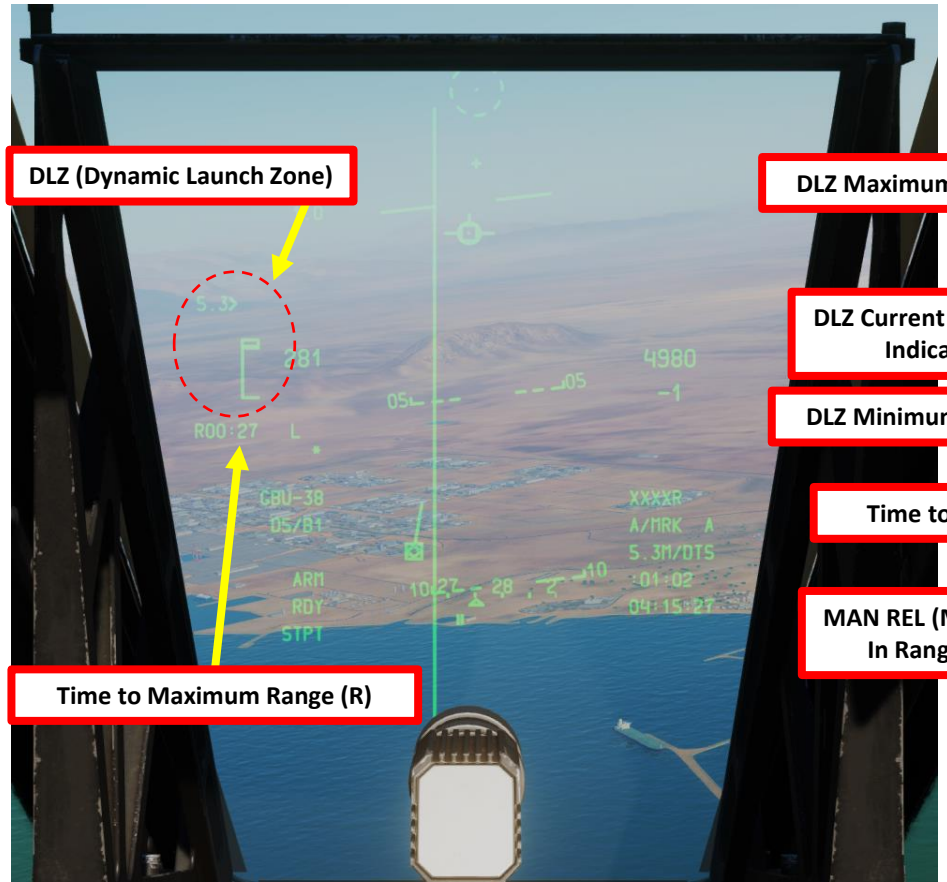
2.6 – GBU-38 JDAM (TARGETING POD)

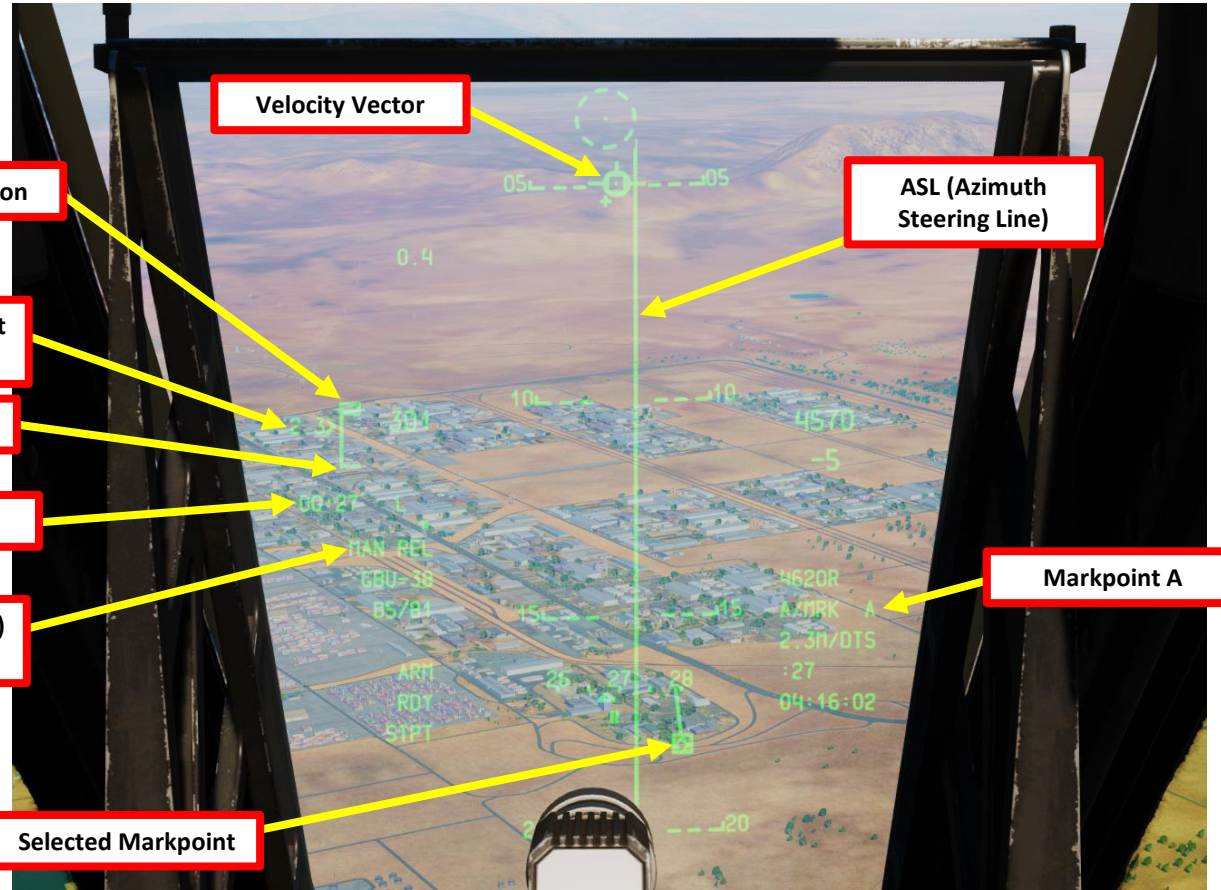
(A-10C II TANK KILLER SYMBOLOGY)

D: PERFORM ATTACK

30. From an altitude of at least 5000 ft (optimal between 10000 and 15000 ft), fly level and maneuver the aircraft to align the velocity vector with the ASL.
31. The DLZ (Dynamic Launch Zone) current range and caret indication will move down from above the DLZ.
32. Once the current range caret is between the maximum and minimum range indication on the DLZ, the weapon may be released. MAN REL will appear in the In Range Indication field.
33. Press and hold down the Weapon Release button (RALT+SPACE) until JDAM is released.
34. The JDAM will home on the target coordinates by itself, guided by its own embedded GPS.

A-10C II Tank Killer Expansion Only





2.6 – GBU-38 JDAM (TARGETING POD)

2.7 – CBU-105 WCMD (CCRP + TARGETING POD)

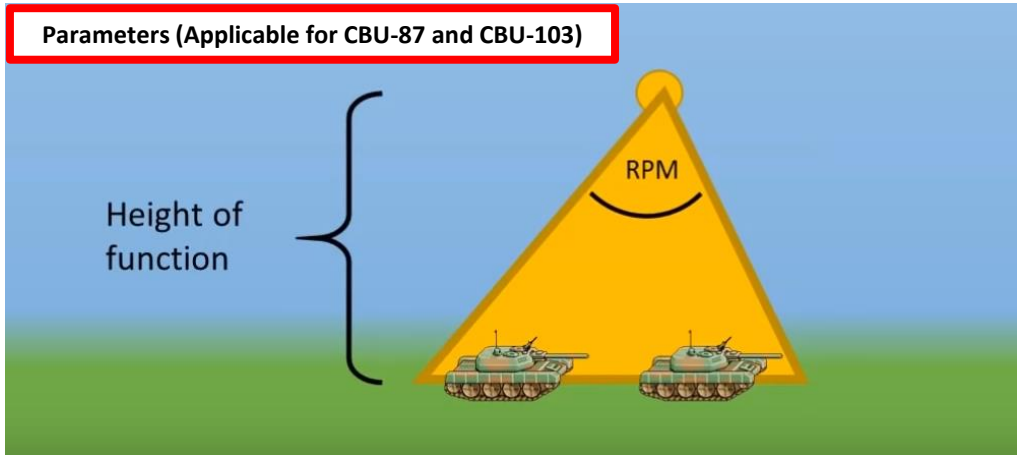
CBUs (Cluster Bomb Units) are generally used against "soft" targets. Some of them like the CBU-103 and CBU-105 use Wind Corrected Munition Dispenser kits to correct the effect of the wind on their trajectory.

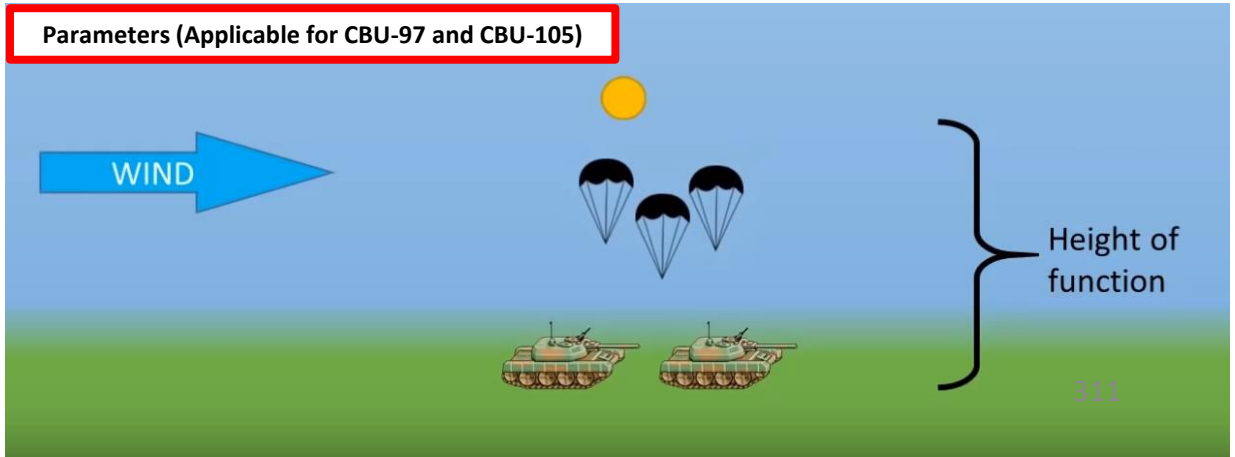
Keep in mind that there are two parameters that we can adjust to improve the effectiveness of CBUs:

- **Height of Function (HoF),** which determines at which height the bombs will release. It impacts area spread and accuracy.
- **RPM**, which is the area spread of the bomblets that affects the concentration of fire available on the target. This parameter is applicable to the CBU-87 and CBU-103 only. Recommended value is experimental, but you can use a value of 1000.

CBU (Cluster Bomb Unit) Types

CBU-87: This Combined Effects Munitions (CEM) weighs 950 lbs and is an all-purpose cluster bomb. The SW-65 Tactical Munitions Dispenser contains 202 BLU-97/B Combined Effects Bomblets (CEB) and they are effective against armored and unarmored targets. *Recommended HoF/RPM parameters: 1800 ft/1000*	**CBU-103:** Standard CBU-87 cluster bomb fitted with an INS guidance kit to form a Wind Corrected Munition Dispenser (WCMD, or "Wick Mid"). Unlike the GBU-31 and GBU-38, a WCMD does not use GPS guidance. Rather, the WCMD system uses the aircraft's inertial navigation system to "know" its current location and the location of the target, and then use the tail kit to steer the bomb to the target location. *Recommended HoF/RPM parameters: 1800 ft/1000*
CBU-97: 1,000-pound class weapon containing sensor-fused sub-munitions for specifically attacking armor. *Recommended HoF parameter: 2200 ft*	**CBU-105:** Wind Corrected Munitions Dispenser (WCMD, or "Wick Mid") tail kit version of the CBU-97. Using Inertial Navigation System (INS) guidance, the CBU-105 can be dropped at much higher altitudes than the CBU-97 and guide to the targeted location (SPI). *Recommended HoF parameter: 2200 ft*

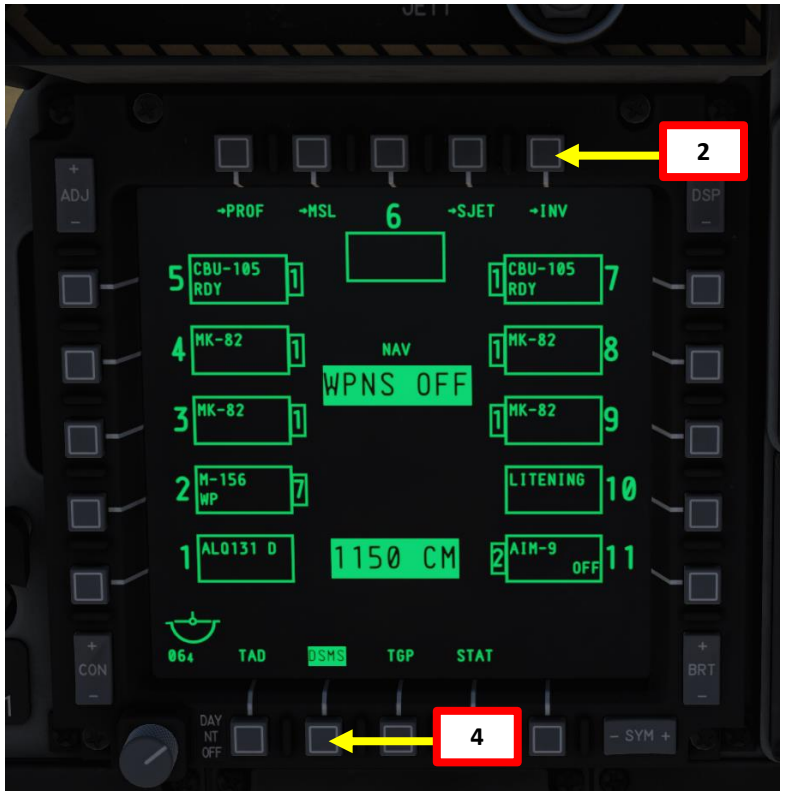




2.7 – CBU-105 WCMD (CCRP + TARGETING POD)

A: SET WEAPON PROFILE, SELECT PROFILE & SELECT WEAPON

1. Select DSMS (Digital Stores Management System) page
2. Select "INV" (Inventory) page
3. Select desired CBU-105 station
4. Select "INV STAT" (Inventory Station)
5. Click repeatedly on the OSB (Option Select Button) next to HOF (Height of Function/Fall) until a height of 2200 ft is selected
6. Click on OSB next to LOAD if you want to load these parameters for this station only. If you have a symmetrical (same) loadout on opposite pylons (e.g., 5 and 7, select LOAD SYM to load these parameters on both CBU-105 stations.

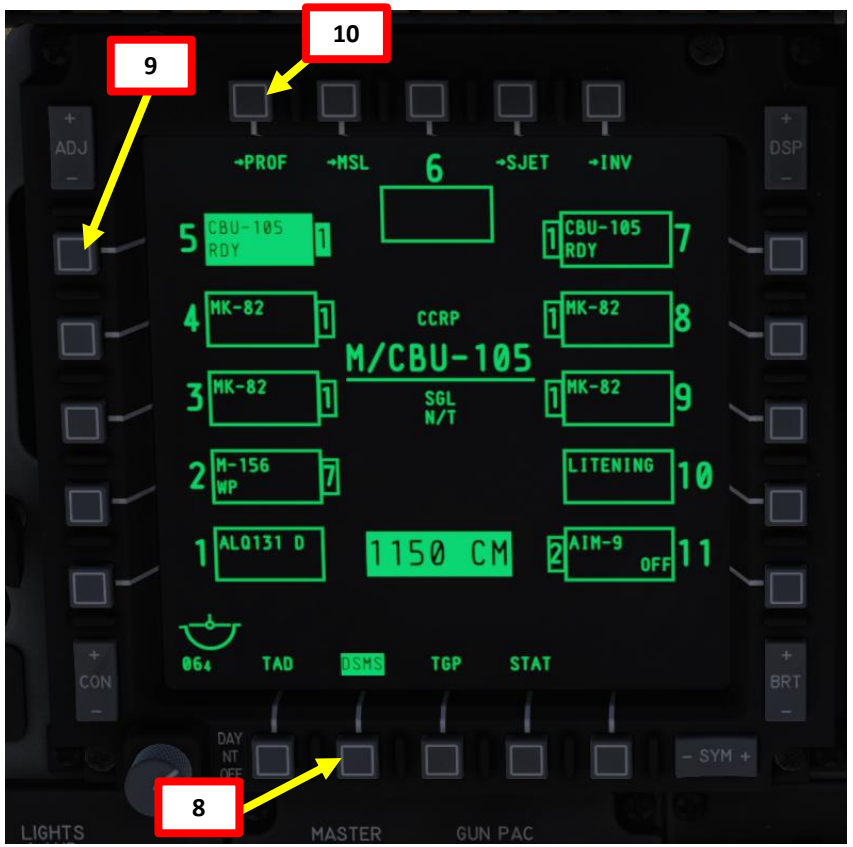


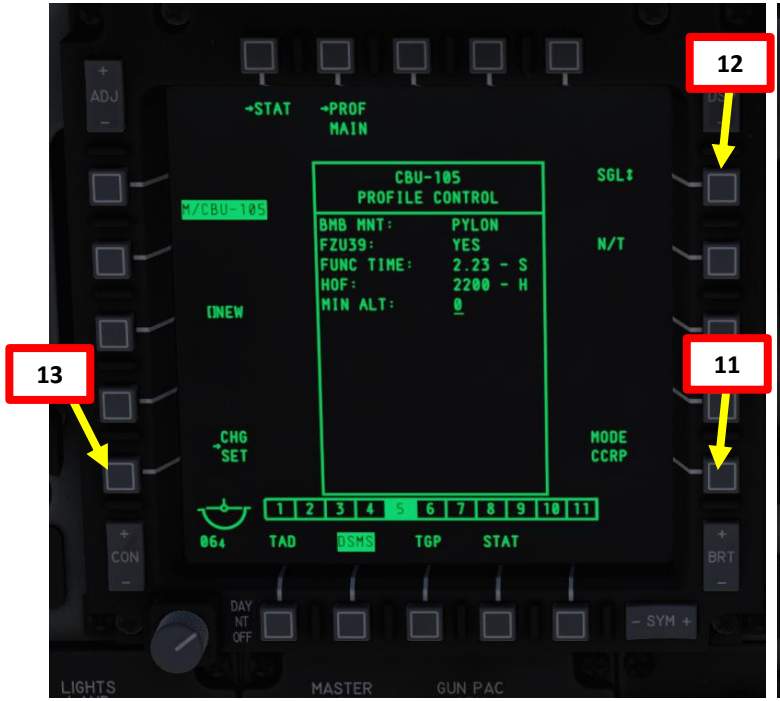
5

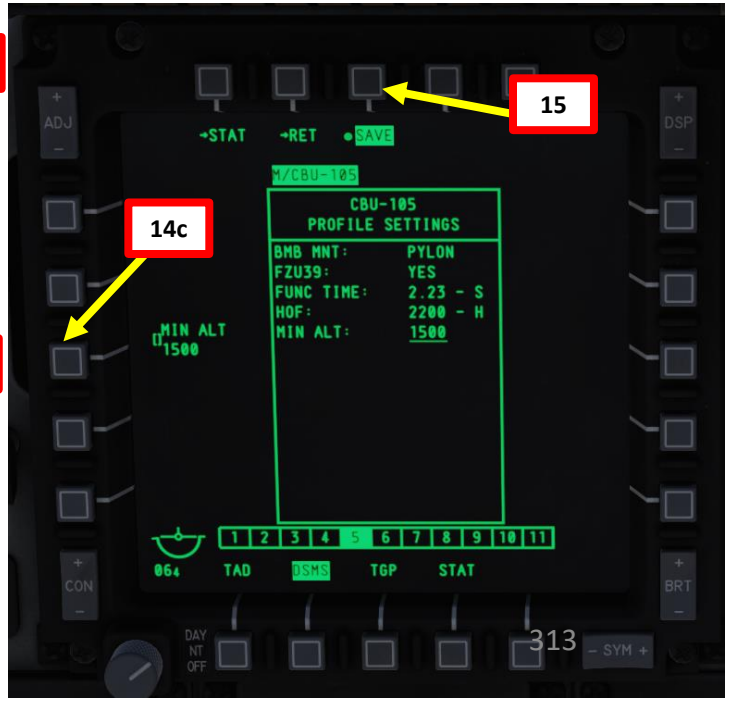
2.7 – CBU-105 WCMD (CCRP + TARGETING POD)

A: SET WEAPON PROFILE, SELECT PROFILE & SELECT WEAPON

7. Set Master Arm Switch ON (UP)
8. Select DSMS (Digital Stores Management System) page
9. Select CBU-105 Bomb (green when selected)
10. Select PROF (Weapon Profile) menu
11. CCRP (Continuously Computed Release Point) Mode is the only selectable mode
12. Set Release Type (Single, Pairs, etc.)
13. Select the OSB next to CHG SET (Change Settings) to modify bomb settings.
14. OPTIONAL: If you want to see Minimum Release Altitude cues on the Heads-Up Display, enter Minimum Altitude on the UFC scratchpad, then press on the OSB next to MIN ALT.
15. Press on the OSB next to SAVE to save Weapon Profile.



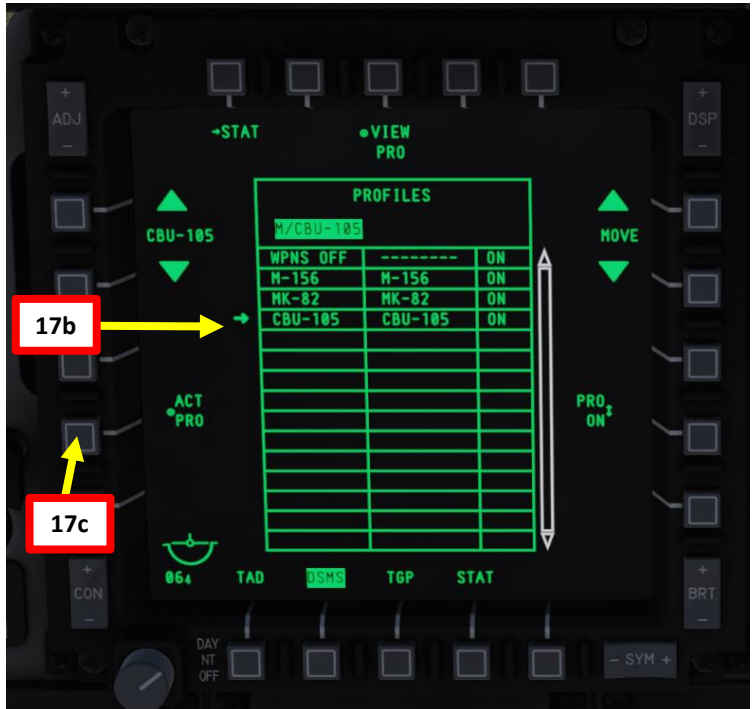


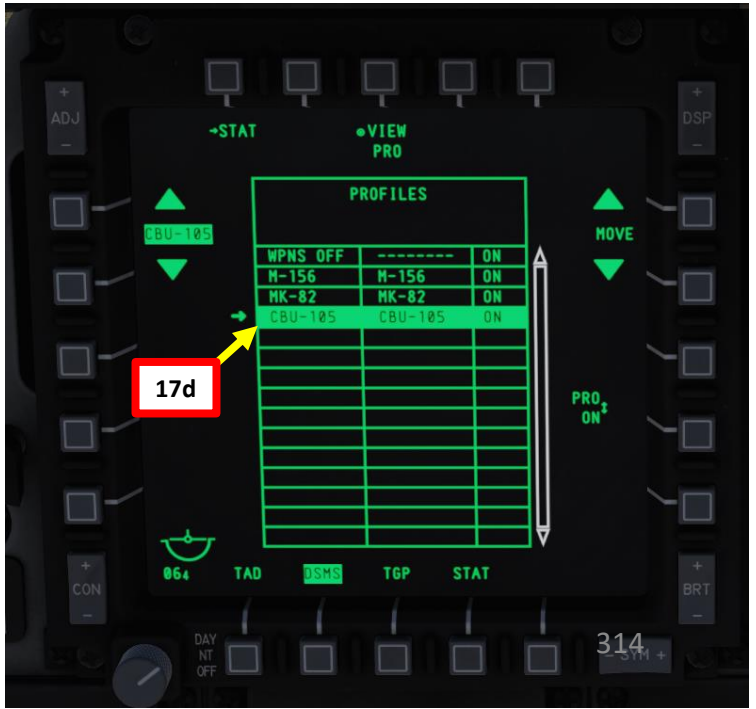


2.7 – CBU-105 WCMD (CCRP + TARGETING POD)

A: SET WEAPON PROFILE, SELECT PROFILE & SELECT WEAPON

16. Once weapon profile is saved, the DSMS page will showcase all different weapon profiles available.
17. Select CBU-105 profile by pressing the Option Select Button Selectors, then press on the OSB next to ACT PRO (Active Profile).
    - While HUD is SOI (Coolie Hat Switch UP), cycle between profiles and stations using the DMS (Data Management Switch) left or right.
18. The CBU-105 Profile will be displayed on the Heads-Up Display.

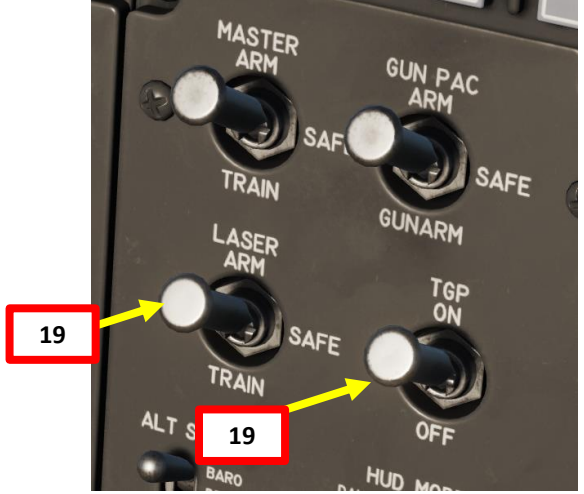


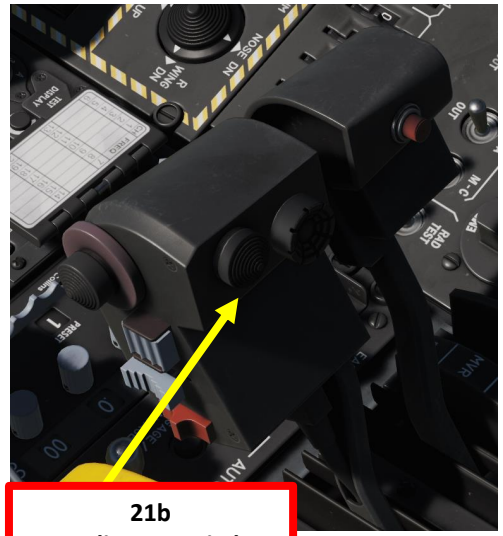


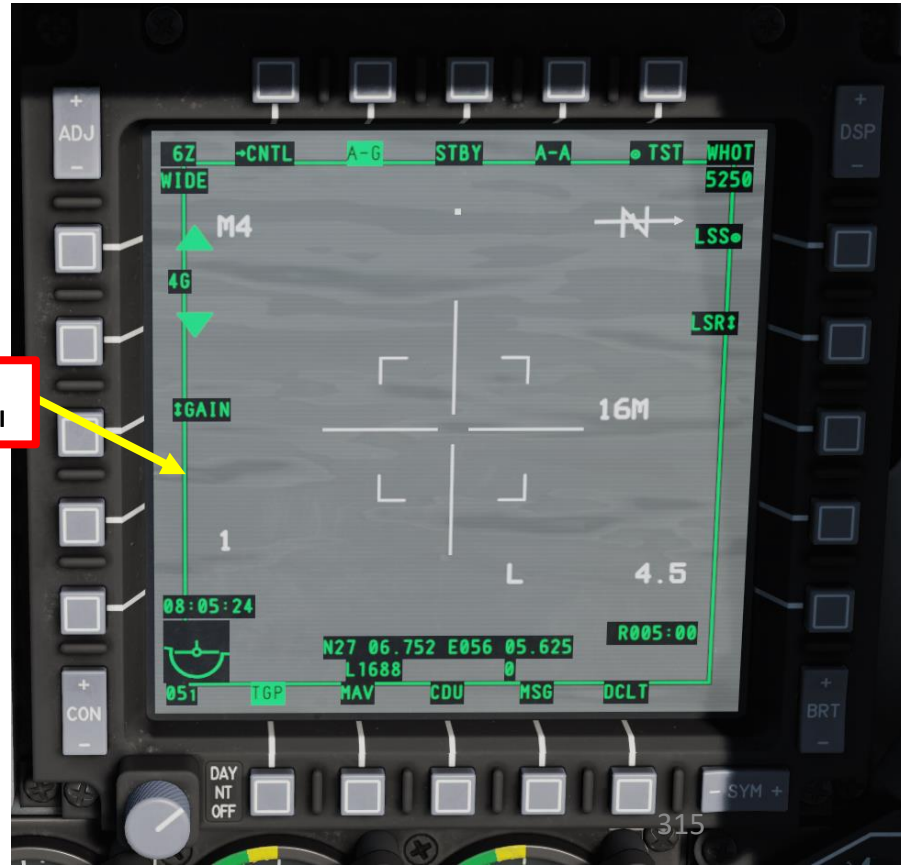
2.7 – CBU-105 WCMD (CCRP + TARGETING POD)

B: DESIGNATE TARGET WITH TARGETING POD

19. On AHCP (Armament HUD Control Panel), set TGP switch ON (UP) to power up the targeting pod. Set the LASER ARM switch to ARM (ON) as well.
20. Press the OSB (Option Select Button) next to TGP (Targeting Pod) to display the TGP Feed Page. Then, select the A-G (Air-to-Ground) Mode.
21. Press the Coolie Hat Switch LONG in the direction of the MFCD that displays your TGP feed (RIGHT since we have the TGP page on the right MFCD). This will set the TGP as the SOI (Sensor of Interest).



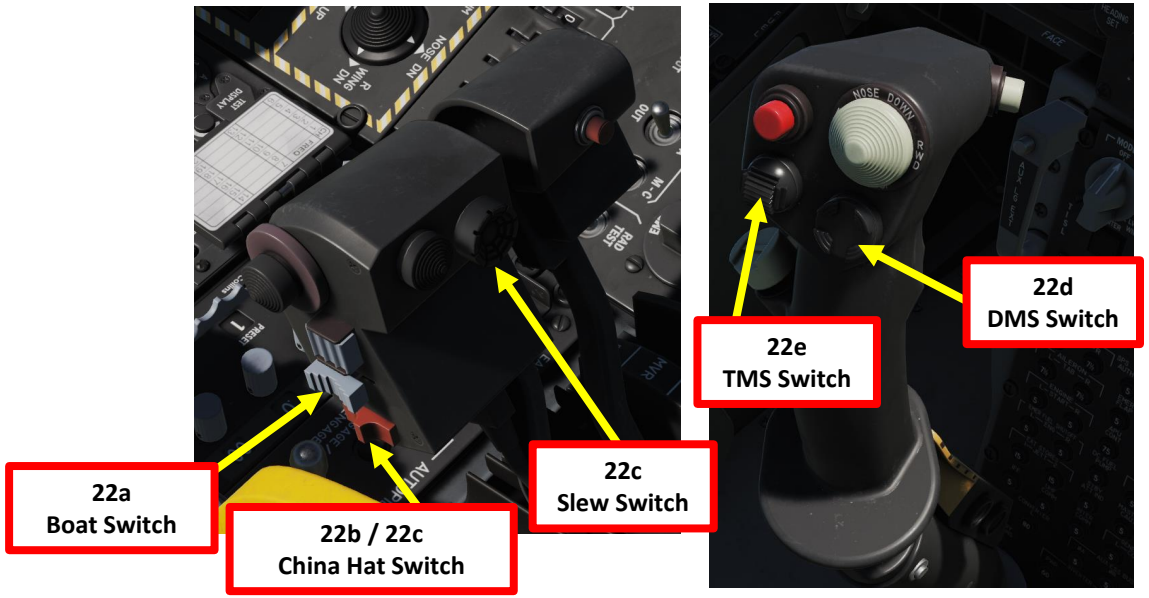


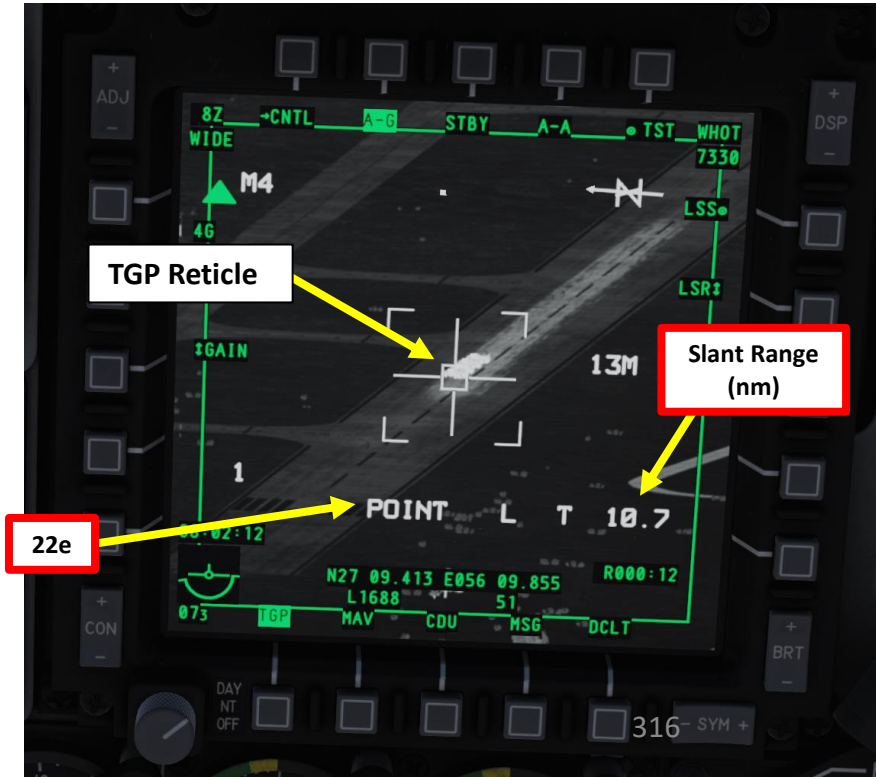


2.7 – CBU-105 WCMD (CCRP + TARGETING POD)

B: DESIGNATE TARGET WITH TARGETING POD

22. Designate target with the Targeting Pod
    a) Select desired Video Mode with the Boat Switch
        - FWD: FLIR BHOT (Forward-Looking Infrared Black Hot)
        - MIDDLE: CCD (Charge Coupled Device/TV)
        - AFT: FLIR WHOT (Forward-Looking Infrared White Hot)
    b) Select Field-of-View Mode with the China Hat Switch
        - FWD SHORT toggles between WIDE and NARROW
    c) Use the Slew Control Switch UP/DOWN/LEFT/RIGHT to set the TGP reticle on the target.
        - Note: If you want to reset the TGP in front of you (boresight):
            - **A-10C LEGACY**: Press the China Hat Switch AFT SHORT
            - **A-10C II TANK KILLER EXPANSION**: In the TGP page, press the OSB next to B-S (Boresight Function)
    d) Press on the DMS (Data Management Switch) FWD/AFT SHORT to adjust Zoom Level.
    e) Press the TMS (Target Management System) switch FWD SHORT to track the target. This will toggle tracking modes between AREA TRACK (static target) and POINT TRACK (moving target).

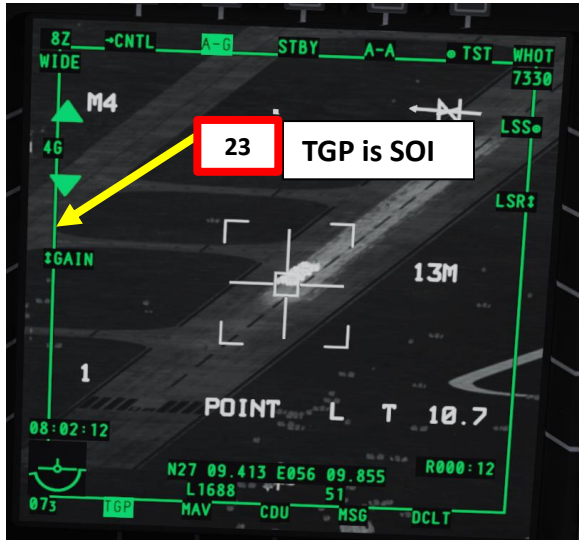


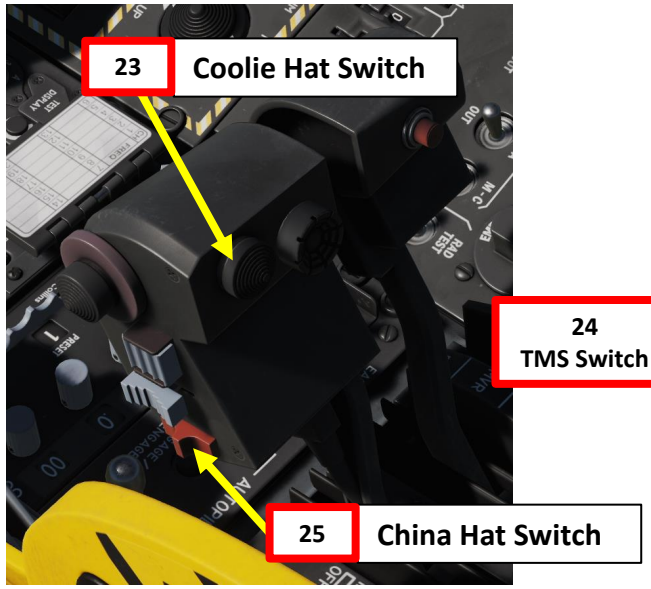


2.7 – CBU-105 WCMD (CCRP + TARGETING POD)

C: SET TARGETING POD TARGET AS SPI (SENSOR POINT OF INTEREST)

23. Verify TGP is SOI. If it's not, press the Coolie Hat Switch LONG in the direction of the MFCD that displays your TGP feed (RIGHT since we have the TGP page on the right MFCD).
24. Press the TMS (Target Management System) switch FWD LONG to designate the TGP Sensor Point of Interest (SPI).
25. Press the China Hat Switch FWD LONG to slave all sensors to the Sensor Point of Interest (SPI).
26. Press the Master Mode button until the CCRP HUD Mode is selected.

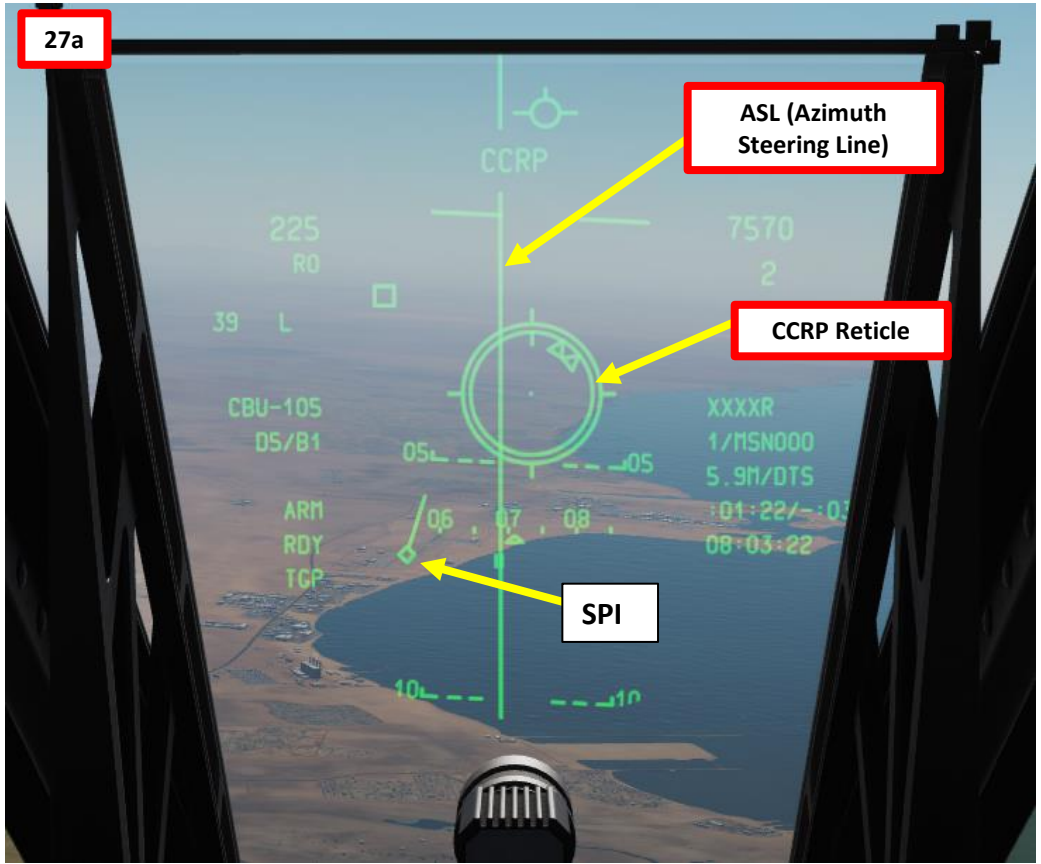


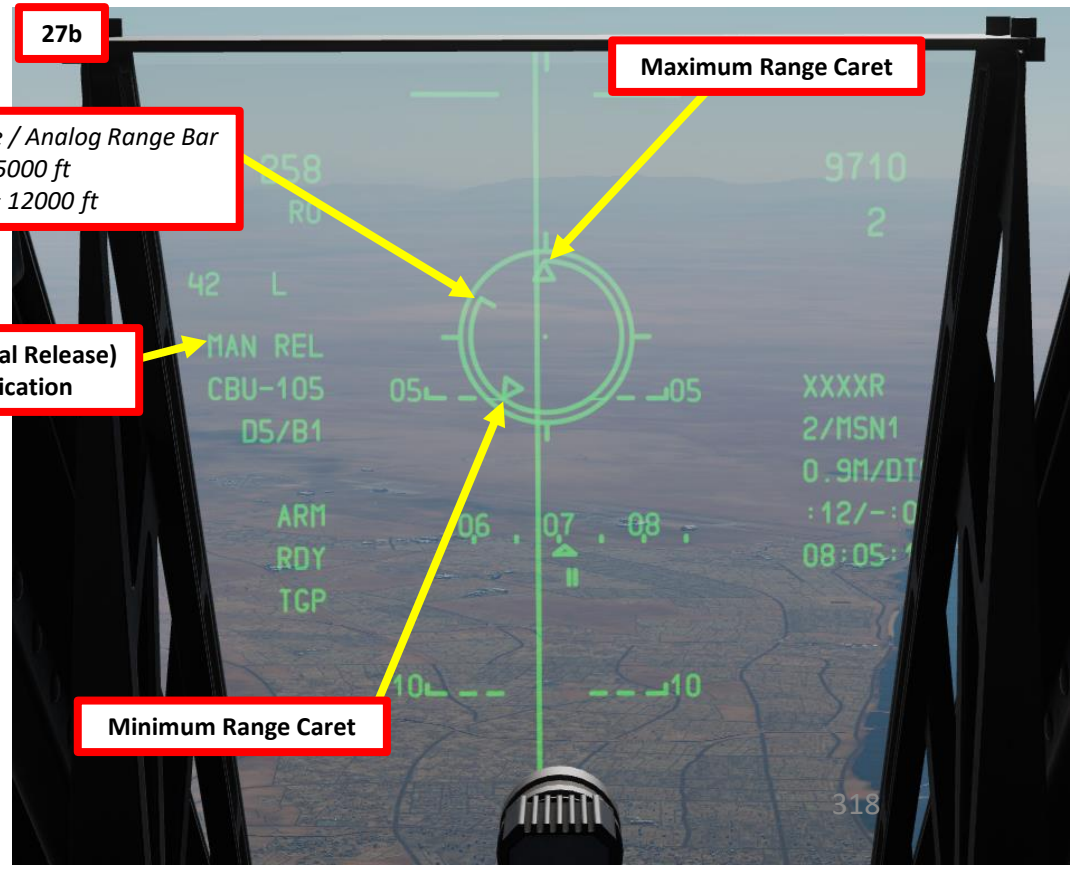


2.7 – CBU-105 WCMD (CCRP + TARGETING POD) (A-10C LEGACY SYMBOLOGY)

D: PERFORM ATTACK

27. From an altitude of at least 5000 ft (optimal between 10000 and 15000 ft), fly level and maneuver the aircraft to align the middle of the CCRP reticle with the ASL.
28. When you are at the Maximum Range, the Release Cue will move from the 12 o'clock position of the CCRP Reticle counter clockwise.
29. When the Release Cue is between the Maximum Range Caret and the Minimum Range Caret, MAN REL will appear in the In Range Indication field.
30. Press and hold down the Weapon Release button (RALT+SPACE) until CBU is released.
31. At the programmed HoF (Height of Function), the dispenser will release bomblets, which will slowly descend on the target and explode in clusters.





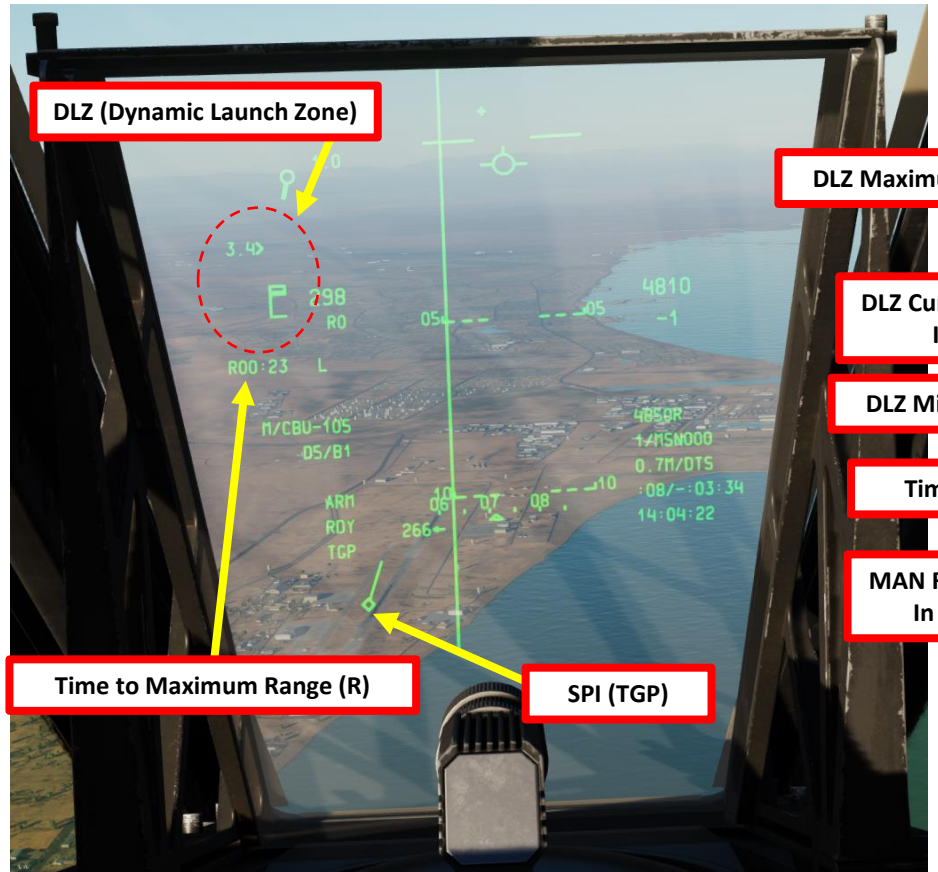
2.7 – CBU-105 WCMD (CCRP + TARGETING POD)

(A-10C II TANK KILLER SYMBOLOGY)

D: PERFORM ATTACK

27. From an altitude of at least 5000 ft (optimal between 10000 and 15000 ft), fly level and maneuver the aircraft to align the velocity vector with the ASL.
28. The DLZ (Dynamic Launch Zone) current range and caret indication will move down from above the DLZ.
29. Once the current range caret is between the maximum and minimum range indication on the DLZ, the weapon may be released. MAN REL will appear in the In Range Indication field.
30. Press and hold down the Weapon Release button (RALT+SPACE) until CBU is released.
31. At the programmed HoF (Height of Function), the dispenser will release bomblets, which will slowly descend on the target and explode in clusters.

A-10C II Tank Killer Expansion Only



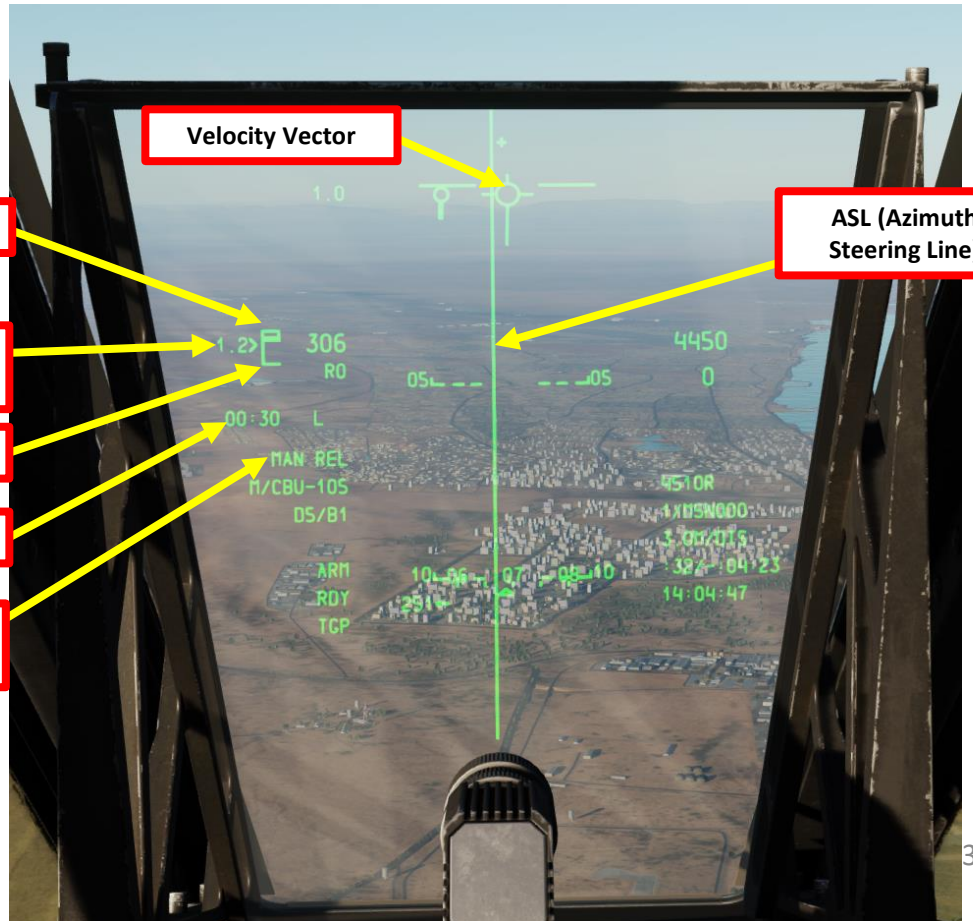
DLZ Maximum Range Indication

DLZ Current Range to Target Indication (nm)

DLZ Minimum Range Caret

Time to Target (No R)

MAN REL (Manual Release) In Range Indication

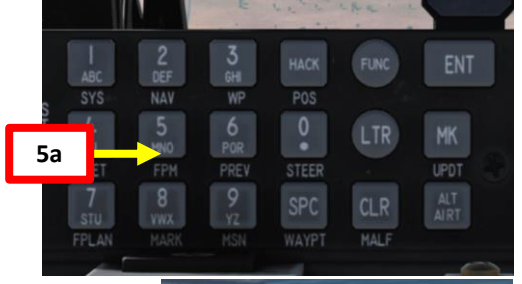


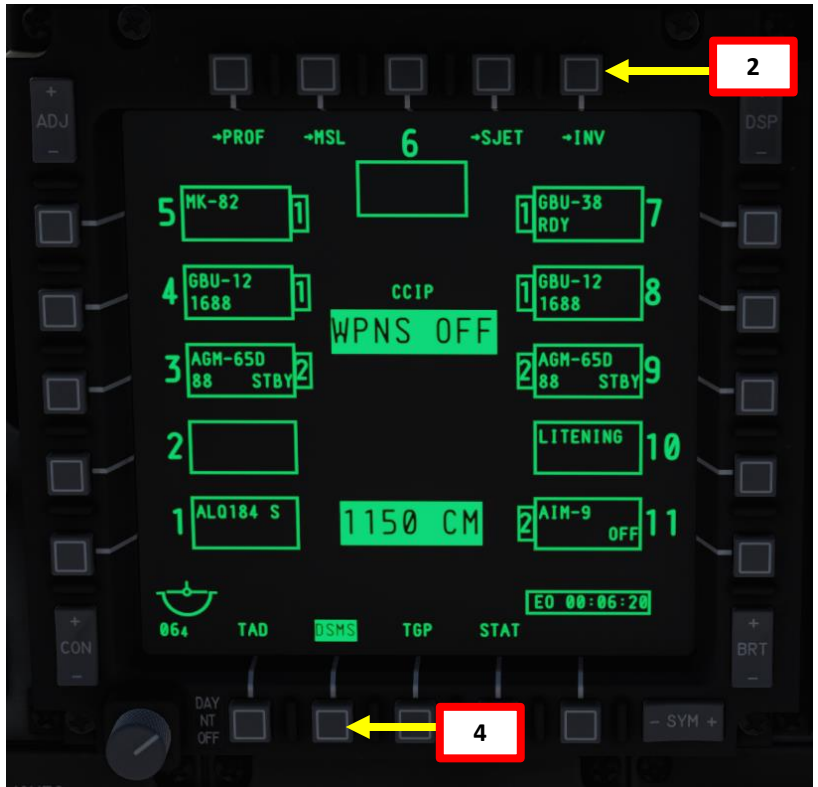
2.7 – CBU-105 WCMD (CCRP + TARGETING POD)

2.8 – GBU-12 PAVEWAY II GUIDED BOMB (LASER-GUIDED WITH TARGETING POD)

A: PROGRAM GBU-12 LASER CODE

1. Select DSMS (Digital Stores Management System) page
2. Select "INV" (Inventory) page
3. Select desired GBU-12 station (Station 4)
4. Select "INV STAT" (Inventory Station)
5. Enter desired GBU-12 laser code on the UFC scratchpad (i.e. 1687).
6. Click on the OSB next to LSR CODE to set new laser code (1687) on the GBU.
7. Click on OSB next to LOAD if you want to load these parameters for this station only. If you have a symmetrical (same) loadout on opposite pylons (e.g., 4 and 8, select LOAD SYM to load these parameters on both GBU-12 stations.





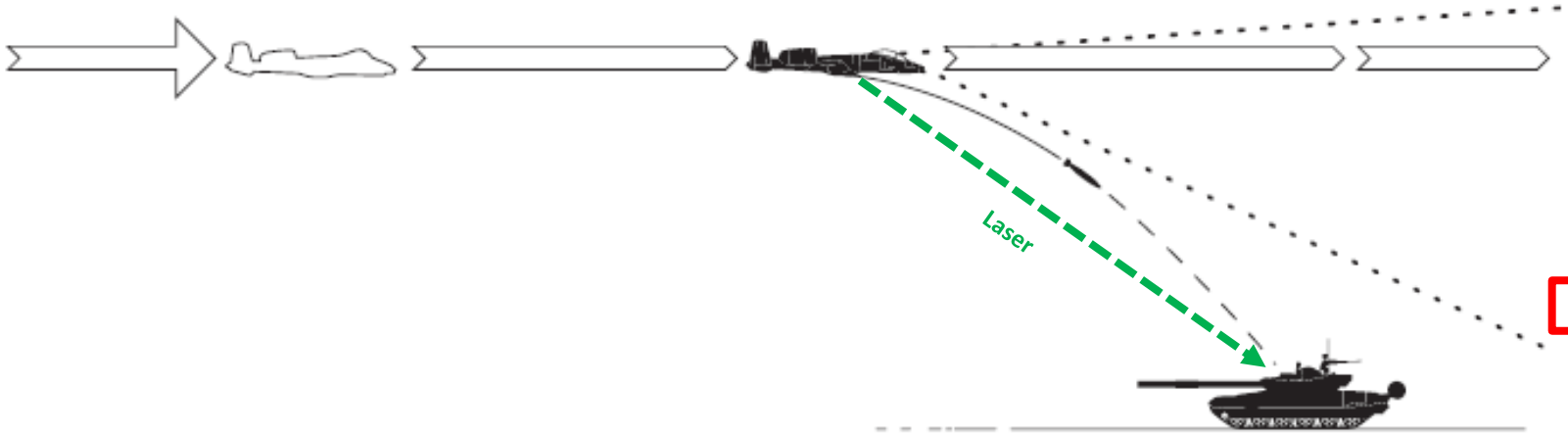
2.8 – GBU-12 PAVEWAY II GUIDED BOMB (LASER-GUIDED WITH TARGETING POD)

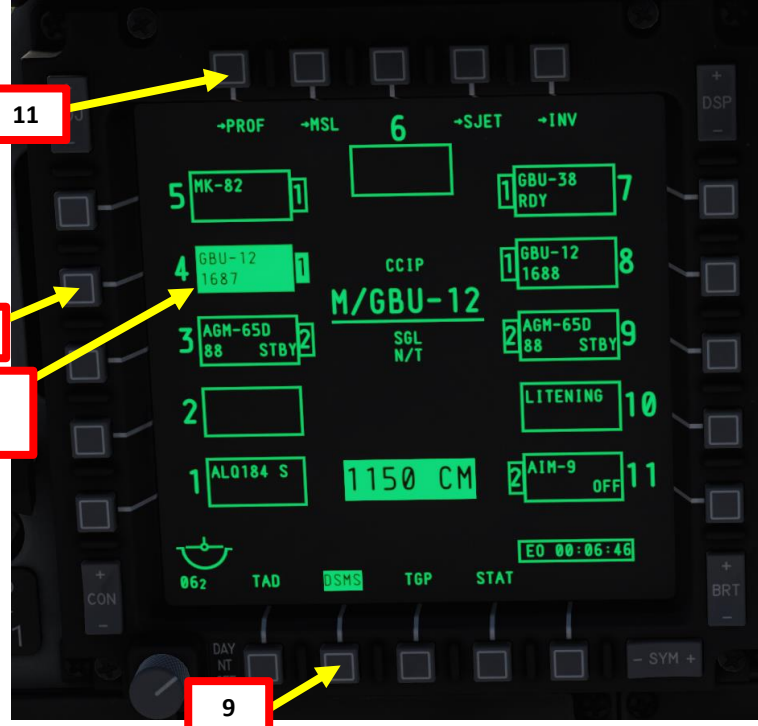
B: SELECT WEAPON

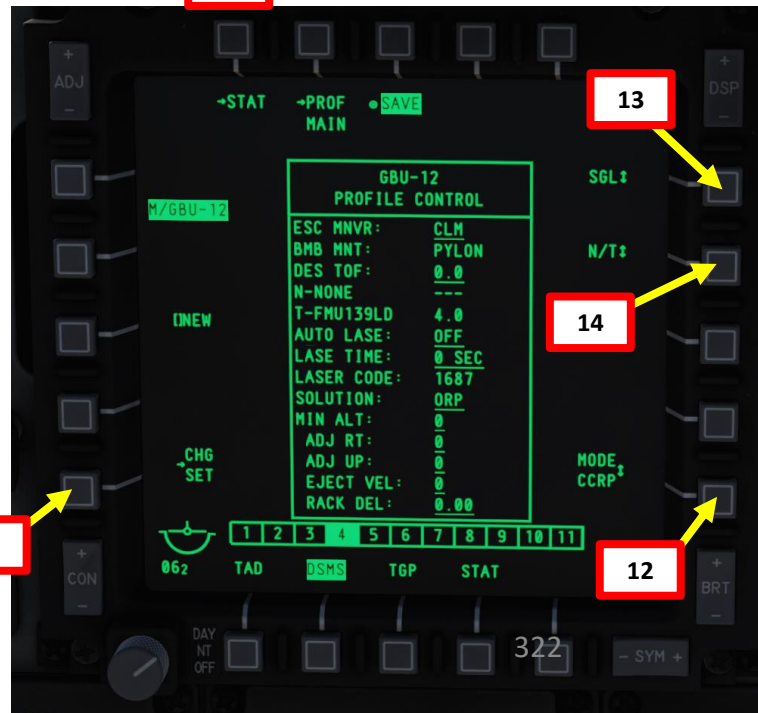
8. Set Master Arm Switch ON (UP)
9. Select DSMS (Digital Stores Management System) page
10. Select GBU-12 Bomb (green when selected)
11. Select PROF (Weapon Profile) menu

C: SET WEAPON PROFILE

12. Set CCRP (Continuously Computed Release Point) Mode
13. Set Release Type
    - SGL (Single): Single Bomb Drop
    - PRS (Pairs): Bombs dropped in Pairs
    - RIP SGL (Ripple Single): Each press of the weapon release button will release the set number of bombs set from the RIP QTY (Ripple Quantity) setting
    - RIP PRS (Ripple Pairs): Each press of the weapon release button will release the number of bombs specified in the RIP PRS setting, in pairs
14. Set Bomb Fuze Setting (Nose, Tail, or Nose & Tail)
15. If required, set Bomb Ripple Quantity by typing the desired quantity on the UFC scratchpad, then pressing the OSB (Option Select Button) next to RIP QTY.
16. If required, set Bomb Interval Distance in feet by typing the desired distance on the UFC scratchpad, then pressing the OSB next to FT.
17. Select the OSB next to CHG SET (Change Settings) to modify bomb settings.



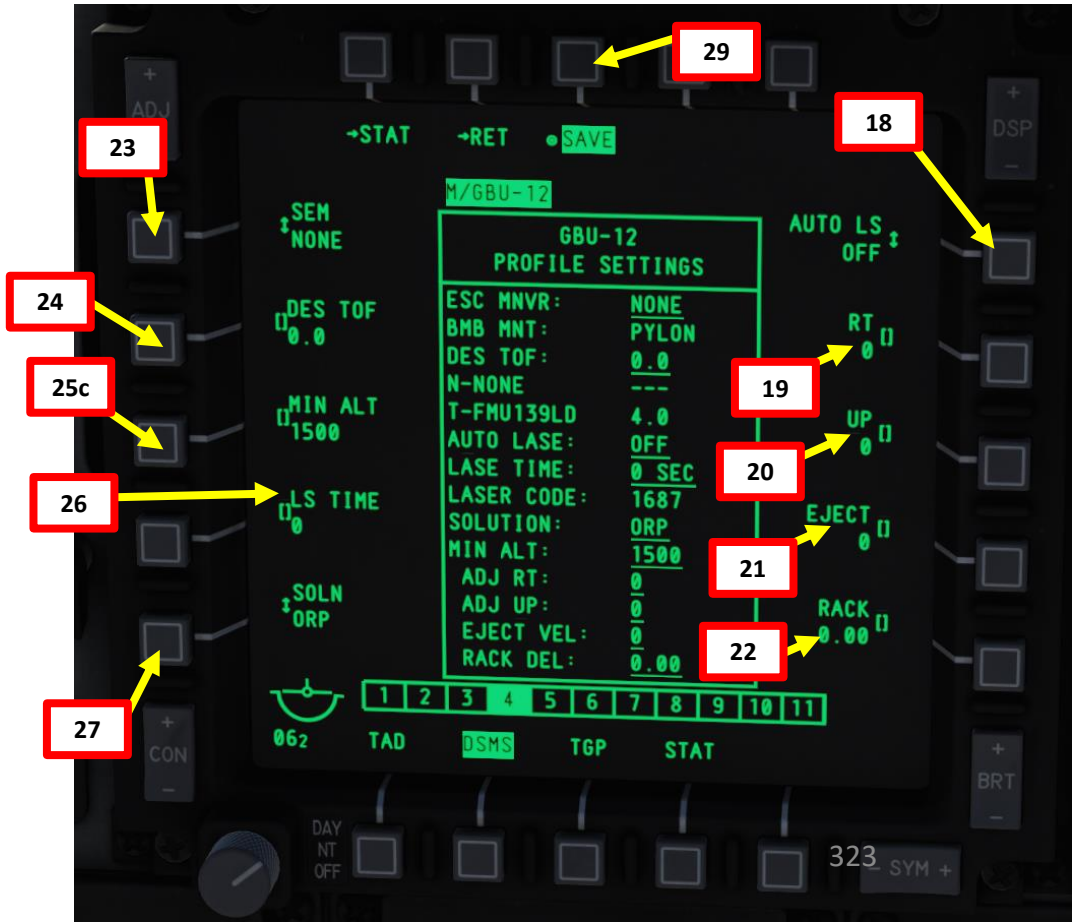




2.8 – GBU-12 PAVEWAY II GUIDED BOMB (LASER-GUIDED WITH TARGETING POD)

C: SET WEAPON PROFILE

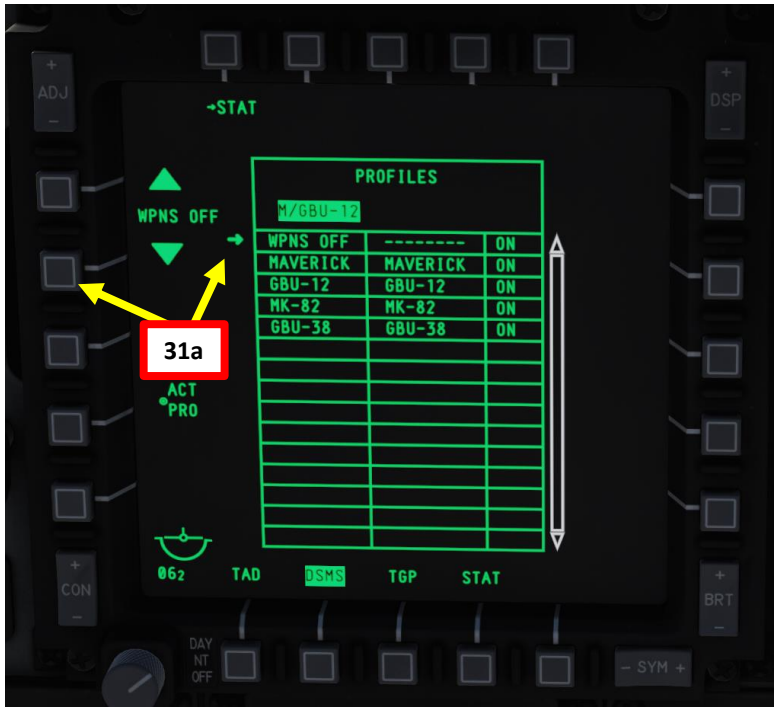
18. Set Auto Laser as desired. We will laser manually, so we will leave this to OFF.
    - *If set to ON, the laser will fire automatically according to the LS TIME (seconds before bomb impact). For best accuracy, set this to 8 seconds before impact. If set to 0, the laser will default to firing 4 seconds before impact.*
19. OPTIONAL: If using an horizontal offset (we aren't), enter Horizontal Offset value (in mils) on the UFC scratchpad, then press on the OSB next to RT (Right Adjustment). Value must be between -15 and +15 mils.
20. OPTIONAL: If using a vertical offset (we aren't), enter Vertical Offset value (in mils) on the UFC scratchpad, then press on the OSB next to UP (Upwards Adjustment). Value must be between -15 and +15 mils.
21. OPTIONAL: If using a Weapon eject Velocity setting, enter velocity in ft/sec on the UFC scratchpad, then press on the OSB next to EJECT. Value must be between -10 and +30 ft/sec.
22. OPTIONAL: If using a bomb rack delay, enter delay on the UFC scratchpad, then press on the OSB next to RACK. Value must be between -0.40 and +0.40.
23. Select desired Escape Maneuver Type
    - NONE: No Escape Maneuver
    - CLB: Climbing Maneuver
    - TRN: Turn Maneuver
    - TLT: Turn Level Turn Maneuver
24. OPTIONAL: If you want to set a desired Time of Fall (in sec) of the bomb from release time to impact time, enter ToF value on the UFC scratch pad, then press on the OSB next to DES TOF.
25. OPTIONAL: If you want to see Minimum Release Altitude cues on the Heads-Up Display, enter Minimum Altitude on the UFC scratchpad, then press on the OSB next to MIN ALT.
26. OPTIONAL: If AUTO LS is ON, enter how many seconds before weapon impact that wish the laser to start firing on the UFC scratchpad, then press on the OSB next to LS TIME. Otherwise, leave it to 0.
27. Select Solution Option: flight path of bomb between ORP for Optimal Release Point and BAL for Ballistic release point
28. Verify all weapon profile parameters are set as desired
29. Press on the OSB next to SAVE to save Weapon Profile.

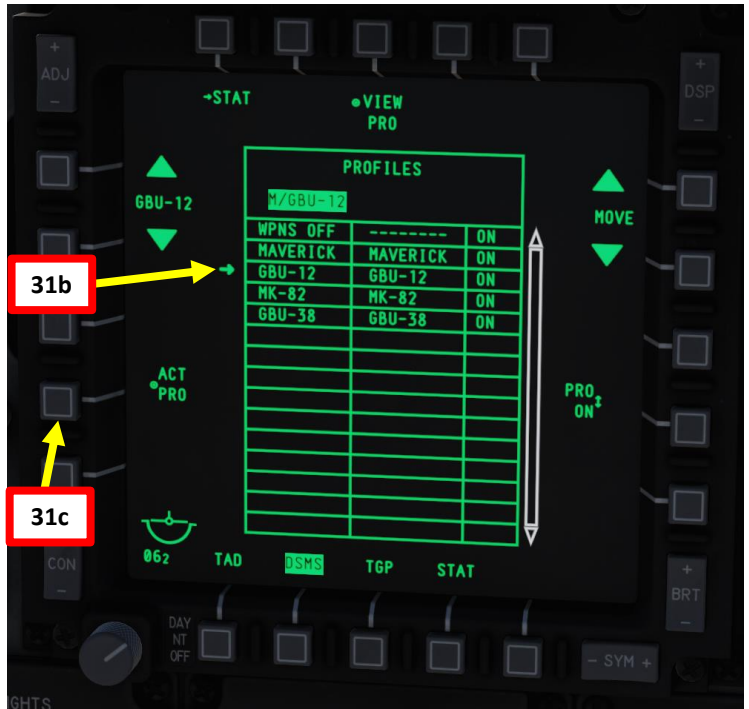


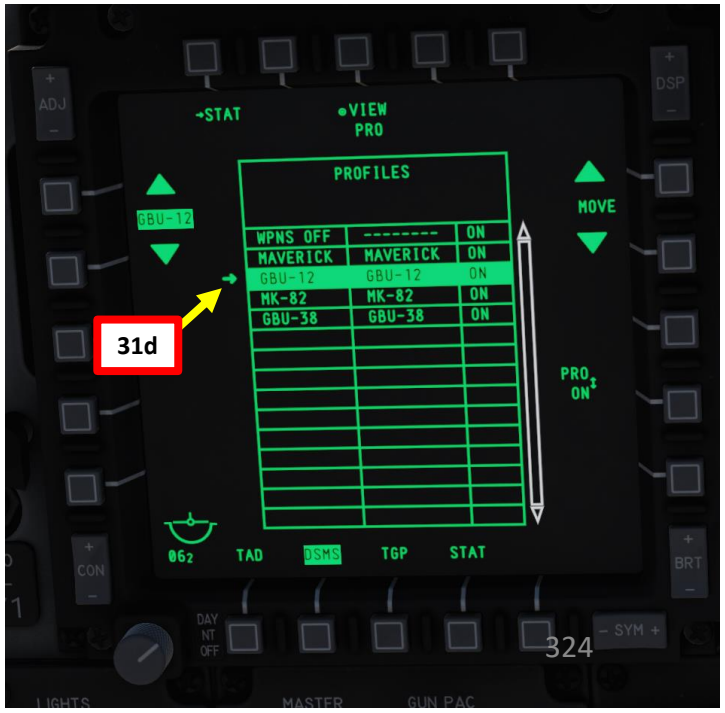
2.8 – GBU-12 PAVEWAY II GUIDED BOMB (LASER-GUIDED WITH TARGETING POD)

C: SELECT WEAPON PROFILE

30. Once weapon profile is saved, the DSMS page will showcase all different weapon profiles available.
31. Select GBU-12 profile by pressing the Option Select Button Selectors, then press on the OSB next to ACT PRO (Active Profile).
    - While HUD is SOI (Coolie Hat Switch UP), cycle between profiles and stations using the DMS (Data Management Switch) left or right.
32. The GBU-12 Profile will be displayed on the Heads-Up Display.



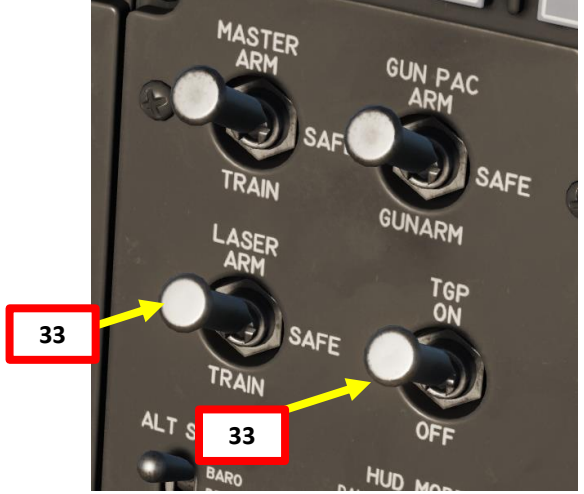


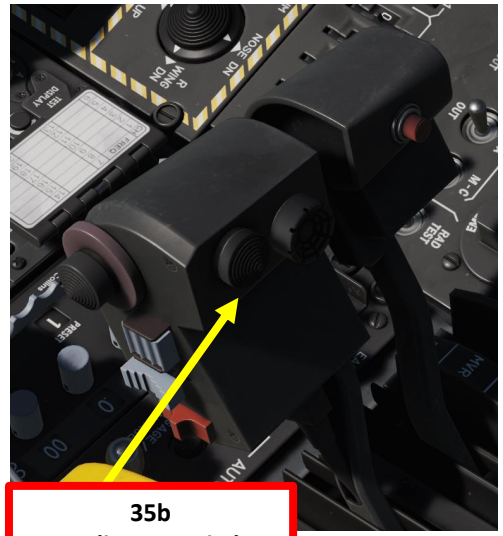


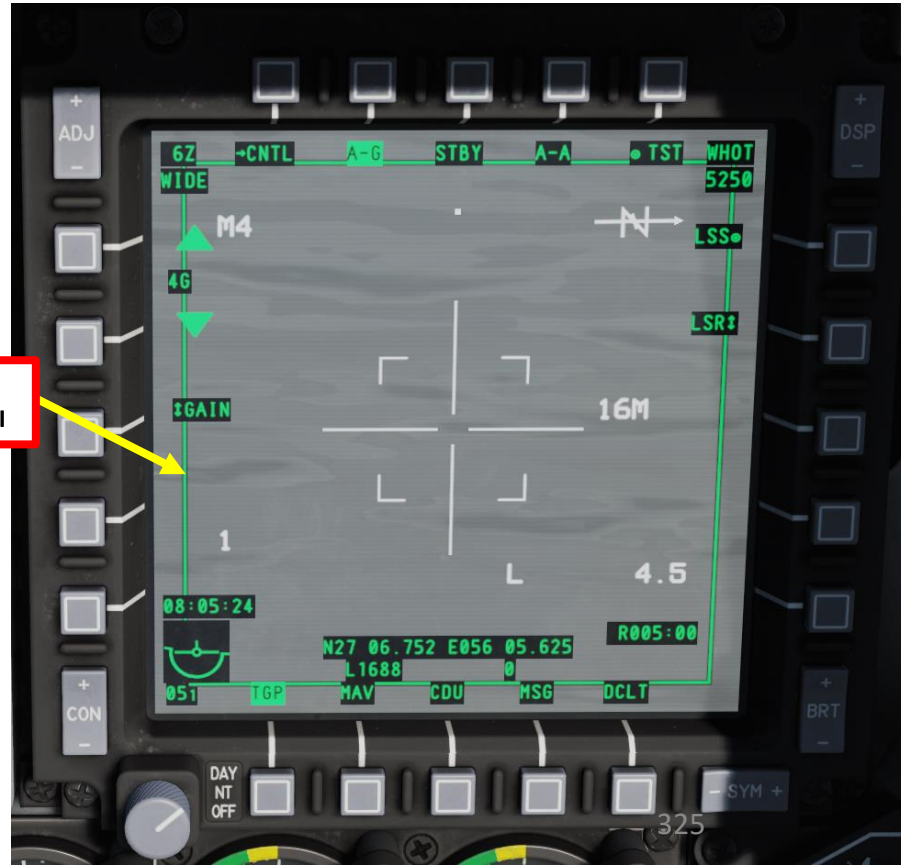
2.8 – GBU-12 PAVEWAY II GUIDED BOMB (LASER-GUIDED WITH TARGETING POD)

D: DESIGNATE TARGET WITH TARGETING POD

33. On AHCP (Armament HUD Control Panel), set TGP switch ON (UP) to power up the targeting pod. Set the LASER ARM switch to ARM (ON) as well.
34. Press the OSB (Option Select Button) next to TGP (Targeting Pod) to display the TGP Feed Page. Then, select the A-G (Air-to-Ground) Mode.
35. Press the Coolie Hat Switch LONG in the direction of the MFCD that displays your TGP feed (RIGHT since we have the TGP page on the right MFCD). This will set the TGP as the SOI (Sensor of Interest).



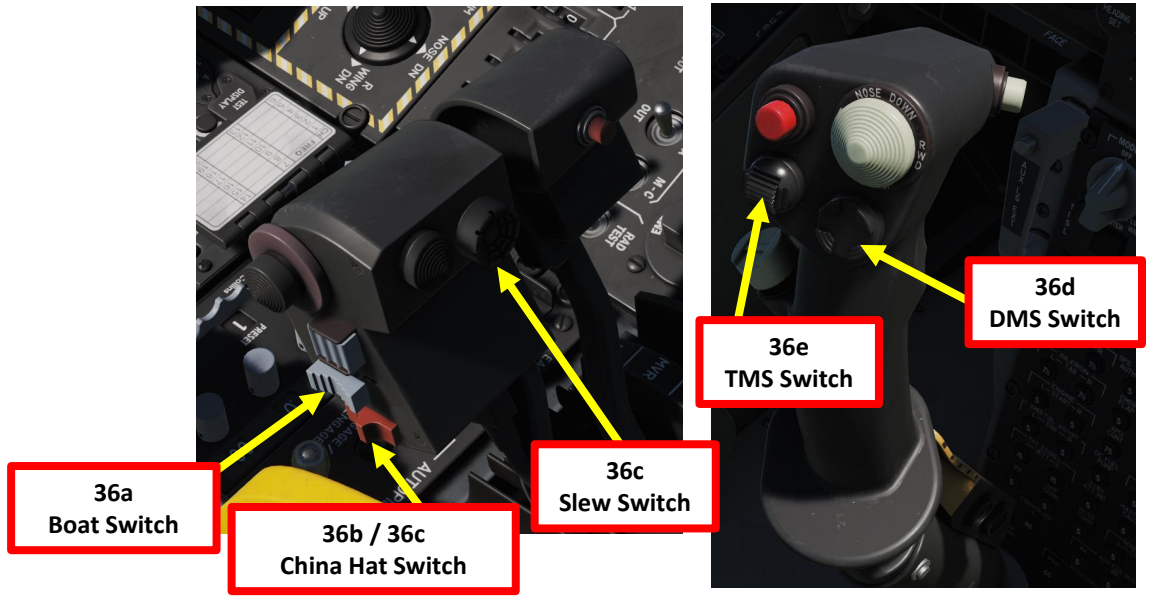


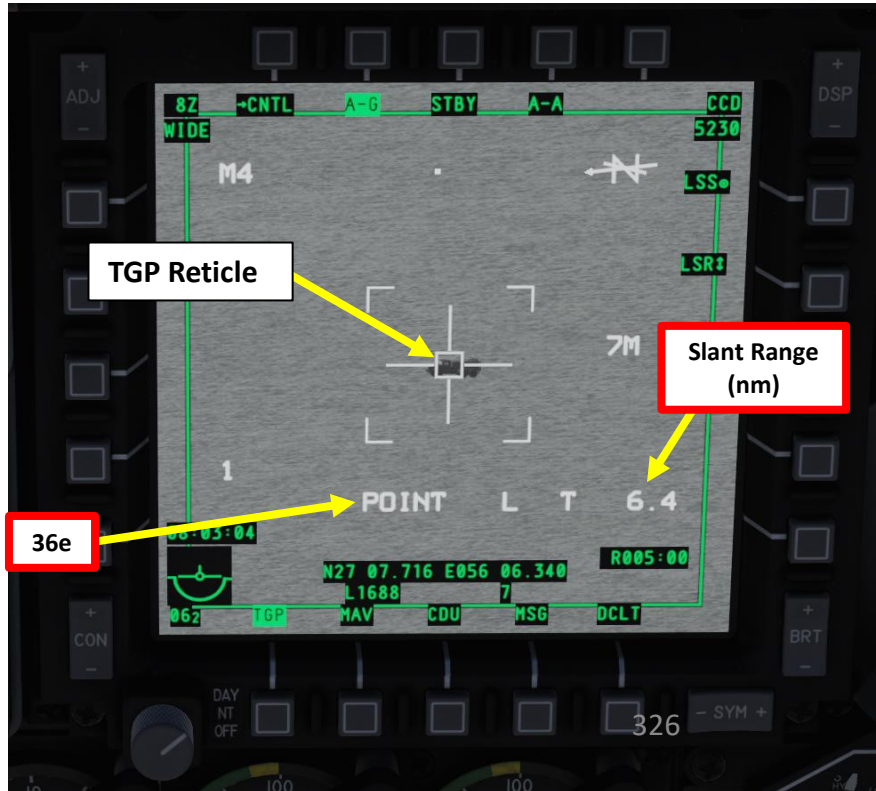


2.8 – GBU-12 PAVEWAY II GUIDED BOMB (LASER-GUIDED WITH TARGETING POD)

D: DESIGNATE TARGET WITH TARGETING POD

36. Designate target with the Targeting Pod
    a) Select desired Video Mode with the Boat Switch
        - FWD: FLIR BHOT (Forward-Looking Infrared Black Hot)
        - MIDDLE: CCD (Charge Coupled Device/TV)
        - AFT: FLIR WHOT (Forward-Looking Infrared White Hot)
    b) Select Field-of-View Mode with the China Hat Switch
        - FWD SHORT toggles between WIDE and NARROW
    c) Use the Slew Control Switch UP/DOWN/LEFT/RIGHT to set the TGP reticle on the target.
        - Note: If you want to reset the TGP in front of you (boresight):
            - **A-10C LEGACY**: Press the China Hat Switch AFT SHORT
            - **A-10C II TANK KILLER EXPANSION**: In the TGP page, press the OSB next to B-S (Boresight Function)
    d) Press on the DMS (Data Management Switch) FWD/AFT SHORT to adjust Zoom Level.
    e) Press the TMS (Target Management System) switch FWD SHORT to track the target. This will toggle tracking modes between AREA TRACK (static target) and POINT TRACK (moving target).

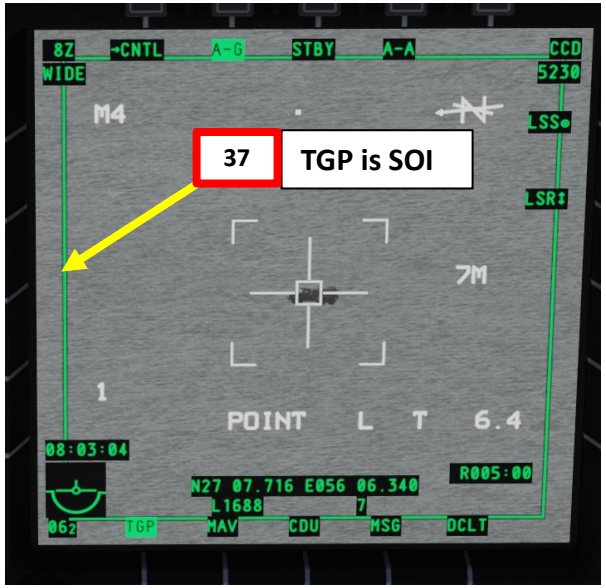


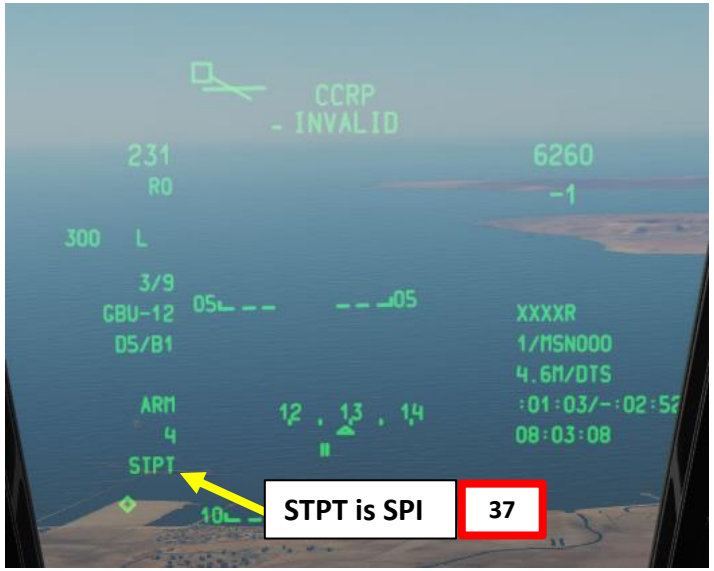


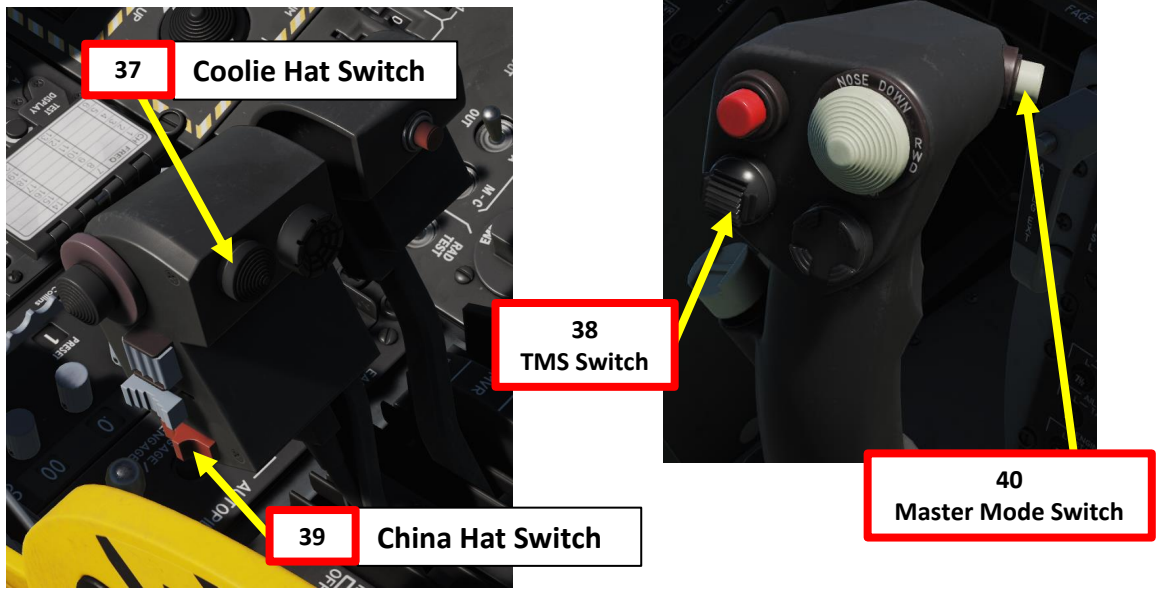
2.8 – GBU-12 PAVEWAY II GUIDED BOMB (LASER-GUIDED WITH TARGETING POD)

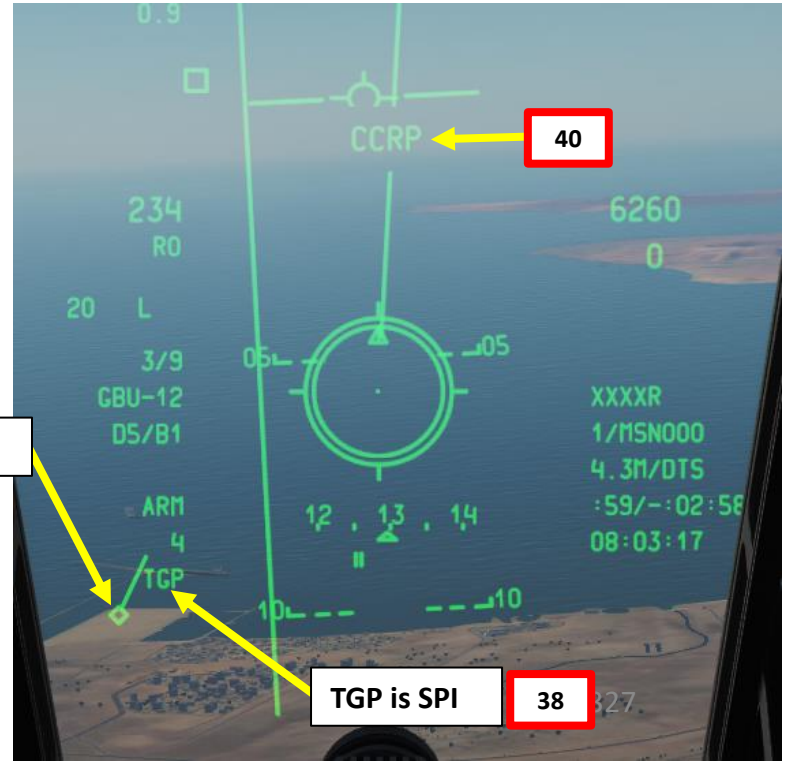
D: DESIGNATE TARGET WITH TARGETING POD

37. Verify TGP is SOI. If it's not, press the Coolie Hat Switch LONG in the direction of the MFCD that displays your TGP feed (RIGHT since we have the TGP page on the right MFCD).
38. Press the TMS (Target Management System) switch FWD LONG to designate the TGP Sensor Point of Interest (SPI).
39. Press the China Hat Switch FWD LONG to slave all sensors to the Sensor Point of Interest (SPI).
40. Press the Master Mode button until the CCRP HUD Mode is selected.







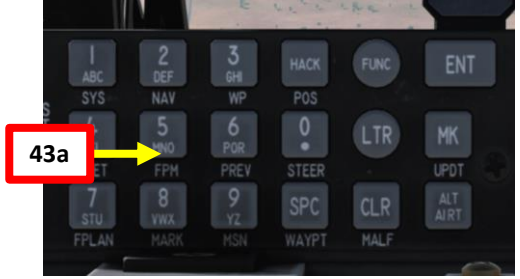


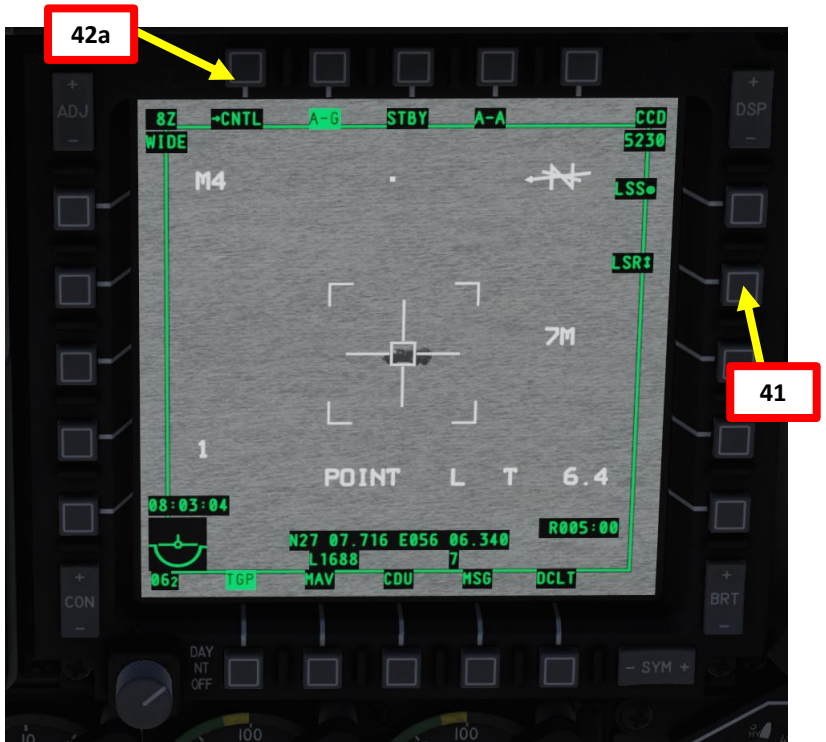
2.8 – GBU-12 PAVEWAY II GUIDED BOMB (LASER-GUIDED WITH TARGETING POD)

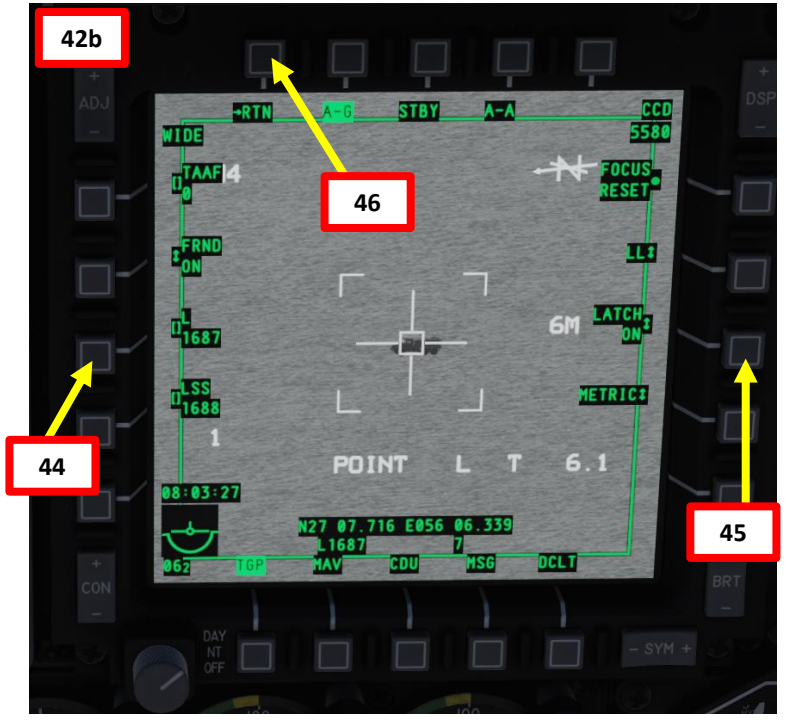
E: LASE TARGET

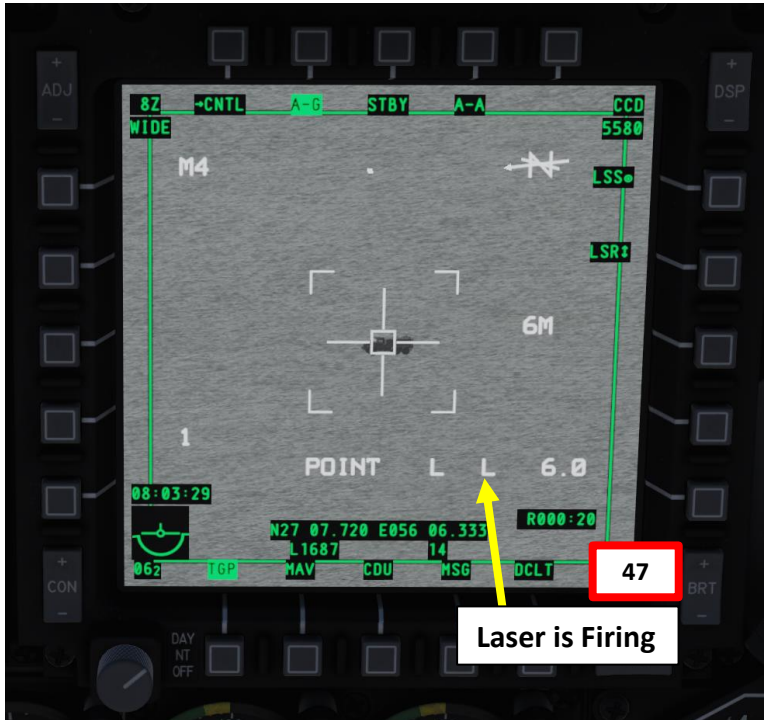
41. Select desired Laser Designator Mode (LSR) with OSB.
42. Press the OSB next to CNTL to enter see the TGP AG Control Page.
43. Enter the desired Laser Code on the UFC Scratchpad. We will choose laser code 1687, which we set previously on the GBU-12 of station 4.
44. Press on the OSB next to "L" (Laser Designation Code) to enter laser code 1687.
45. Select desired LATCH mode with OSB (LATCH ON means the laser is latched once fired by pressing the Nosewheel Steering Button). We will choose LATCH ON.
46. Press OSB next to RTN (Return) to go back to Main TGP page.
47. Press the Nosewheel Steering Button ("Insert" binding) to fire laser.

Note: Normally, you would first launch the GBU-12, then fire the laser to guide the weapon. For simplification purposes, we will lase first then attack.





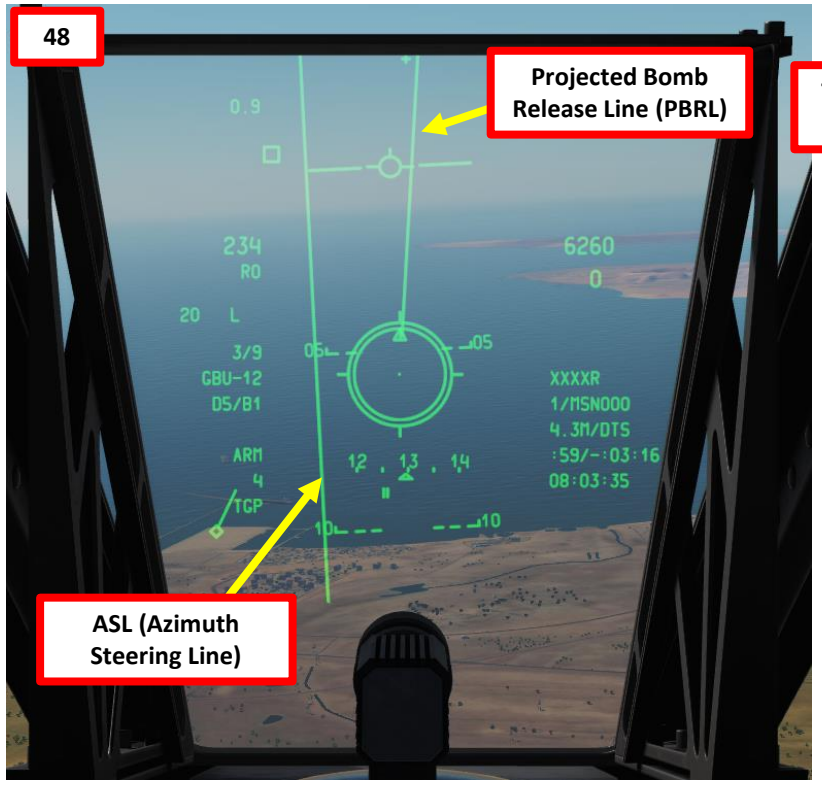


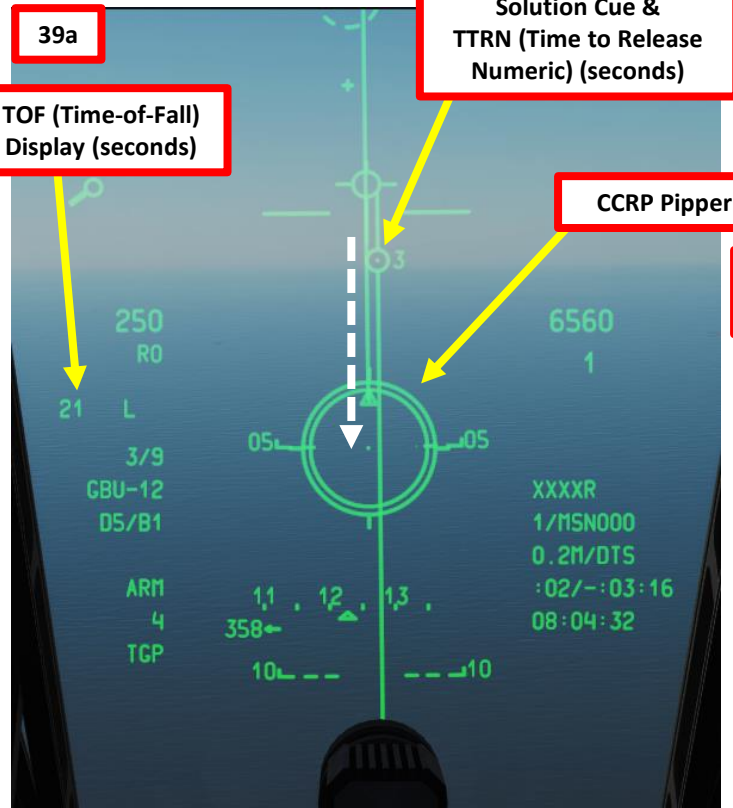


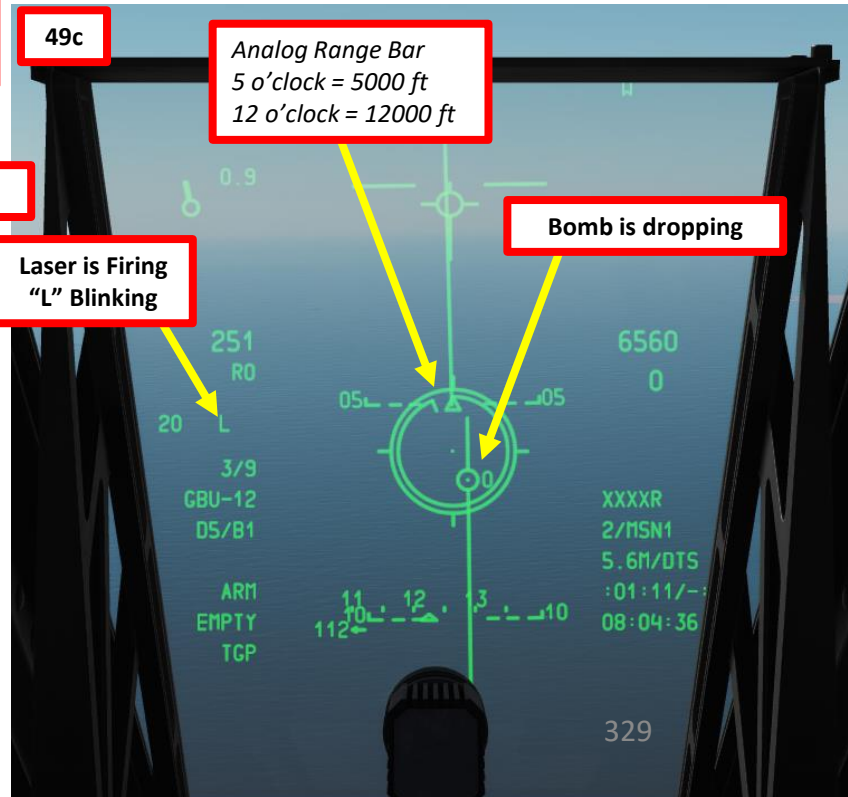
2.8 – GBU-12 PAVEWAY II GUIDED BOMB (LASER-GUIDED WITH TARGETING POD)

F: PERFORM ATTACK

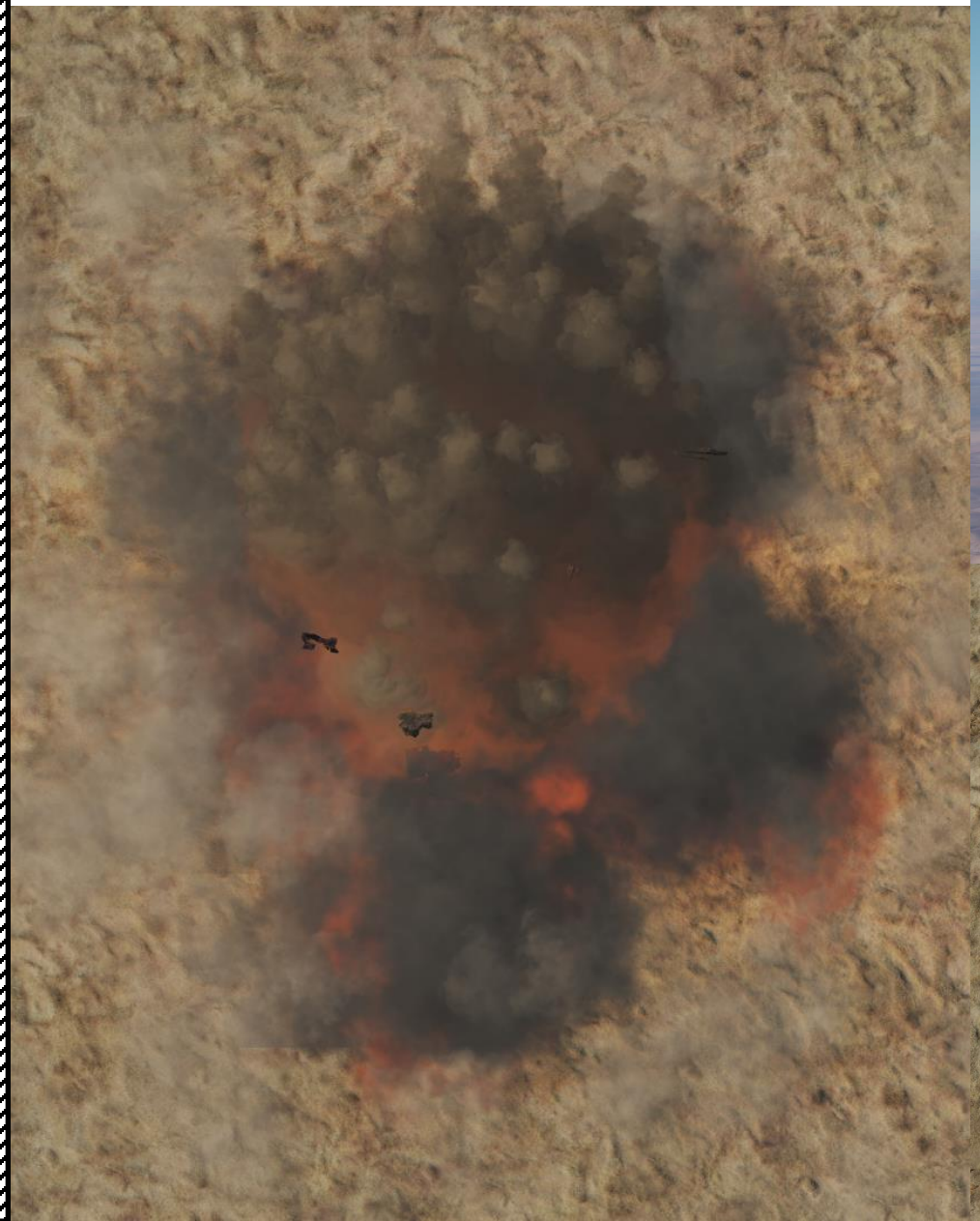
48. Fly level and maneuver the aircraft to align the CCRP Projected Bomb Release Line (PBRL) with the ASL. The CCRP pipper should lay along the ASL (Azimuth Steering Line).
49. At about 6 seconds on the TTRN, the Solution Cue will start to fall down the ASL. Press and hold down the Weapon Release button (RALT+SPACE) and maneuver the aircraft so that the Solution Cue falls through the CCRP pipper.
50. Bomb will automatically release once the Solution Cue falls through the CCRP pipper.
51. Verify that Laser is firing (blinking "L" on the HUD). If not, press the Nosewheel Steering Button ("Insert" binding) to fire laser.
52. The bomb will follow the laser until it hits the target.
53. After bomb impact, press the Nosewheel Steering Button again to stop firing the laser.







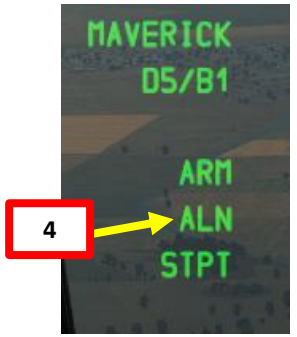
2.8 – GBU-12 PAVEWAY II GUIDED BOMB (LASER-GUIDED WITH TARGETING POD)

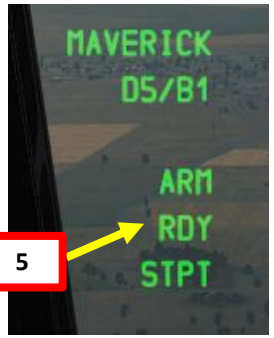


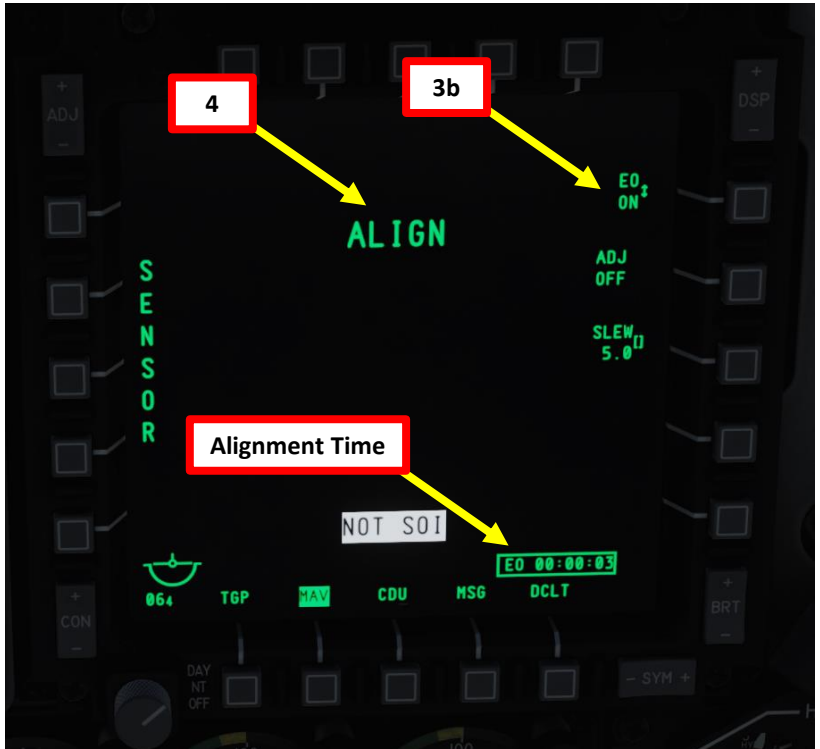
2.9 – AGM-65 MAVERICK (IRMAV)
MAVERICK SENSOR ONLY

A: PREPARE MAVERICK

1. Set Master Arm Switch ON (UP)
2. On the right MFCD, select MAV (Maverick) page
3. Press on the OSB next to EO OFF. This will start a 3-minute alignment period for the Maverick's Electro-Optical system.
4. During alignment, MAV page displays ALIGN and HUD displays ALN.
5. Missile alignment is complete once ALIGN caution disappears from the MAV page and HUD displays RDY.



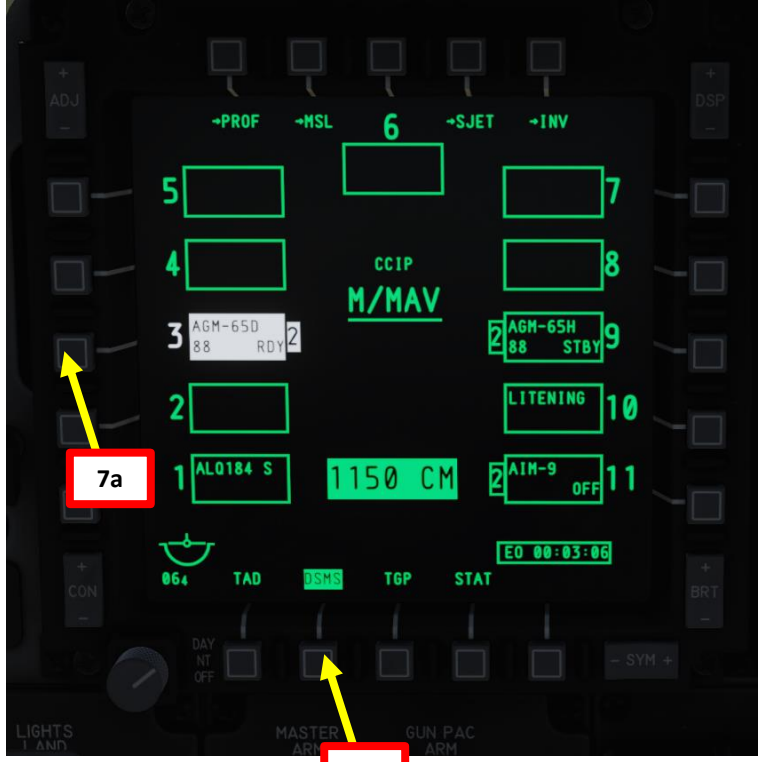


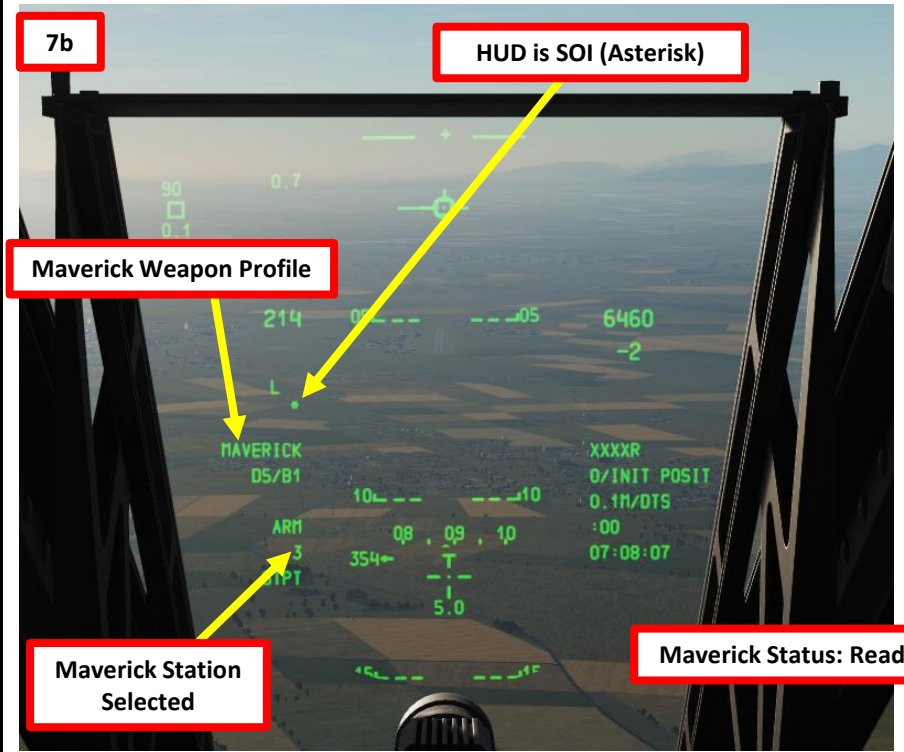


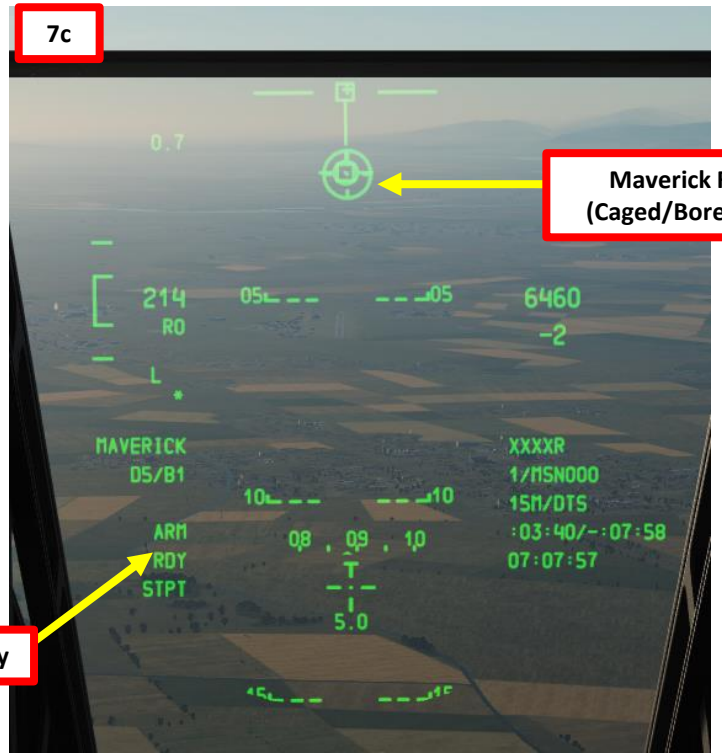
2.9 – AGM-65 MAVERICK (IRMAV)
MAVERICK SENSOR ONLY

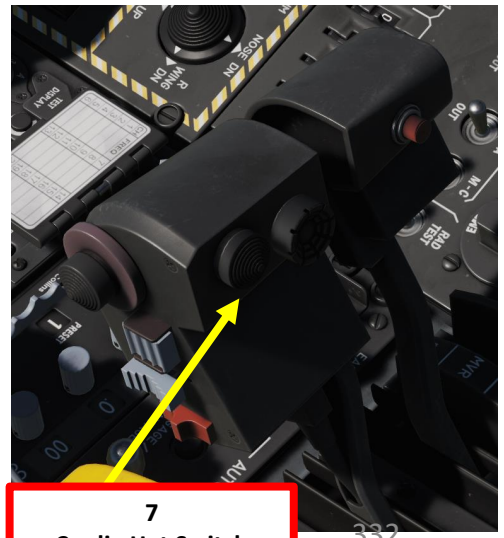
A: PREPARE MAVERICK

6. Select DSMS (Digital Stores Management System) page
7. Select AGM-65 Missile (green when selected).
    - When HUD is the Sensor of Interest (SOI, performed with Coolie Hat UP), you can cycle between stations (**A-10C LEGACY ONLY**) and profiles using the DMS (Data Management Switch) left or right. The Station will momentarily be displayed when switching stations, then revert back to RDY.





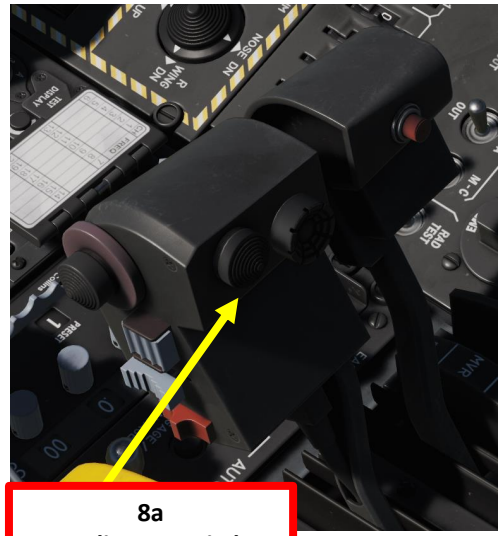




2.9 – AGM-65 MAVERICK (IRMAV)
MAVERICK SENSOR ONLY

B: LOCK TARGET WITH MAVERICK MISSILE

8. Press the Coolie Hat Switch LONG in the direction of the MFCD that displays your MAV feed (RIGHT since we have the MAV page on the right MFCD). This will set the Maverick as the SOI (Sensor of Interest).
9. Set Adjustment Boresight Function as required (we will leave it to OFF)
10. If you want to adjust the missile slew rate, you can enter the rate on the UFC scratchpad, then press on the OSB next to SLEW. The default slew rate is 5.0, but some users recommend 9.0.



8a
Coolie Hat Switch

Seeker Indication Relative to Boresight

Active Maverick Station Number

8b **MAV sensor is SOI (Sensor of Interest)**

Maverick Dynamic Launch Zone (DLZ)

9 **Adjustment Boresight Function**
Adjusts boresight position of the Maverick. Slew the Maverick to the desired boresight position, and press the OSB next to ADJ OFF. With ADJ ON, the next time you cage the missile to boresight, it will automatically cage to the set position.

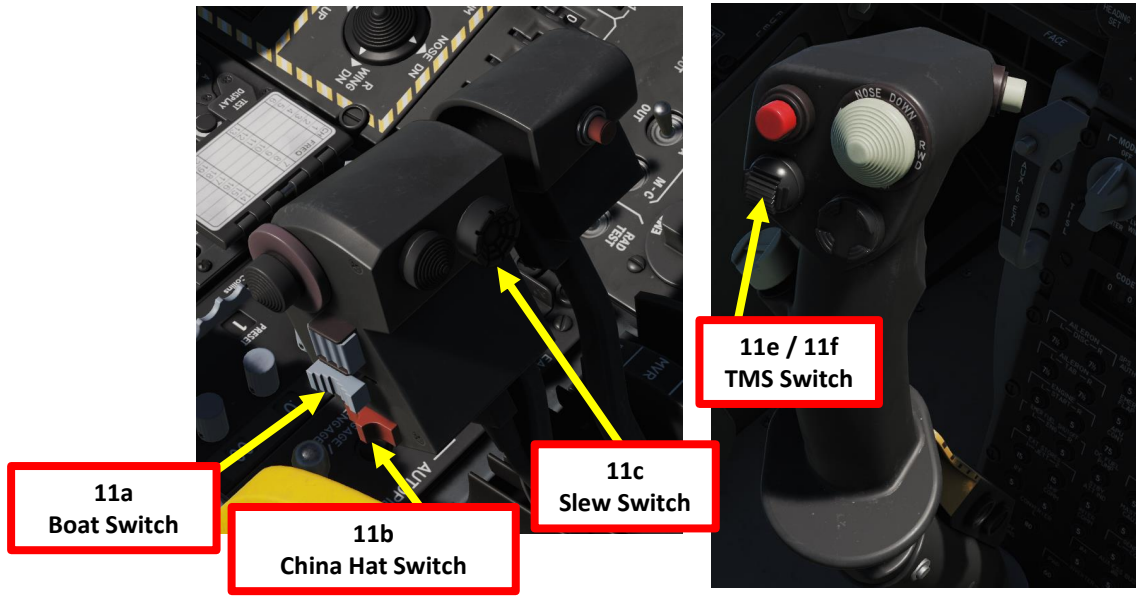
10 **Maverick Slew Rate Data Field**

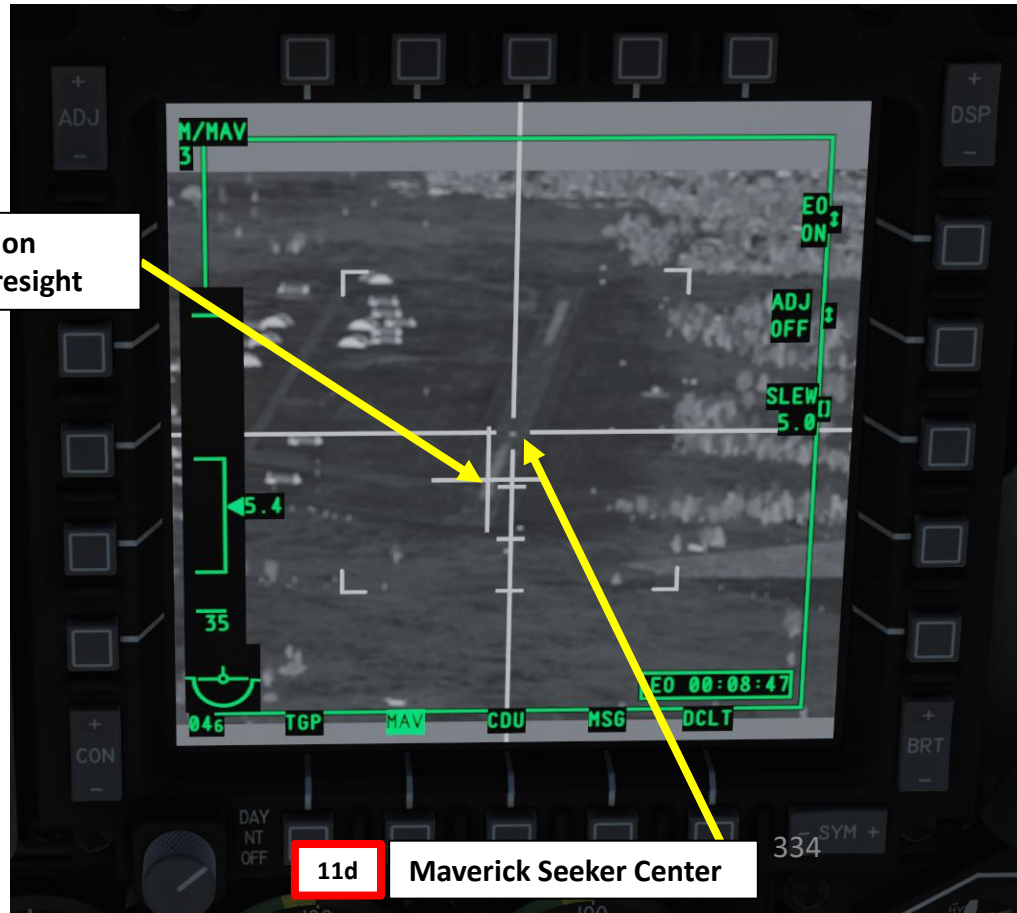
Maverick Seeker Center

2.9 – AGM-65 MAVERICK (IRMAV)
MAVERICK SENSOR ONLY

B: LOCK TARGET WITH MAVERICK MISSILE

11. Lock target with the Maverick
    a) Select desired Video Mode with the Boat Switch
        - FWD: Black Symbols
        - MIDDLE: Force Correlate / AUTO
        - AFT: White Symbols
    b) Select Field-of-View Mode with the China Hat Switch
        - FWD SHORT toggles between WIDE and NARROW
    c) Use the Slew Control Switch UP/DOWN/LEFT/RIGHT to set the MAV reticle on the target.
        - If required, use China Hat AFT SHORT to reset missile to its boresighted position
    d) When you release the slew control, the **Maverick will automatically attempt to lock onto the center of mass of a target it detects inside the tracking gate**. If it cannot lock on to a target, after a few seconds, the seeker will go into Break Lock mode and the crosshairs will expand out to the edges of the display.
    e) Press TMS (Target Management System) switch AFT SHORT to ground stabilize the reticle.
    f) Press TMS (Target Management System) switch FWD LONG to set Maverick as SPI (Sensor Point of Interest)



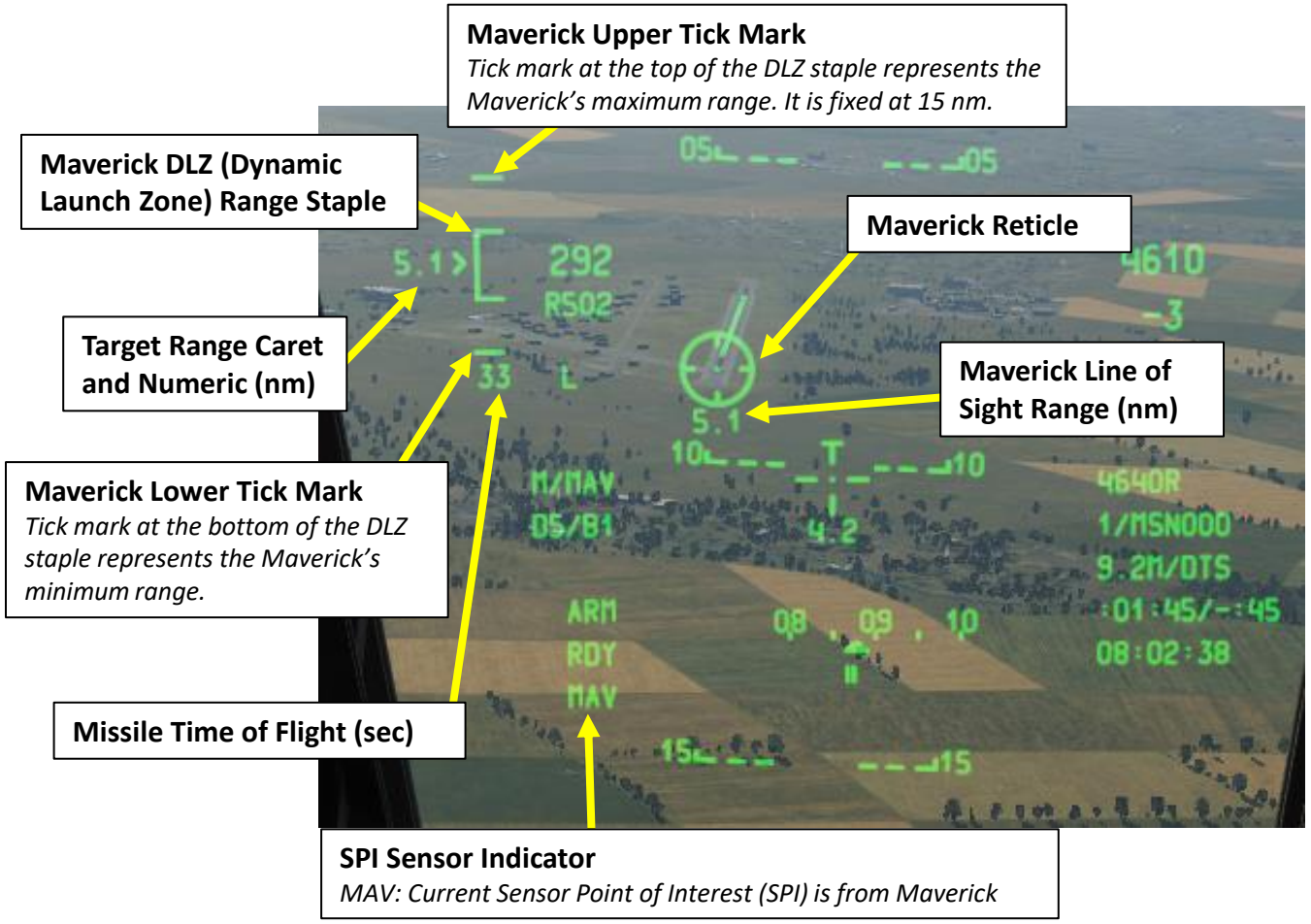


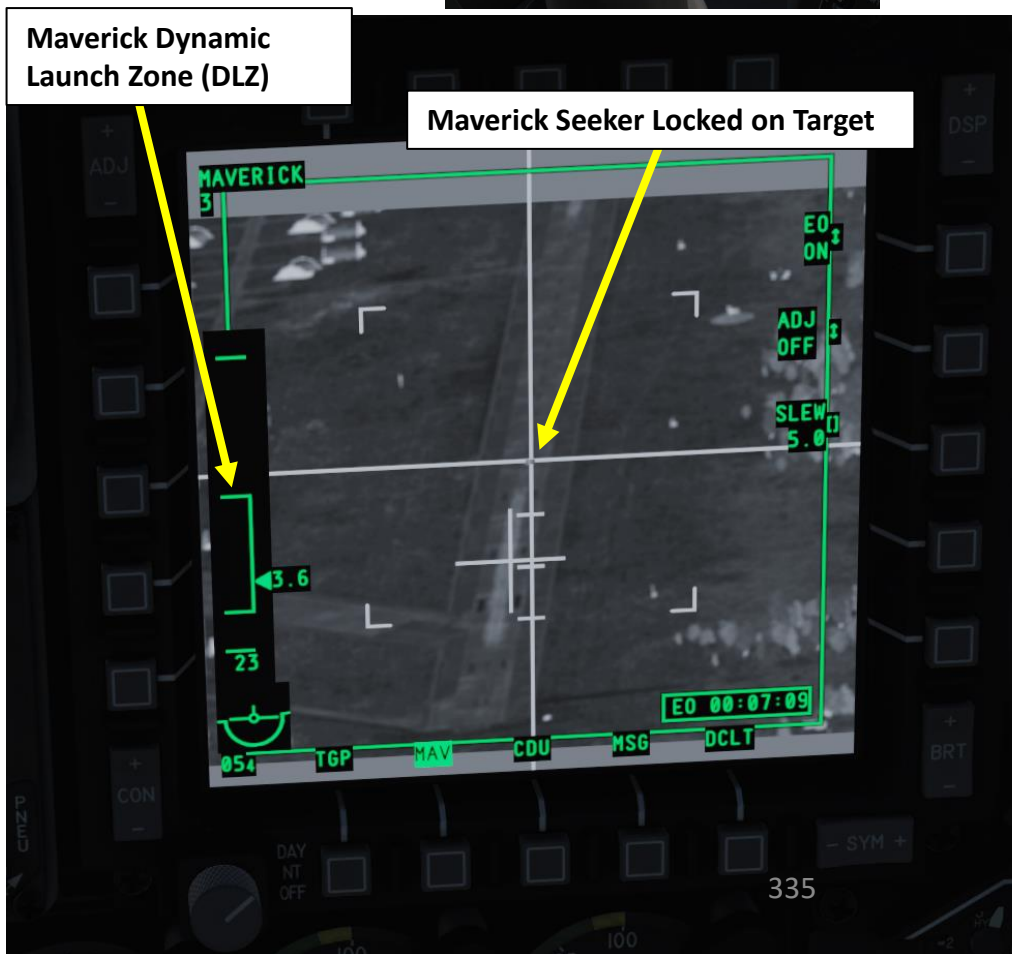
2.9 – AGM-65 MAVERICK (IRMAV)
MAVERICK SENSOR ONLY

C: PERFORM ATTACK

12. When missile has a good lock (generally between 3 and 7 nm), press the Weapon Release button (RALT+SPACE) to fire Maverick missile. LAUNCH INHIBIT message will be displayed if no valid lock is obtained when pressing the Weapon Release button.

Note: flaps must be UP when firing a missile since it could be damaged by the missile launch.





2.9 – AGM-65 MAVERICK (IRMAV)
MAVERICK SENSOR ONLY

2.10 – AGM-65 MAVERICK (IRMAV)
TARGETING POD SENSOR

The Maverick seeker, even if it can find and lock a target by itself, has a very limited range. It is quite clunky to use just by itself. The Targeting Pod (which has a much greater range and is easier to operate) can be used to designate a target. A press of the China Hat Switch FWD can then slave the Maverick seeker to the TGP Sensor Point of Interest, which is quite handy since the missile will lock the target once in range.

Here is a great video by Bunyap showcasing this functionality: https://youtu.be/MpUtNEvFXNI

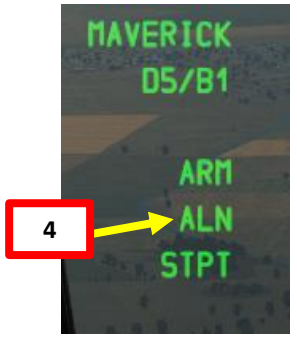
Here is the best method to use the Maverick in conjunction with the Targeting Pod:

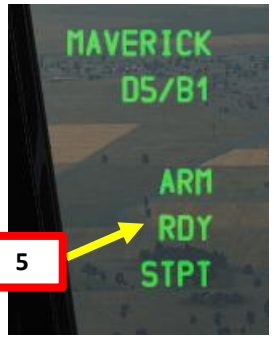
A. Prepare and arm the Maverick Missile
B. Designate the target with the targeting pod, then set it as the SPI (Sensor Point of Interest)
C. Slave Maverick seeker to the TGP SPI, then acquire lock on target with the Maverick
D. Perform the attack and launch the Maverick

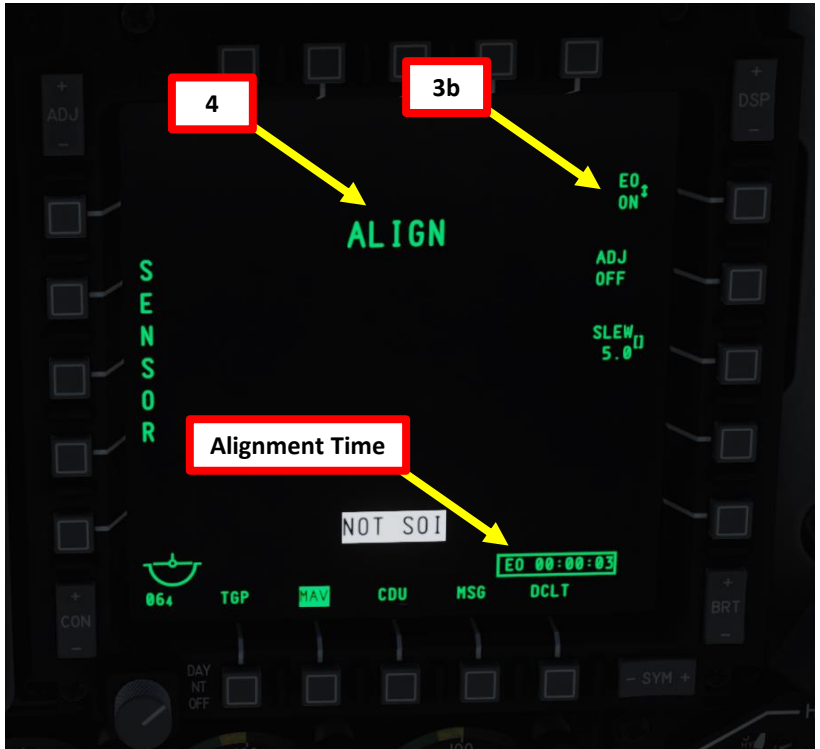
2.10 – AGM-65 MAVERICK (IRMAV) TARGETING POD SENSOR

A: PREPARE MAVERICK

1. Set Master Arm Switch ON (UP)
2. On the right MFCD, select MAV (Maverick) page
3. Press on the OSB next to EO OFF. This will start a 3-minute alignment period for the Maverick's Electro-Optical system.
4. During alignment, MAV page displays ALIGN and HUD displays ALN.
5. Missile alignment is complete once ALIGN caution disappears from the MAV page and HUD displays RDY.



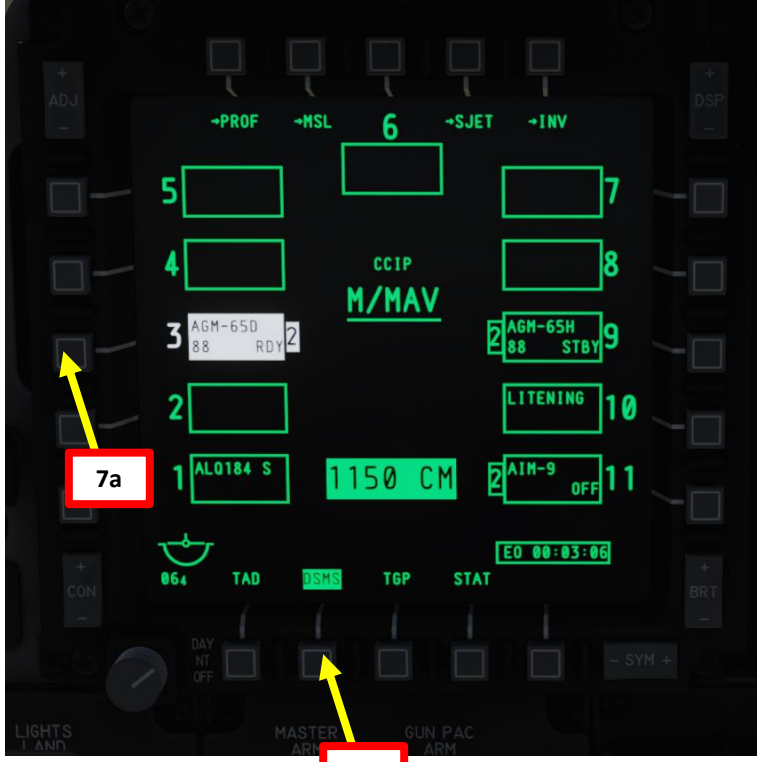


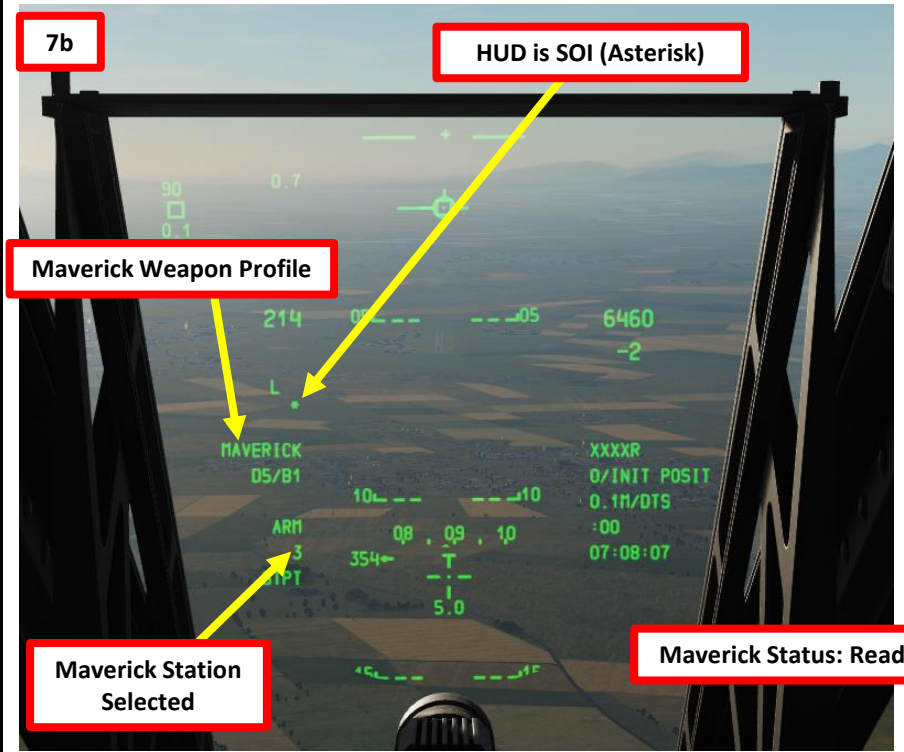


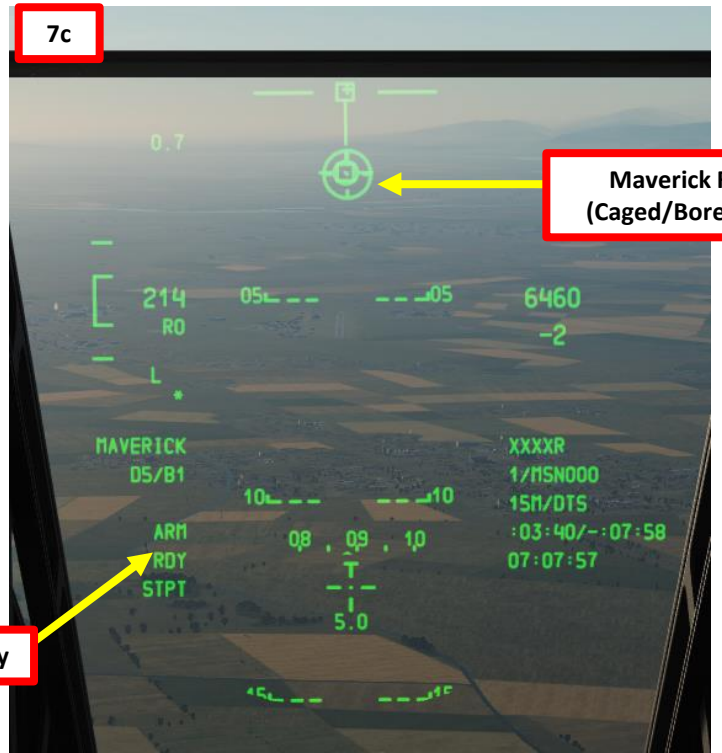
2.10 – AGM-65 MAVERICK (IRMAV) TARGETING POD SENSOR

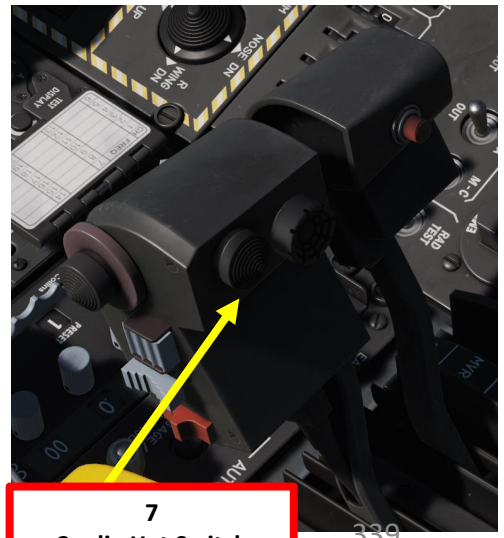
A: PREPARE MAVERICK

6. Select DSMS (Digital Stores Management System) page
7. Select AGM-65 Missile (green when selected).
    - When HUD is the Sensor of Interest (SOI, performed with Coolie Hat UP), you can cycle between stations (**A-10C LEGACY ONLY**) and profiles using the DMS (Data Management Switch) left or right. The Station will momentarily be displayed when switching stations, then revert back to RDY.





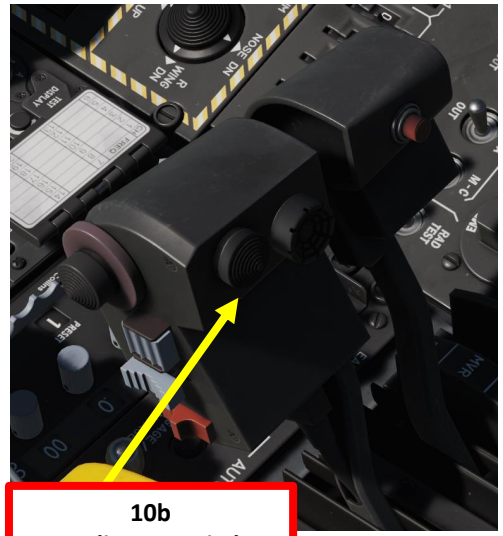


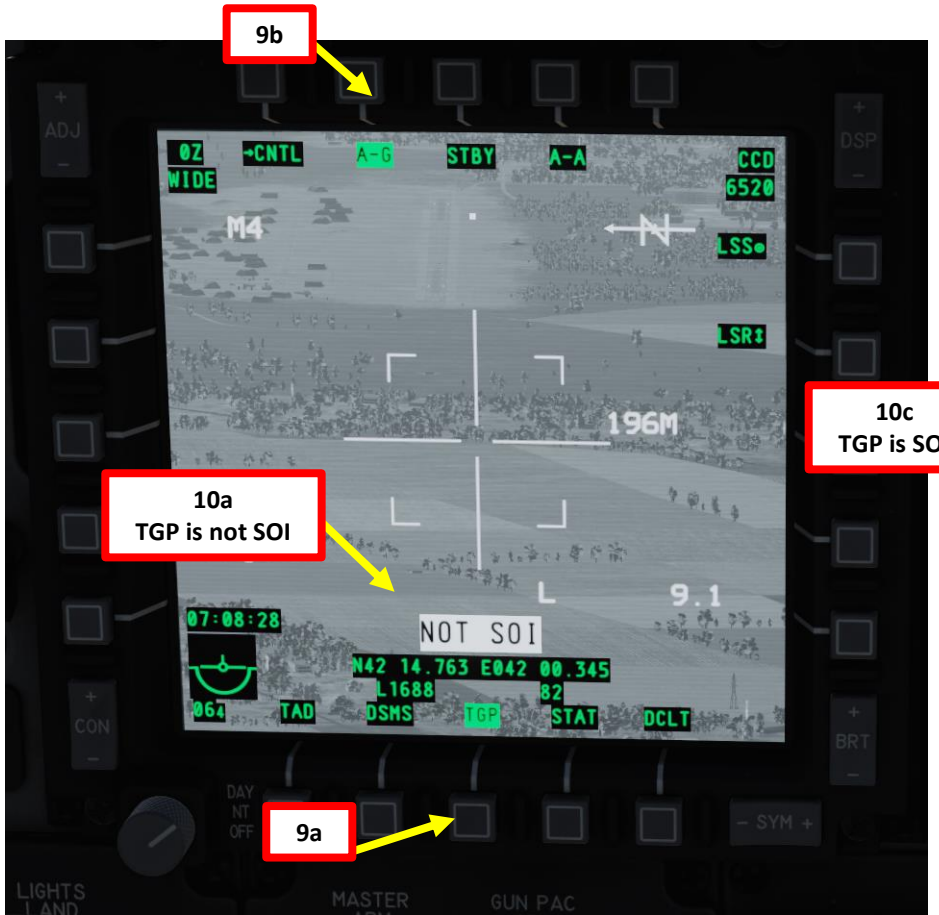


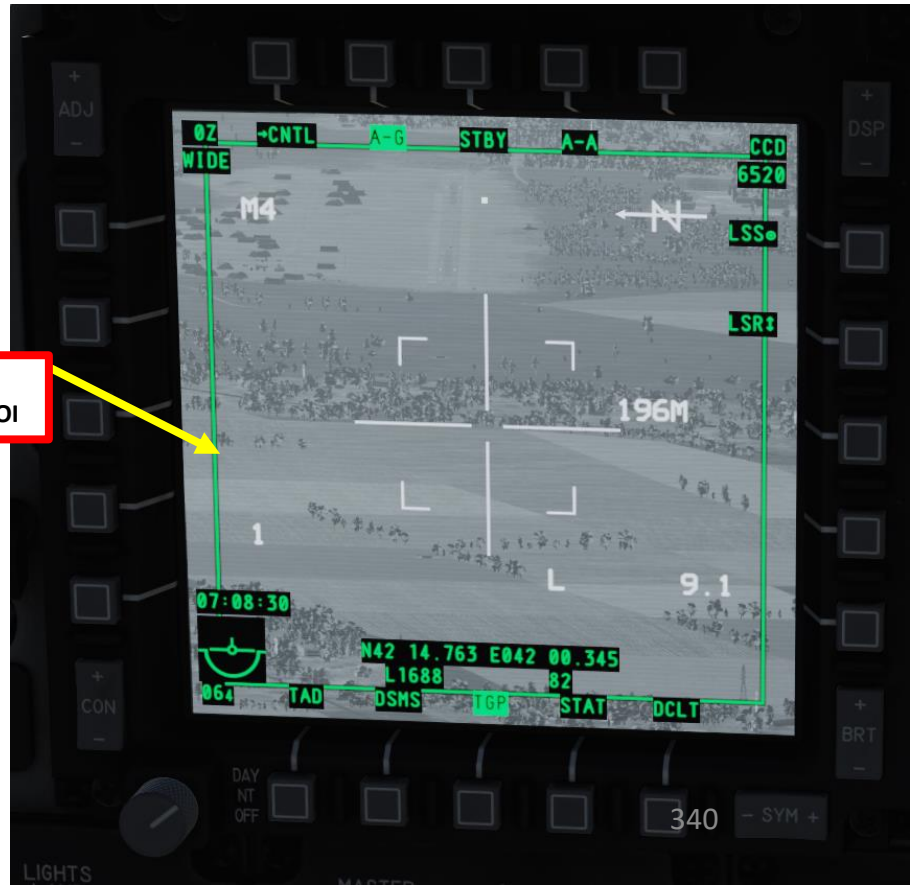
2.10 – AGM-65 MAVERICK (IRMAV) TARGETING POD SENSOR

B: DESIGNATE TARGET WITH TARGETING POD

8. On AHCP (Armament HUD Control Panel), set TGP switch ON (UP) to power up the targeting pod.
9. Press the OSB (Option Select Button) next to TGP (Targeting Pod) to display the TGP Feed Page on the left MFCD. Then, select the A-G (Air-to-Ground) Mode.
10. Press the Coolie Hat Switch LONG in the direction of the MFCD that displays your TGP feed (LEFT since we have the TGP page on the left MFCD). This will set the TGP as the SOI (Sensor of Interest).



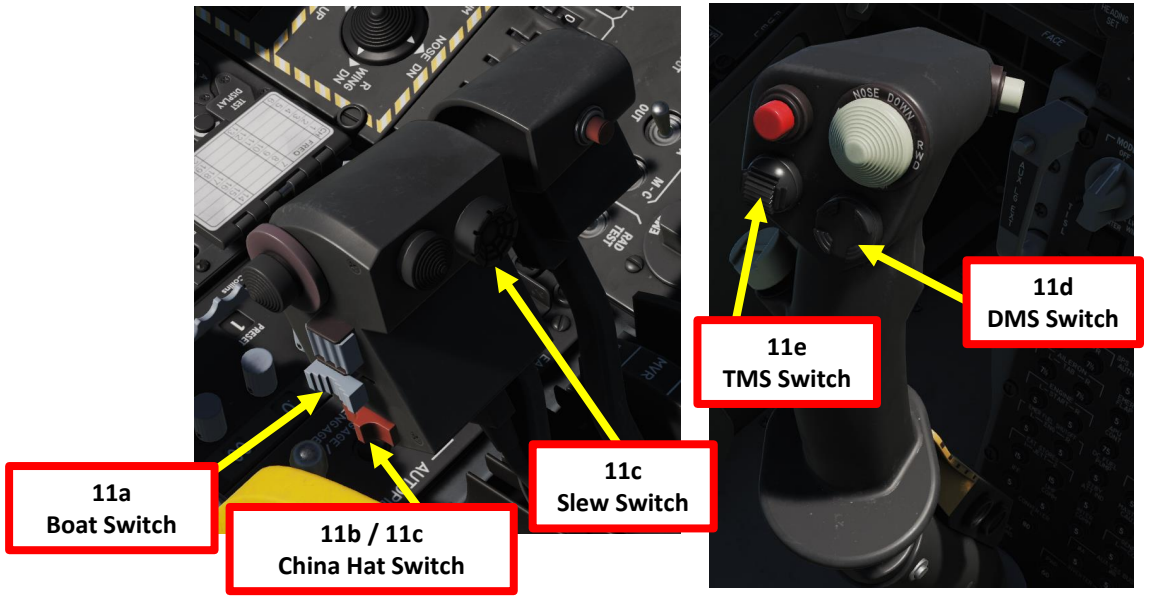


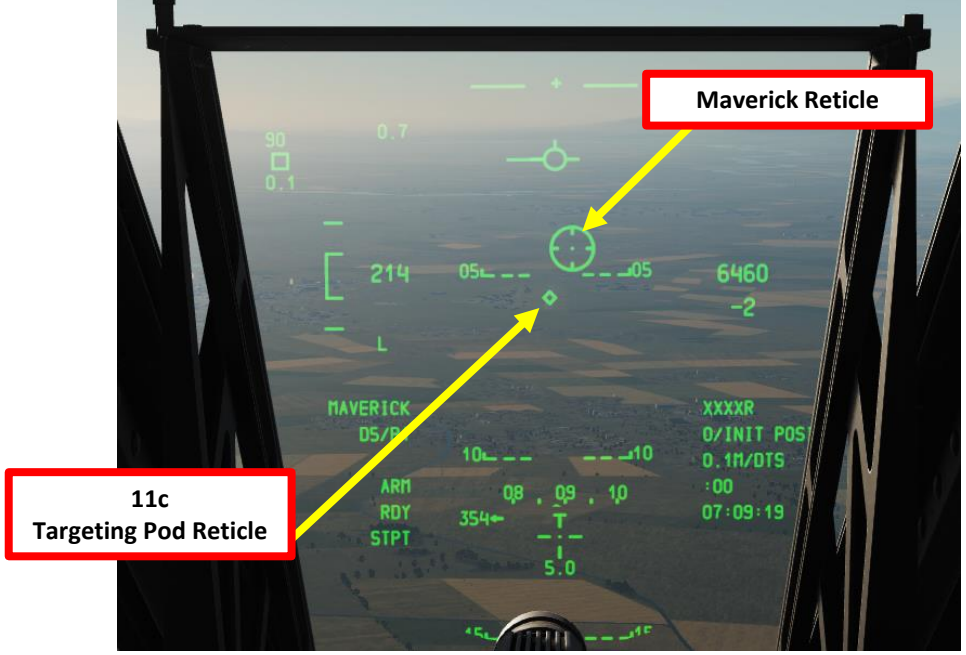


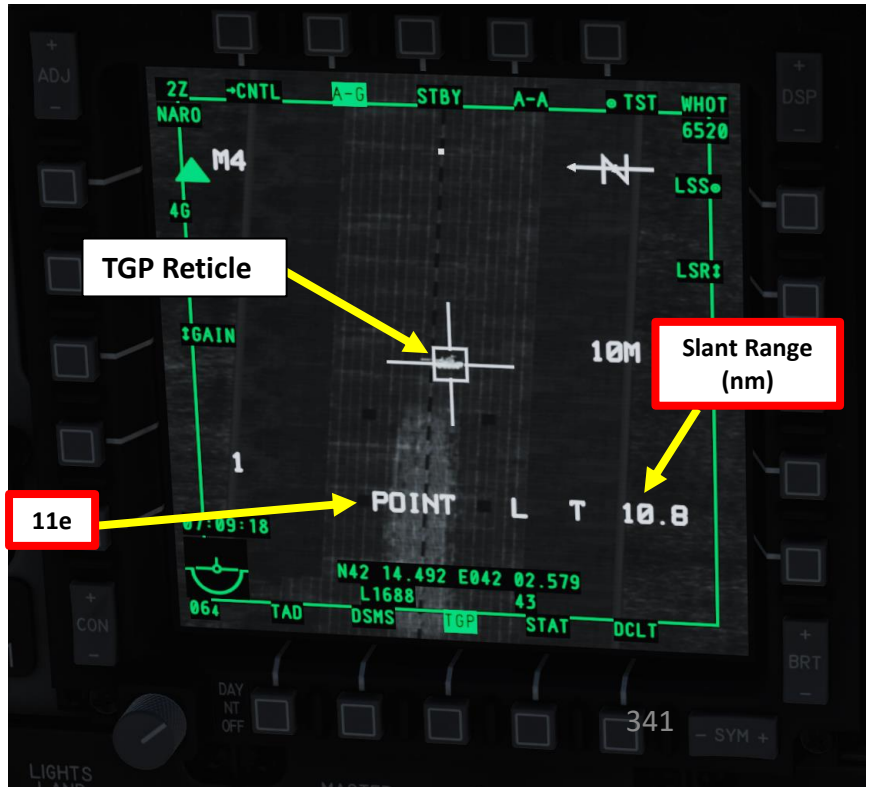
2.10 – AGM-65 MAVERICK (IRMAV) TARGETING POD SENSOR

B: DESIGNATE TARGET WITH TARGETING POD

11. Designate target with the Targeting Pod
    a) Select desired Video Mode with the Boat Switch
        - FWD: FLIR BHOT (Forward-Looking Infrared Black Hot)
        - MIDDLE: CCD (Charge Coupled Device/TV)
        - AFT: FLIR WHOT (Forward-Looking Infrared White Hot)
    b) Select Field-of-View Mode with the China Hat Switch
        - FWD SHORT toggles between WIDE and NARROW
    c) Use the Slew Control Switch UP/DOWN/LEFT/RIGHT to set the TGP reticle on the target.
        - Note: If you want to reset the TGP in front of you (boresight):
            - **A-10C LEGACY**: Press the China Hat Switch AFT SHORT
            - **A-10C II TANK KILLER EXPANSION**: In the TGP page, press the OSB next to B-S (Boresight Function)
    d) Press on the DMS (Data Management Switch) FWD/AFT SHORT to adjust Zoom Level.
    e) Press the TMS (Target Management System) switch FWD SHORT to track the target. This will toggle tracking modes between AREA TRACK (static target) and POINT TRACK (moving target).



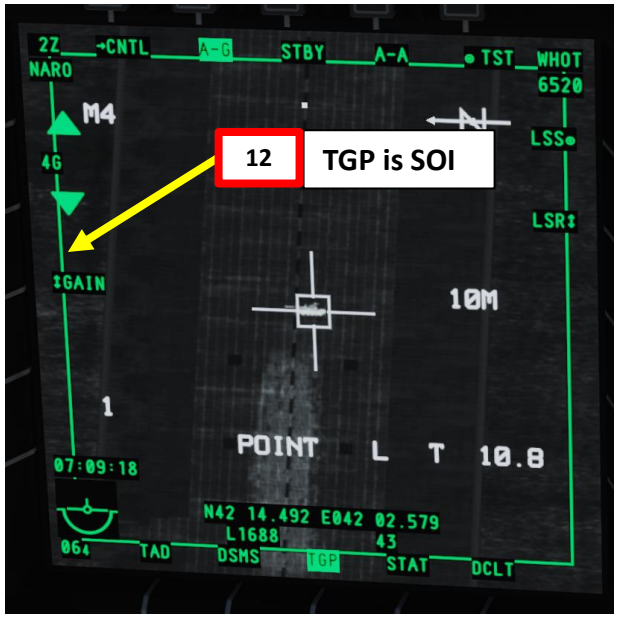


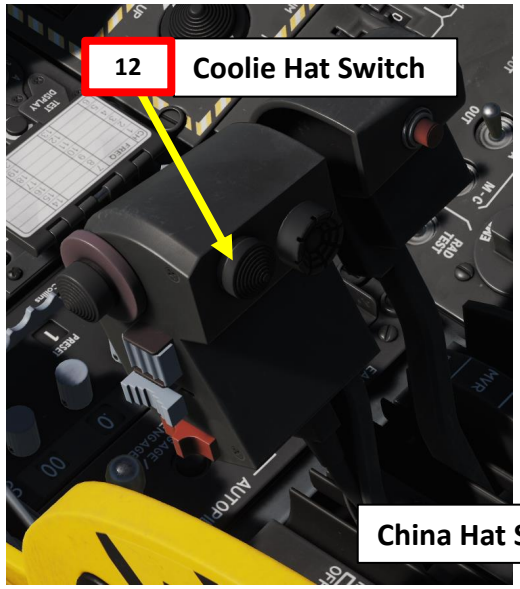


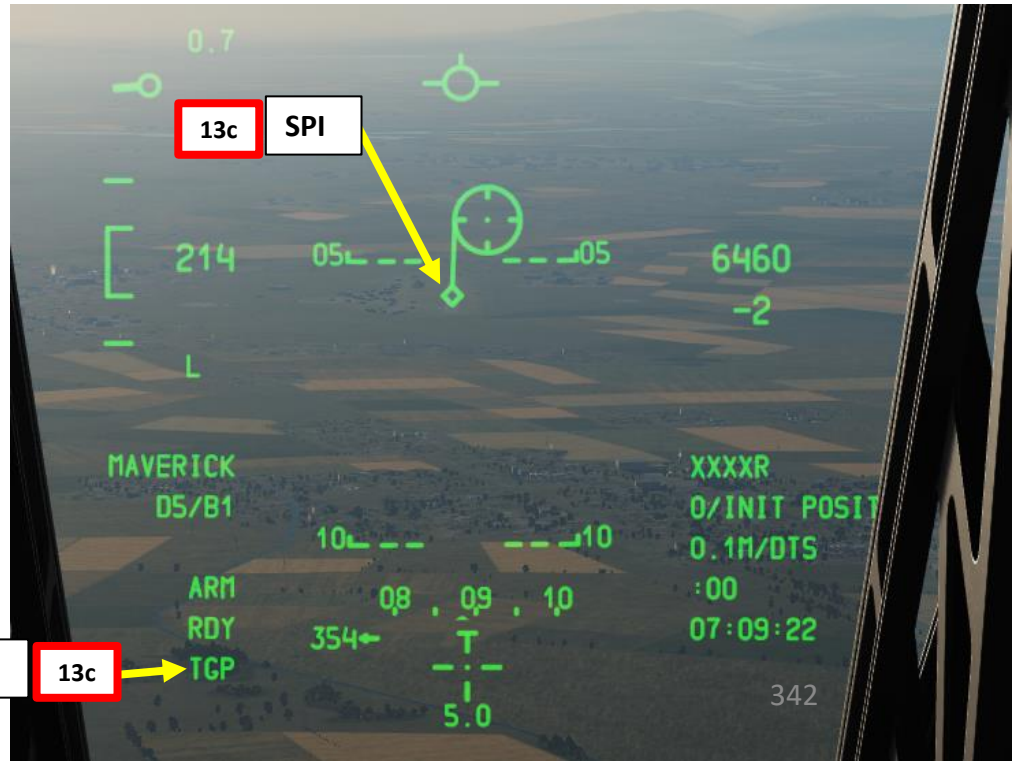
2.10 – AGM-65 MAVERICK (IRMAV) TARGETING POD SENSOR

B: DESIGNATE TARGET WITH TARGETING POD

12. Verify TGP is SOI (Sensor of Interest). If it's not, press the Coolie Hat Switch LONG in the direction of the MFCD that displays your TGP feed (RIGHT since we have the TGP page on the right MFCD).
13. Press the TMS (Target Management System) switch FWD LONG to designate the TGP Sensor Point of Interest (SPI).



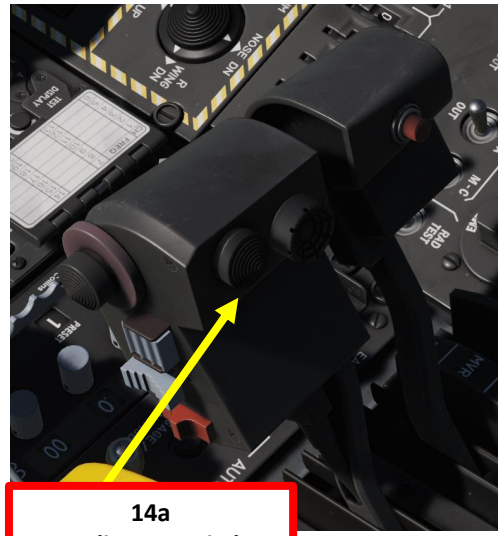




2.10 – AGM-65 MAVERICK (IRMAV) TARGETING POD SENSOR

C: LOCK TARGET WITH MAVERICK MISSILE

14. Press the Coolie Hat Switch LONG in the direction of the MFCD that displays your MAV feed (RIGHT since we have the MAV page on the right MFCD). This will set the Maverick as the SOI (Sensor of Interest).
15. Press the China Hat Switch FWD LONG to slave all sensors to the Sensor Point of Interest (SPI). This will slew the Maverick missile automatically to the point designated by the Targeting Pod, which is the current SPI.
16. Keep in mind that the Maverick has not locked a target yet. The seeker will likely be into Break Lock mode and the crosshairs will expand out to the edges of the display.



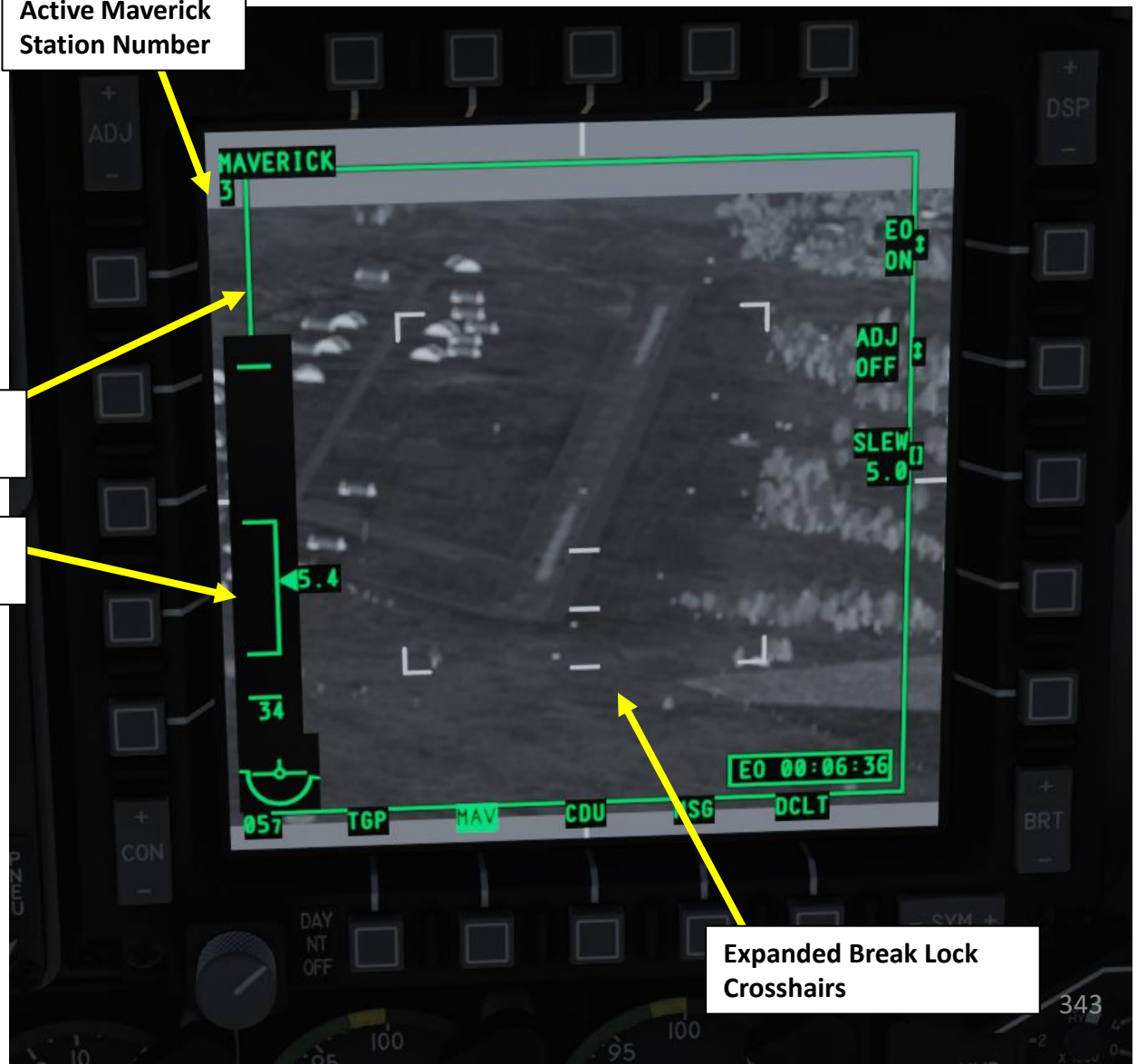
14a
Coolie Hat Switch

14b

MAV sensor is SOI (Sensor of Interest)

Maverick Dynamic Launch Zone (DLZ)

Active Maverick Station Number

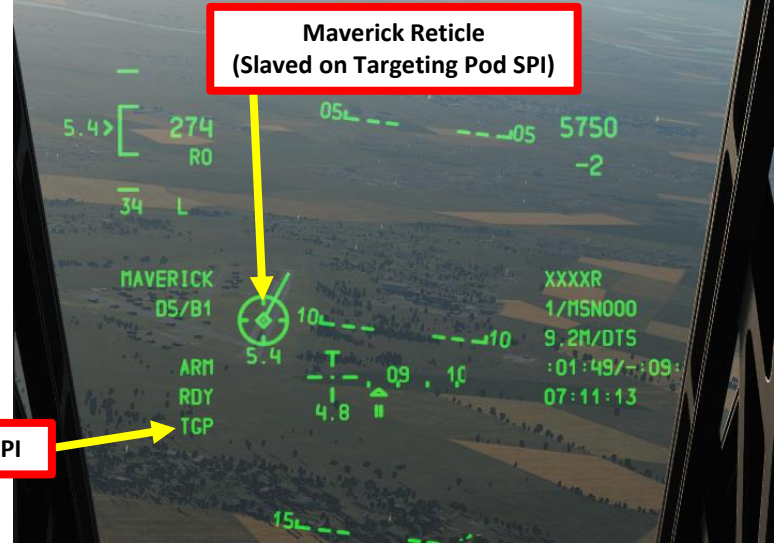


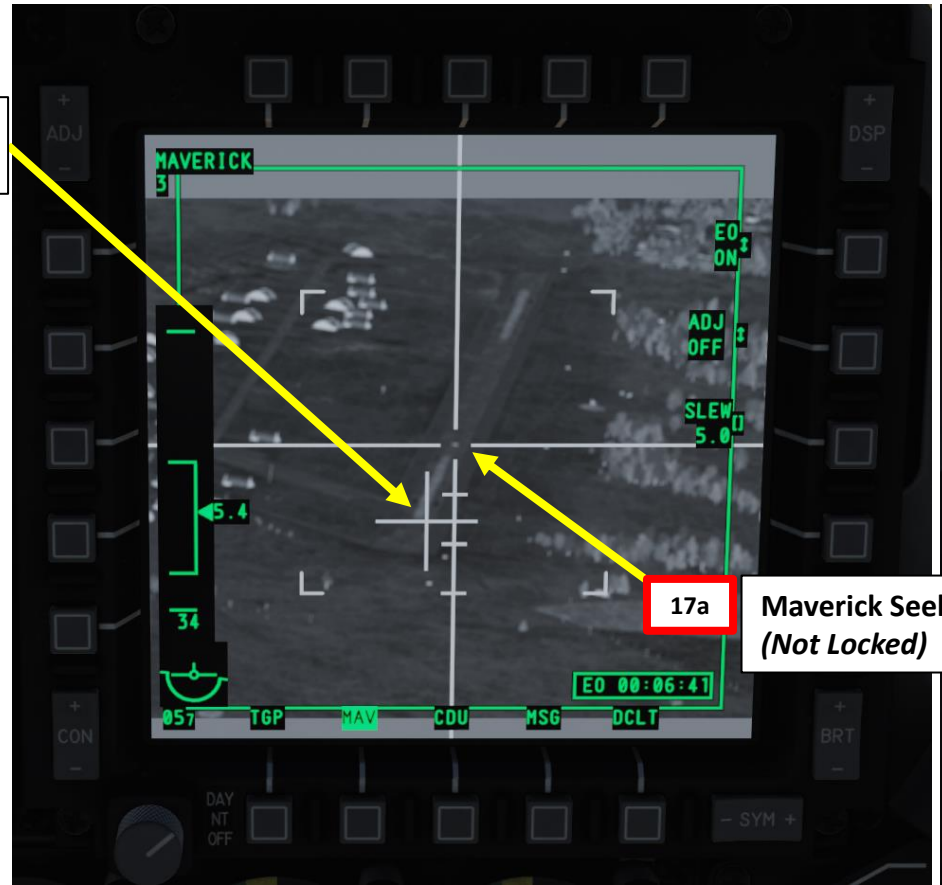
Expanded Break Lock Crosshairs

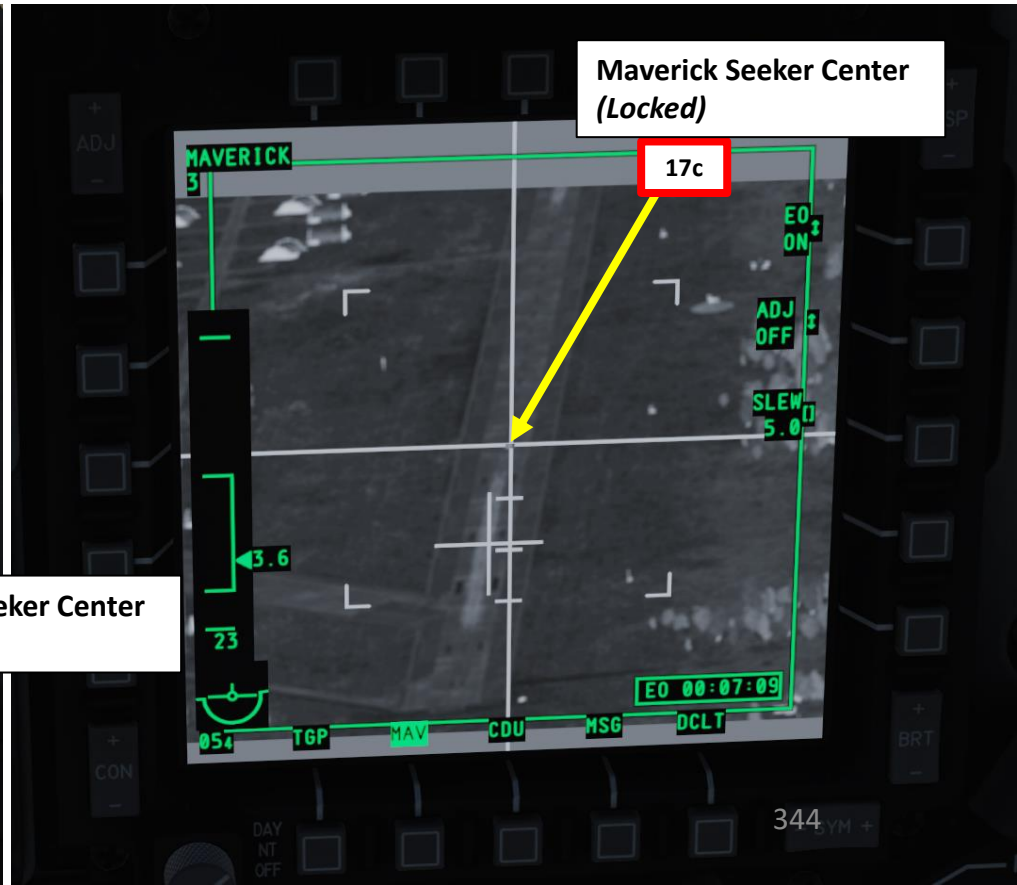
2.10 – AGM-65 MAVERICK (IRMAV) TARGETING POD SENSOR

C: LOCK TARGET WITH MAVERICK MISSILE

17. Lock target with the Maverick.
    a) As you approach the target, check the DLZ (Dynamic Launch Zone) to estimate the range.
    b) When you are in range (between 3 and 7 nm), press TMS (Target Management System) switch FWD SHORT to attempt a lock on the target. You may need to attempt this a couple of times.
    c) Once target is locked on the Maverick, the crosshair symbology will change.





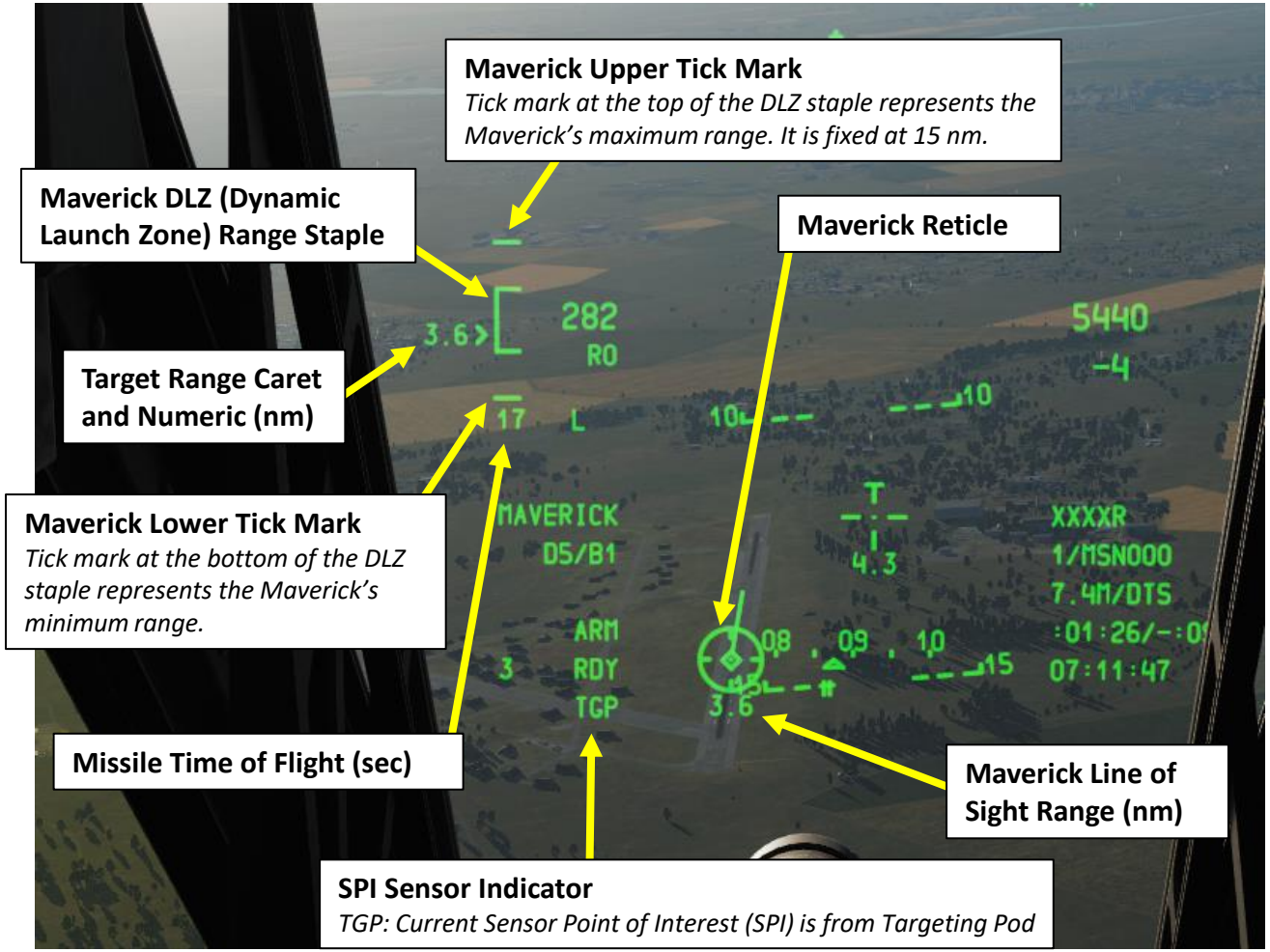


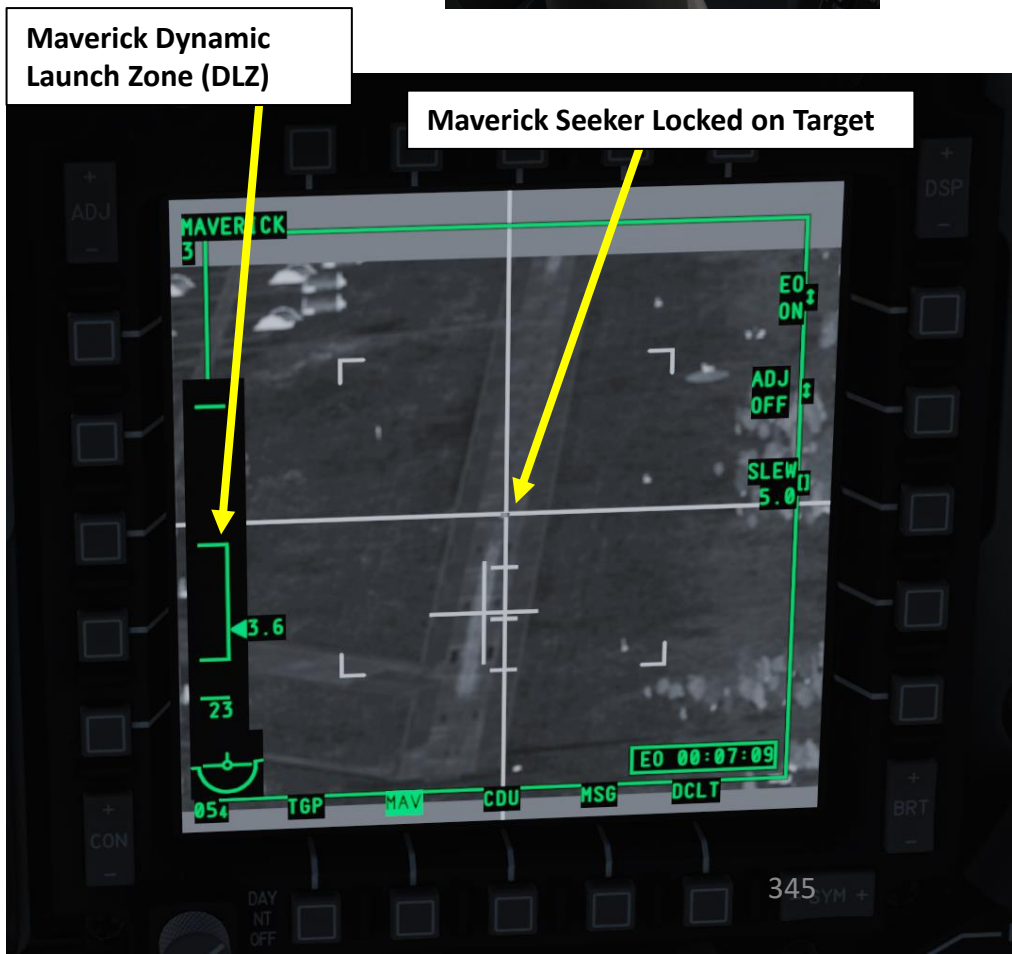
2.10 – AGM-65 MAVERICK (IRMAV) TARGETING POD SENSOR

D: PERFORM ATTACK

18. When missile has a good lock (generally between 3 and 7 nm), press the Weapon Release button (RALT+SPACE) to fire Maverick missile. LAUNCH INHIBIT message will be displayed if no valid lock is obtained when pressing the Weapon Release button.

Note: flaps must be UP when firing a missile since it could be damaged by the missile launch.





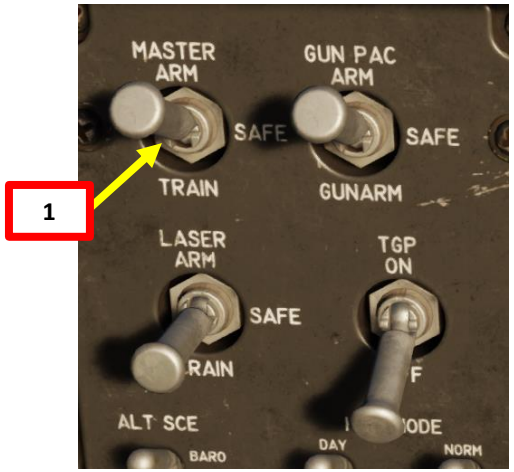
2.10 – AGM-65 MAVERICK (IRMAV)
TARGETING POD SENSOR

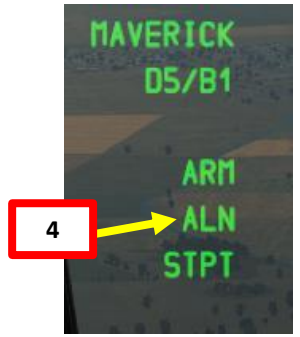
2.11 – AGM-65L LASER MAVERICK TARGETING POD DESIGNATION (LASER)

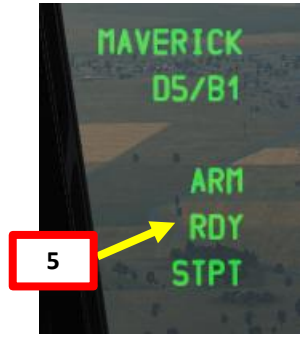
A-10C II Tank Killer Expansion Only

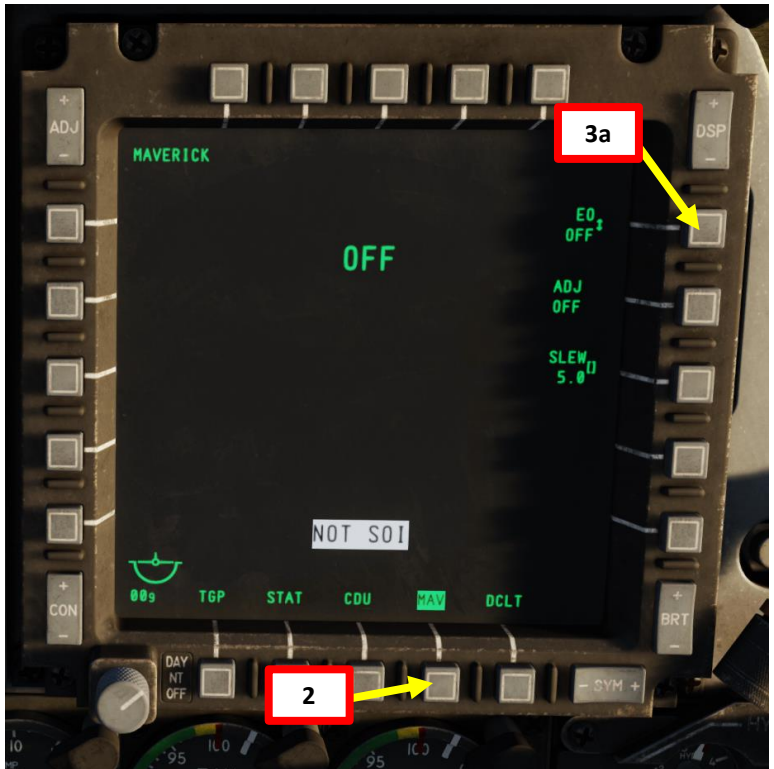
A: PREPARE MAVERICK

1. Set Master Arm Switch ON (UP)
2. On the right MFCD, select MAV (Maverick) page
3. Press on the OSB next to EO OFF. This will start a 3-minute alignment period for the Maverick's system.
4. During alignment, MAV page displays ALIGN and HUD displays ALN.
5. Missile alignment is complete once ALIGN caution disappears from the MAV page and HUD displays RDY.







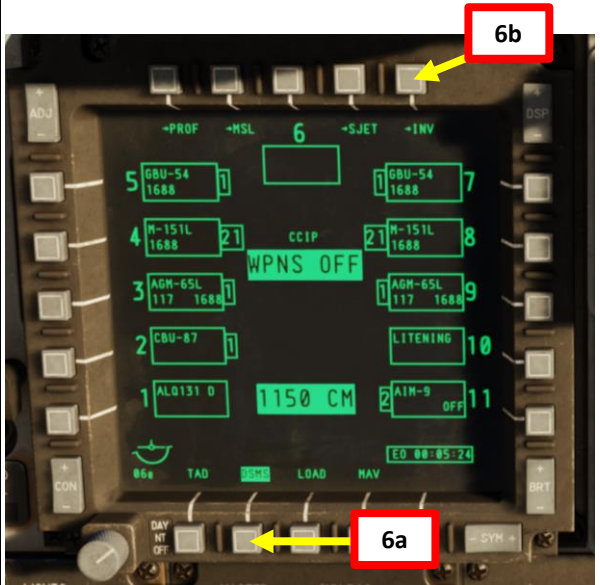


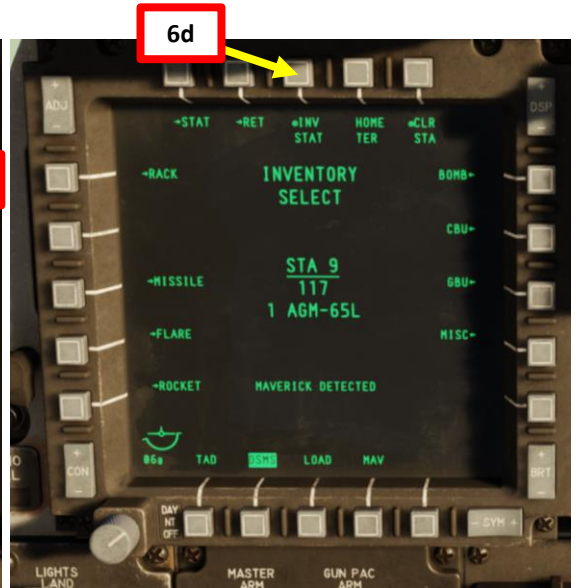
2.11 – AGM-65L LASER MAVERICK TARGETING POD DESIGNATION (LASER)

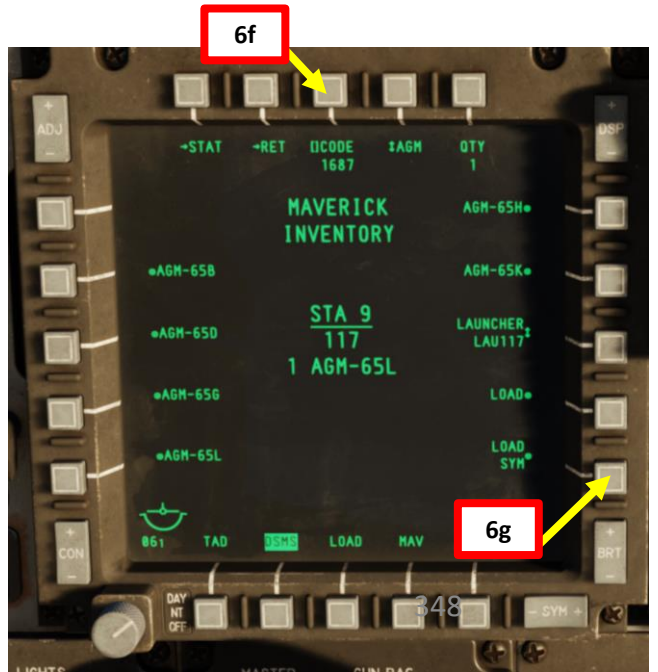
A-10C II Tank Killer Expansion Only

B: PROGRAM MISSILE LASER CODE (VIA DSMS PAGE)

6. Program the laser code the Maverick missile will track. You can do this with the DSMS page.
    a) Select DSMS (Digital Stores Management System) page
    b) Select "INV" (Inventory) page
    c) Select desired AGM-65L station (Station 9)
    d) Select "INV STAT" (Inventory Station)
    e) Enter desired Maverick laser code on the UFC scratchpad (i.e. 1687).
    f) Click on the OSB next to CODE to set new laser code (1687) on the AGM-65L.
    g) Click on OSB next to LOAD if you want to load these parameters for this station only. If you have a symmetrical (same) loadout on opposite pylons (e.g., 3 and 9), select LOAD SYM to load these parameters on both Maverick stations.





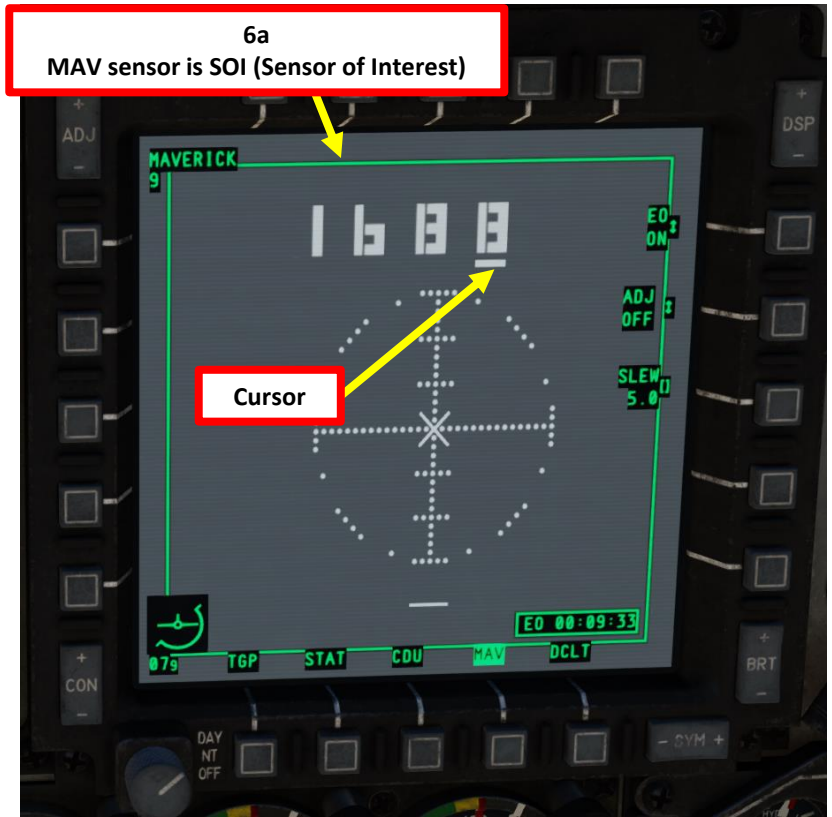


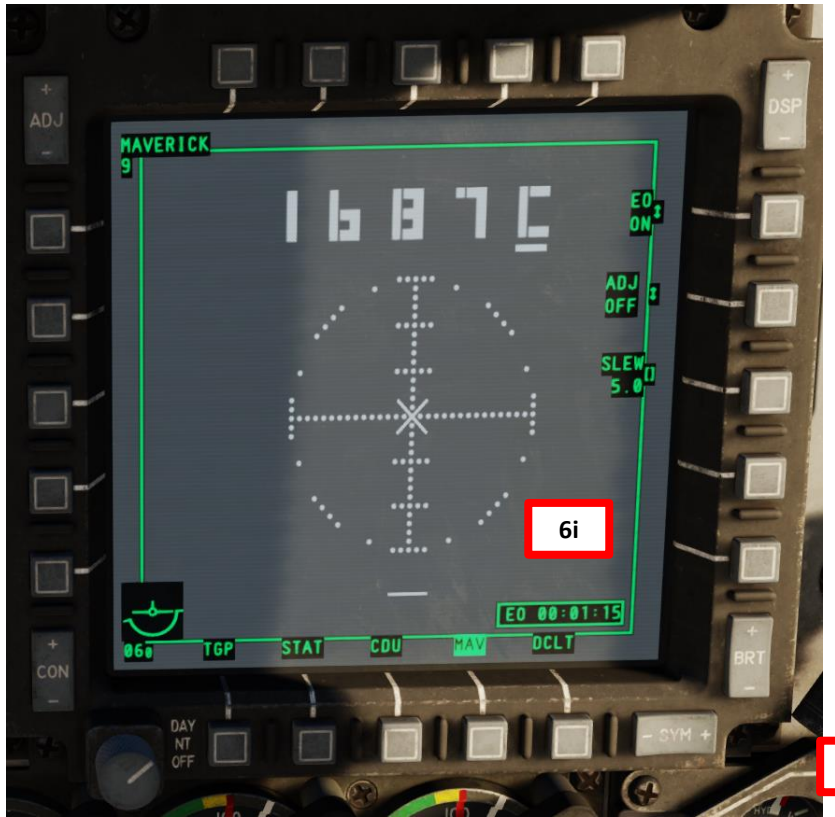
2.11 – AGM-65L LASER MAVERICK TARGETING POD DESIGNATION (LASER)

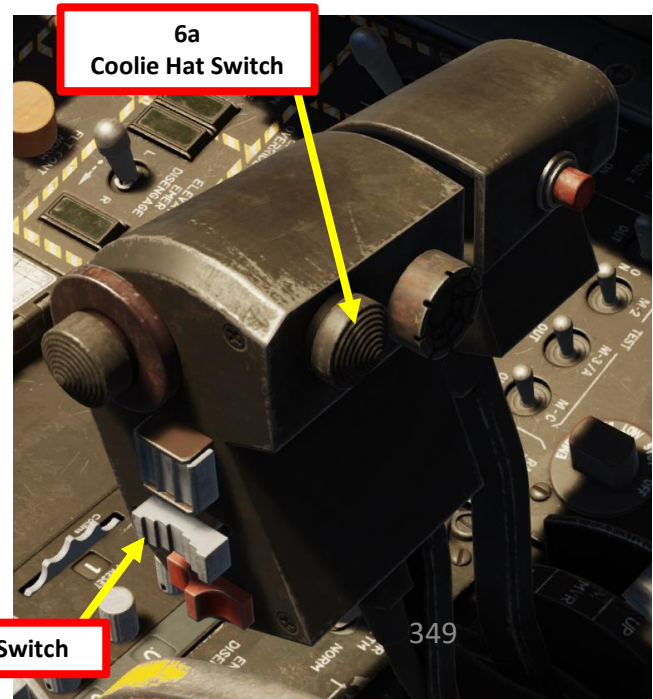
A-10C II Tank Killer Expansion Only

B: PROGRAM MISSILE LASER CODE (VIA MAV PAGE)

6. Program the laser code the Maverick missile will track. An alternative method is to do this with the Boat Switch.
   a) Press the Coolie Hat Switch LONG in the direction of the MFCD that displays your MAV feed (RIGHT since we have the MAV page on the right MFCD). This will set the Maverick as the SOI (Sensor of Interest).
   b) Move Boat Switch FWD to set the cursor under the first digit (furthest left).
   c) Move Boat Switch AFT to cycle digits between 1 and 7.
   d) Move Boat Switch to center to stop digit cycle.
   e) Move Boat Switch FWD again to move the cursor to the next digit.
   f) Move Boat Switch AFT to cycle digits between 1 and 7.
   g) Repeat for other digits until four digits form “1687”, our desired Maverick laser code.
   h) Once code has been set, the cursor will stop flashing.
   i) After inputting the four-digit laser code, you may move the cursor to the fifth position (rightmost) and set countermeasure mode on (when the cursor is in this position, it will not flash). This is done by cycling the Boat switch AFT. When active, a “C” will be displayed.



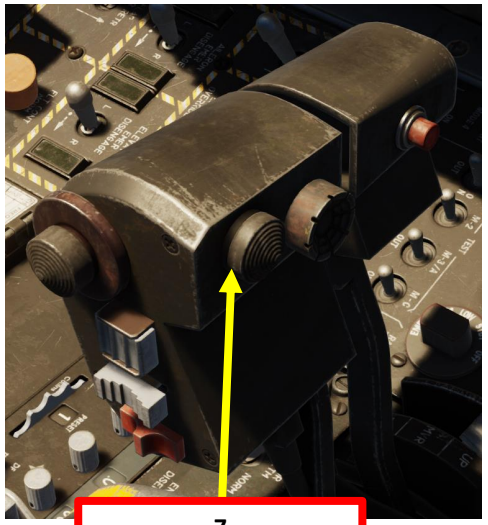


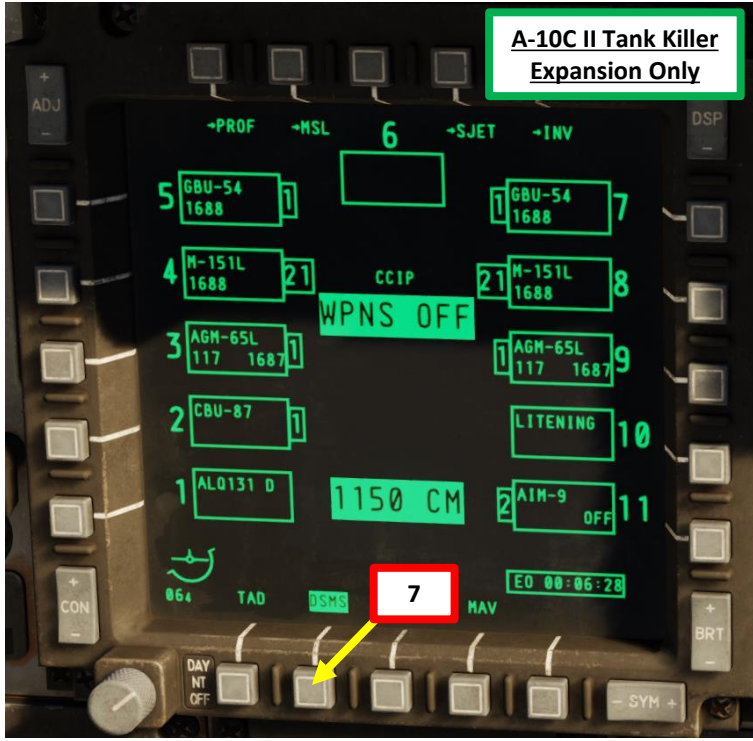


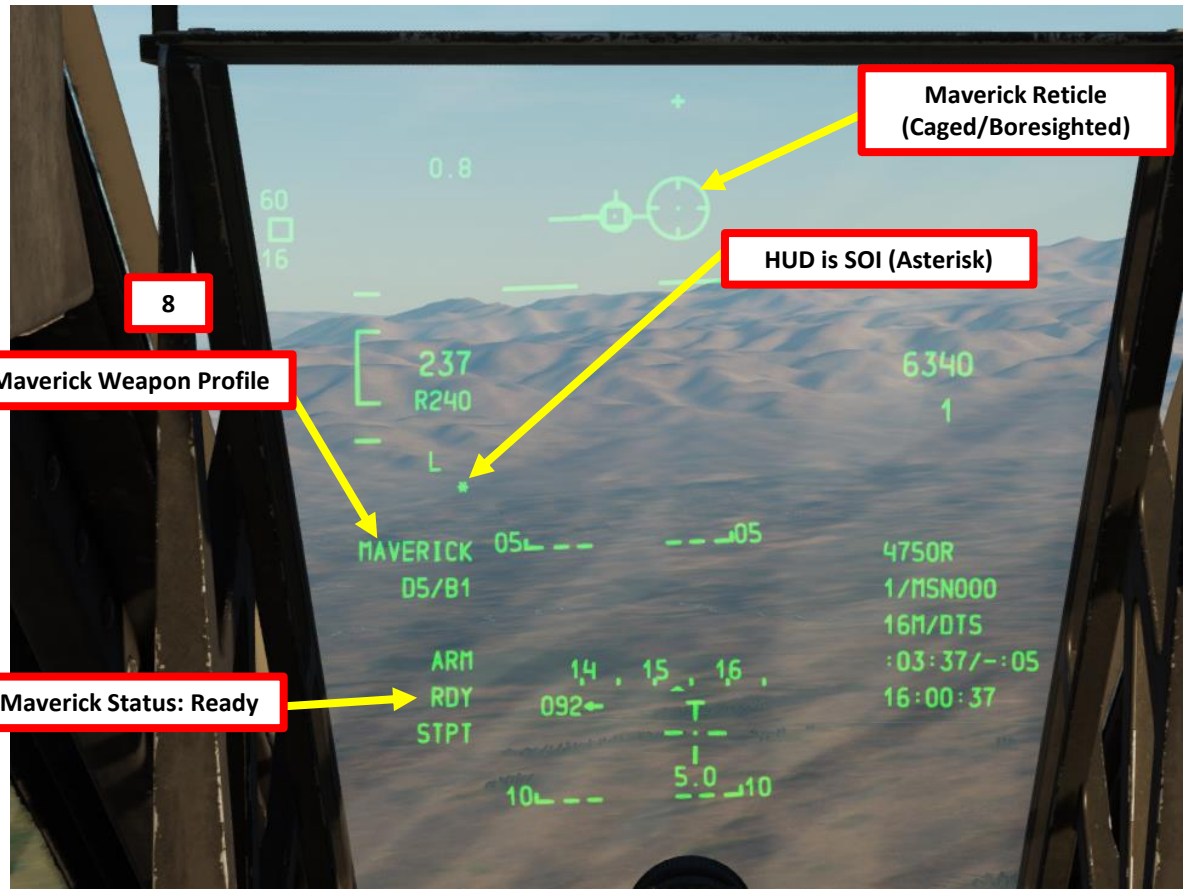
2.11 – AGM-65L LASER MAVERICK TARGETING POD DESIGNATION (LASER)

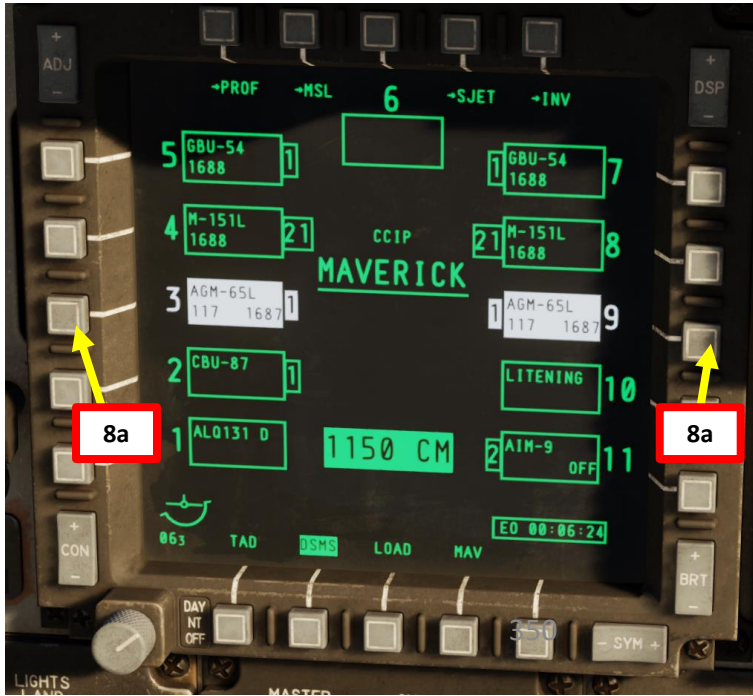
C: SELECT WEAPON & PROFILE

7. Select DSMS (Digital Stores Management System) page
8. Select AGM-65L Missile.
    - When HUD is the Sensor of Interest (SOI, performed with Coolie Hat UP), you can cycle between profiles using the DMS (Data Management Switch) left or right. The Station will momentarily be displayed when switching stations, then revert back to RDY.







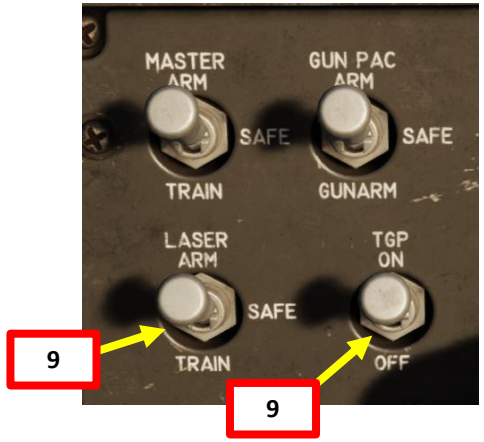


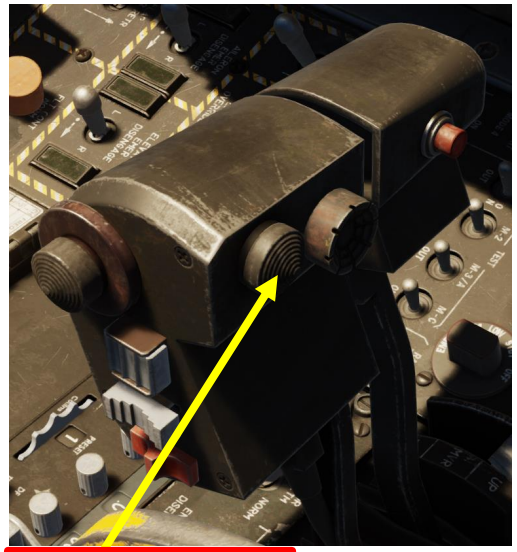
2.11 – AGM-65L LASER MAVERICK TARGETING POD DESIGNATION (LASER)

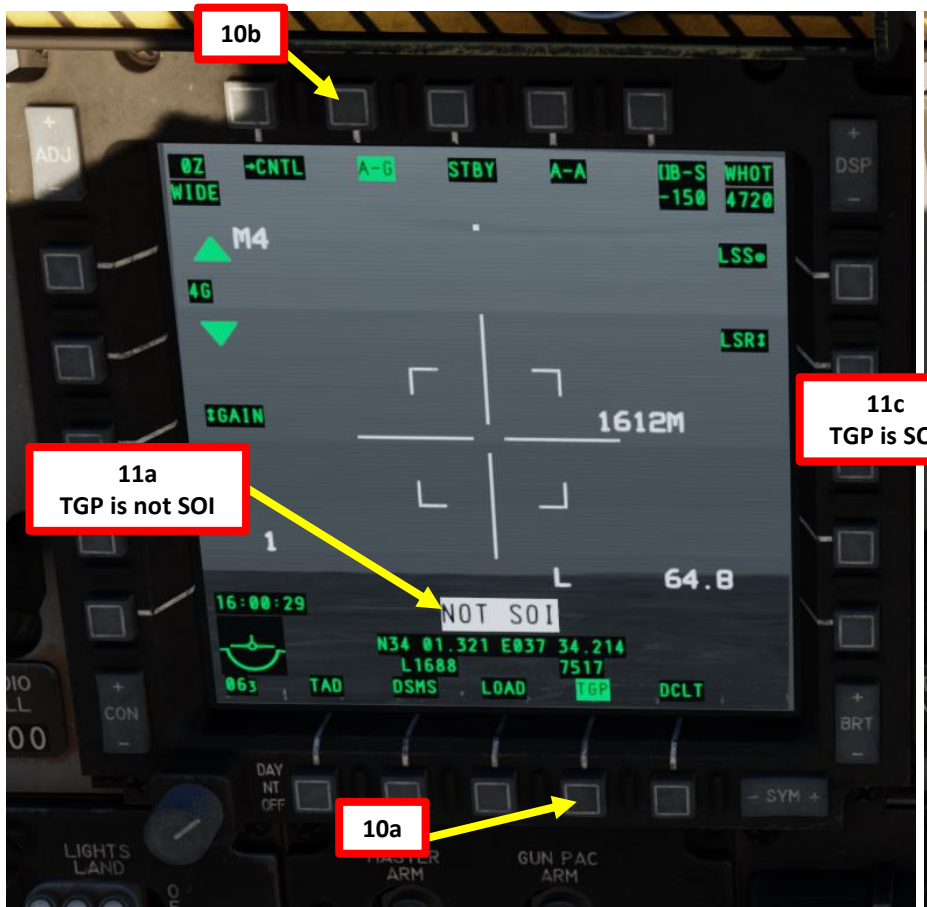
A-10C II Tank Killer Expansion Only

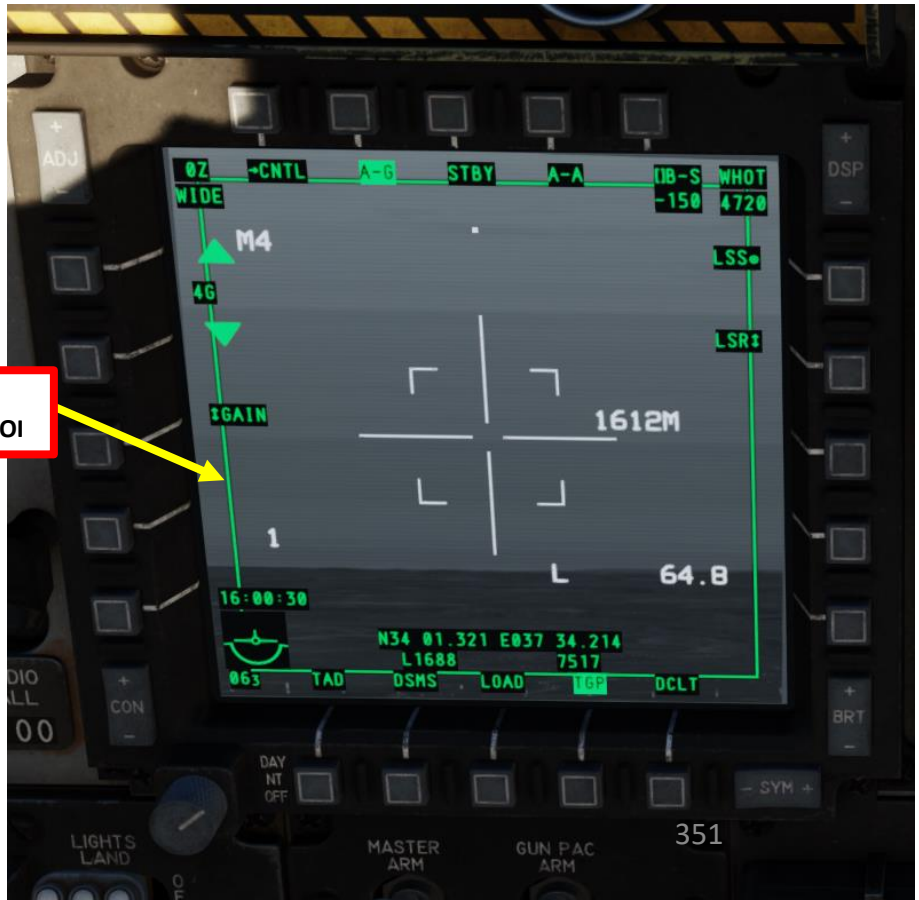
D: DESIGNATE TARGET WITH TARGETING POD

9. On AHCP (Armament HUD Control Panel), set TGP switch ON (UP) to power up the targeting pod. Set the LASER ARM switch to ARM (ON) as well.
10. Press the OSB (Option Select Button) next to TGP (Targeting Pod) to display the TGP Feed Page. Then, select the A-G (Air-to-Ground) Mode.
11. Press the Coolie Hat Switch LONG in the direction of the MFCD that displays your TGP feed (LEFT since we have the TGP page on the left MFCD). This will set the TGP as the SOI (Sensor of Interest).





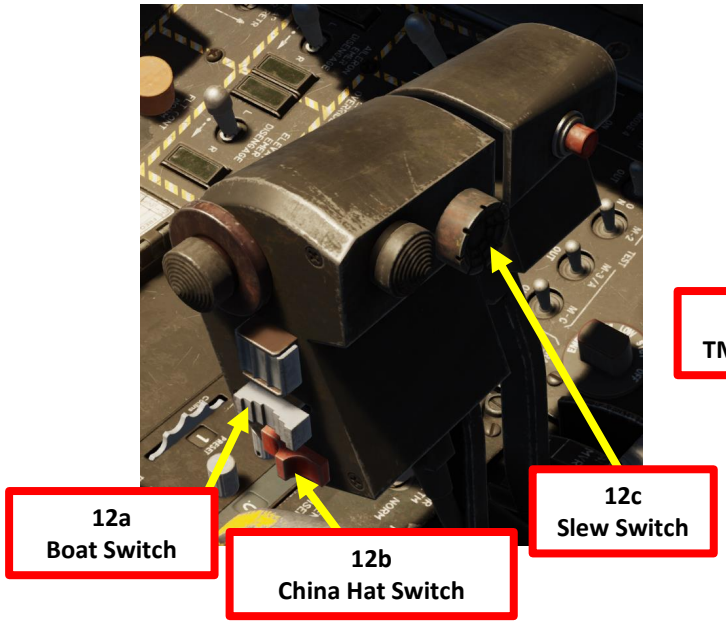


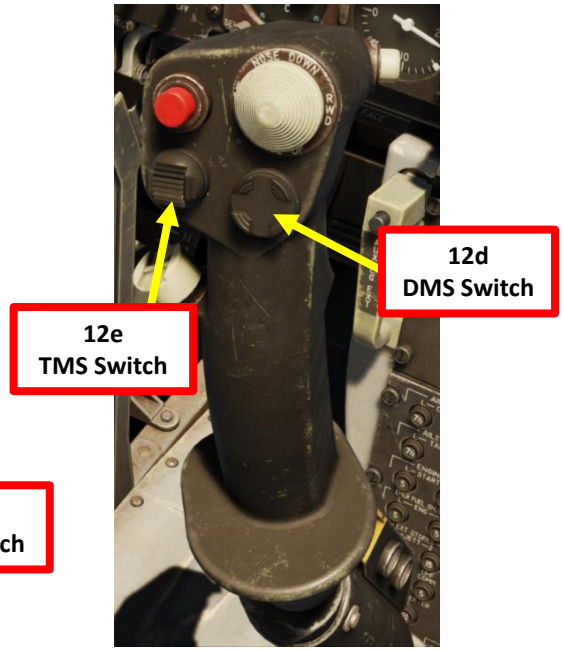


2.11 – AGM-65L LASER MAVERICK TARGETING POD DESIGNATION (LASER)

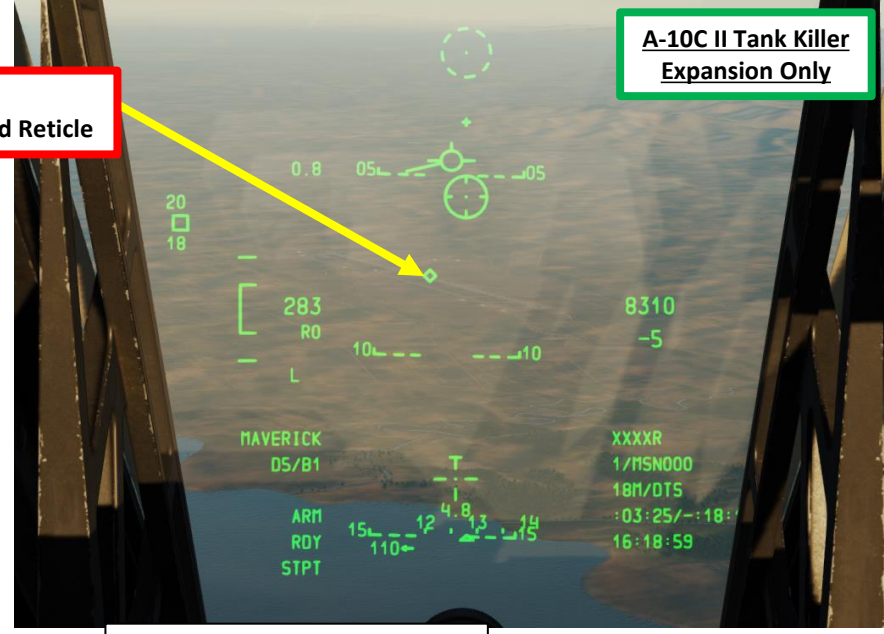
D: DESIGNATE TARGET WITH TARGETING POD

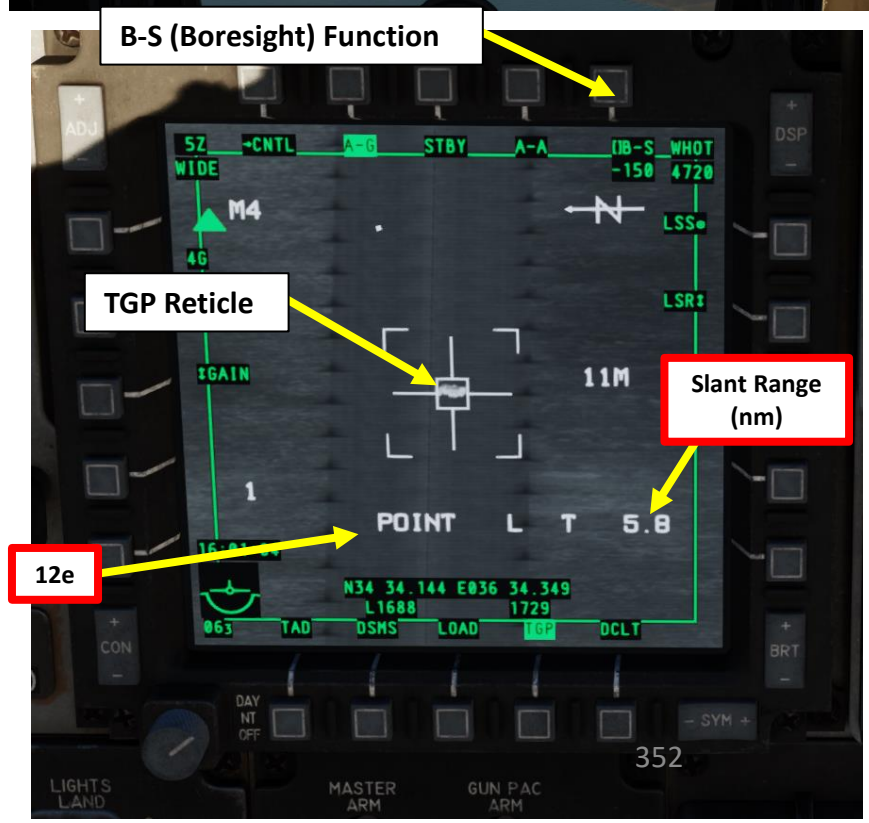
12. Designate target with the Targeting Pod
    a) Select desired Video Mode with the Boat Switch
        - FWD: FLIR BHOT (Forward-Looking Infrared Black Hot)
        - MIDDLE: CCD (Charge Coupled Device/TV)
        - AFT: FLIR WHOT (Forward-Looking Infrared White Hot)
    b) Select Field-of-View Mode with the China Hat Switch
        - FWD SHORT toggles between WIDE and NARROW
    c) Use the Slew Control Switch UP/DOWN/LEFT/RIGHT to set the TGP reticle on the target.
        - If you want to reset the TGP in front of you (boresight): In the TGP page, press the OSB next to B-S (Boresight Function)
    d) Press on the DMS (Data Management Switch) FWD/AFT SHORT to adjust Zoom Level.
    e) Press the TMS (Target Management System) switch FWD SHORT to track the target. This will toggle tracking modes between AREA TRACK (static target) and POINT TRACK (moving target).





A-10C II Tank Killer Expansion Only

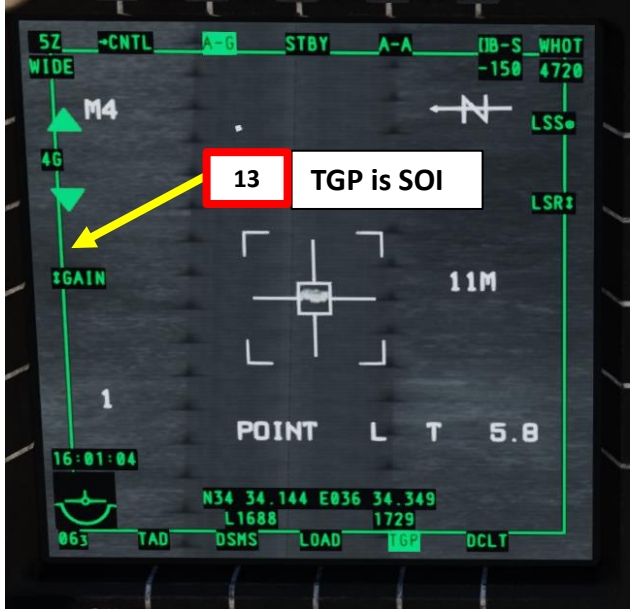


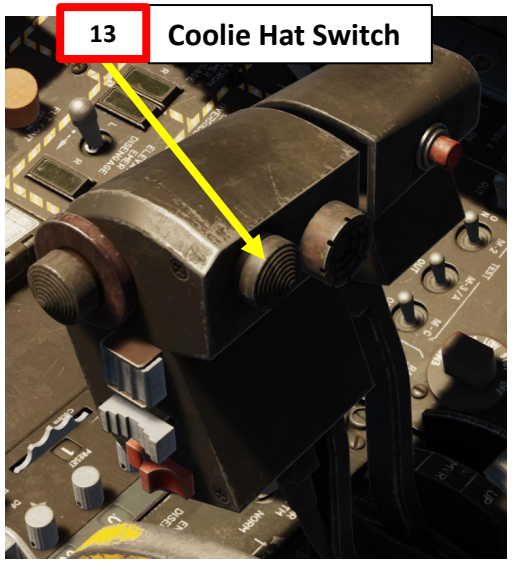


2.11 – AGM-65L LASER MAVERICK TARGETING POD DESIGNATION (LASER)

D: DESIGNATE TARGET WITH TARGETING POD

13. Verify TGP is SOI. If it's not, press the Coolie Hat Switch LONG in the direction of the MFCD that displays your TGP feed (LEFT since we have the TGP page on the left MFCD).
14. Press the TMS (Target Management System) switch FWD LONG to designate the TGP Sensor Point of Interest (SPI).



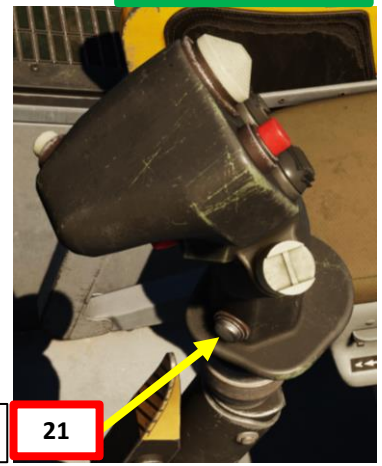


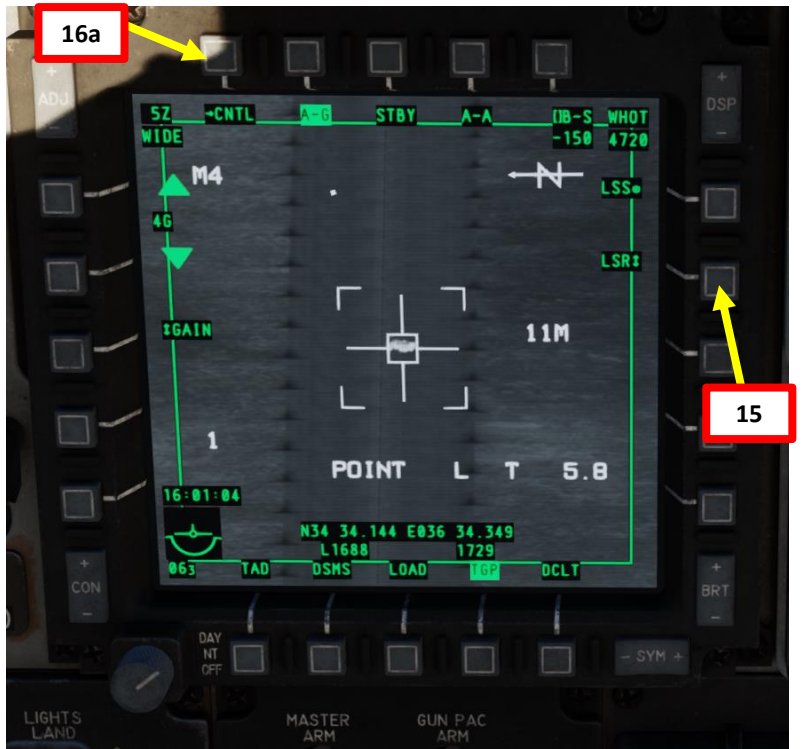
2.11 – AGM-65L LASER MAVERICK TARGETING POD DESIGNATION (LASER)

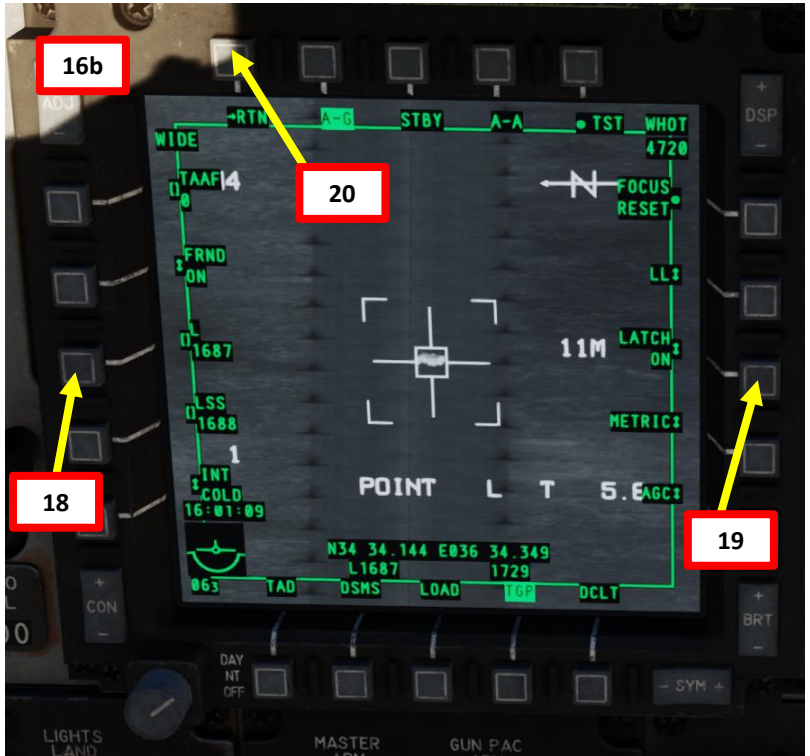
E: LASE TARGET

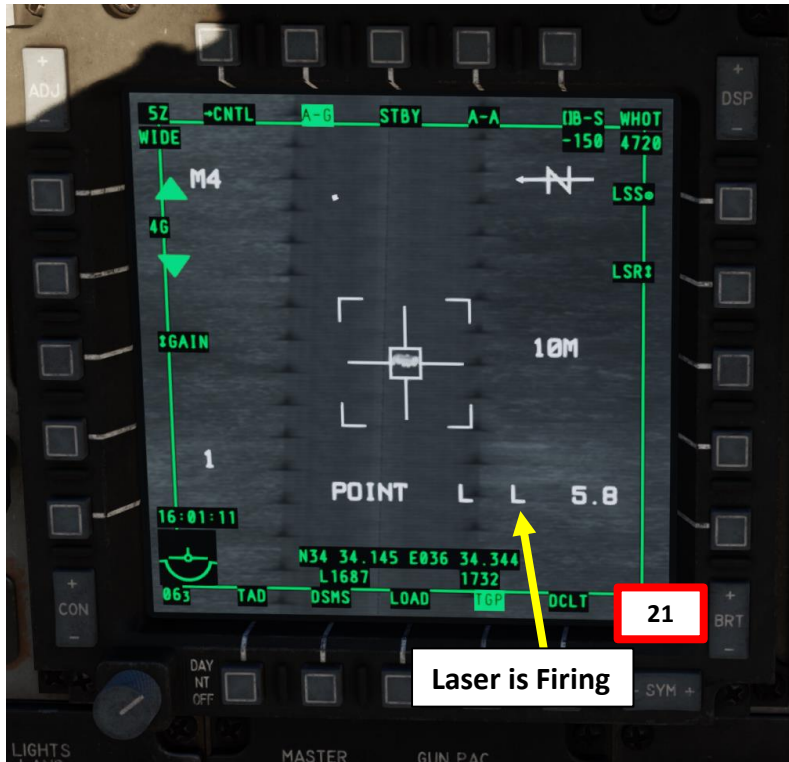
15. Select desired Laser Designator Mode (LSR) with OSB.
16. Press the OSB next to CNTL to enter see the TGP AG Control Page.
17. Enter the desired Laser Code on the UFC Scratchpad. We will choose laser code 1687, which we set previously on the Maverick of station 9.
18. Press on the OSB next to "L" (Laser Designation Code) to enter laser code 1687.
19. Select desired LATCH mode with OSB (LATCH ON means the laser is latched once fired by pressing the Nosewheel Steering Button). We will choose LATCH ON.
20. Press OSB next to RTN (Return) to go back to Main TGP page.
21. Press the Nosewheel Steering Button ("Insert" binding) to fire laser.

A-10C II Tank Killer Expansion Only







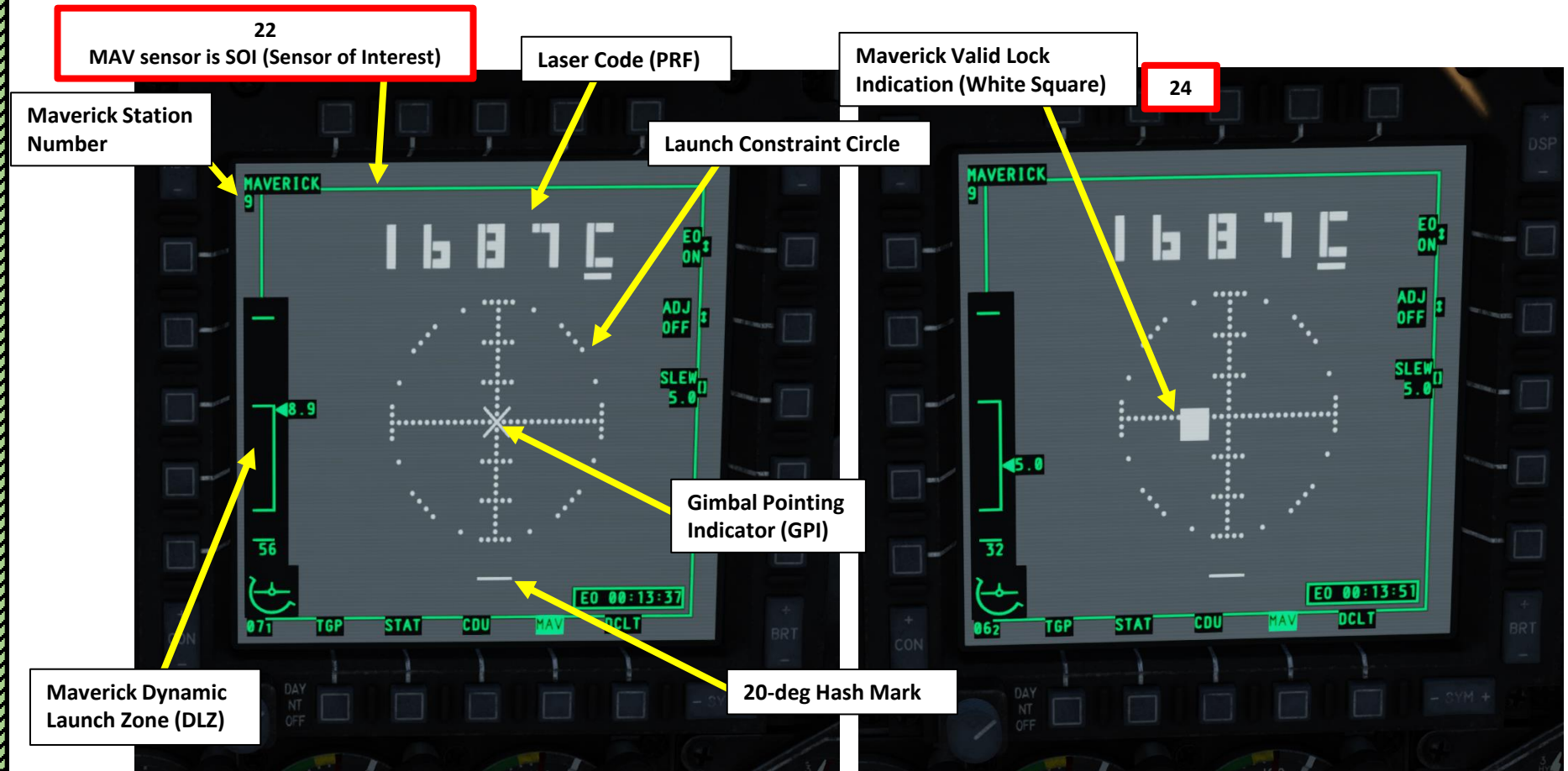


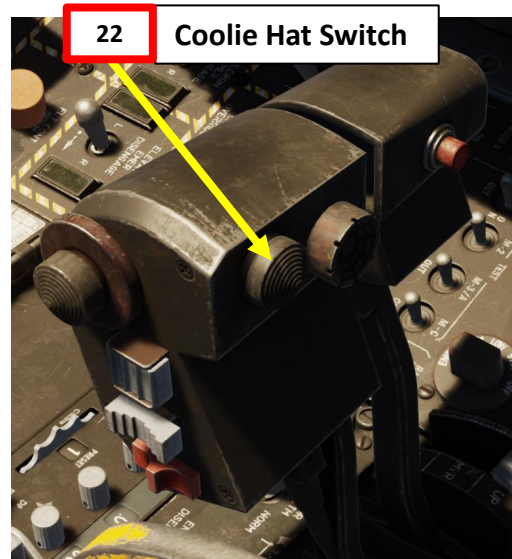
2.11 – AGM-65L LASER MAVERICK TARGETING POD DESIGNATION (LASER)

A-10C II Tank Killer Expansion Only

F: PERFORM ATTACK

22. Press the Coolie Hat Switch LONG in the direction of the MFCD that displays your MAV feed (RIGHT since we have the MAV page on the right MFCD). This will set the Maverick as the SOI (Sensor of Interest).
23. Uncage the missile by pressing TMS (Target Management System) switch FWD SHORT. This is termed the "Activate" mode.
24. Upon entering "Activate" mode, the seeker will begin searching for a laser designation matching that of the entered PRF code along its boresight line of sight (81 mils). If it detects laser energy along this line of sight at the set PRF (Pulse Repetition Frequency, or Laser Code), the GPI will start to flash. If the reflected energy is strong enough, the flashing GPI (Gimbal Pointing Indicator) will automatically become a solid, **white square that indicates a valid lock**.



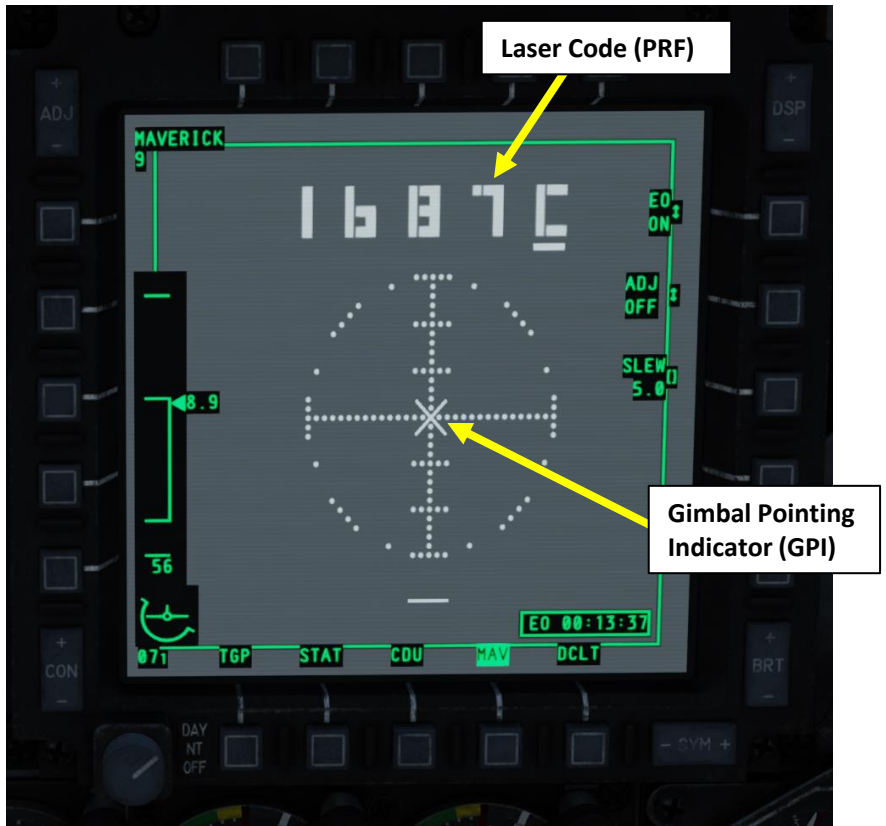


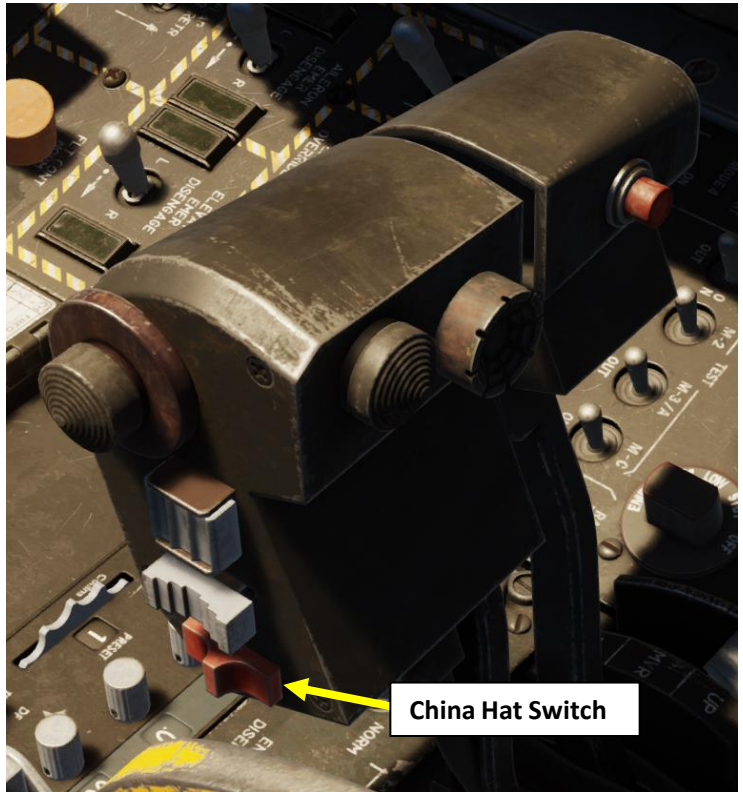
2.11 – AGM-65L LASER MAVERICK TARGETING POD DESIGNATION (LASER)

F: PERFORM ATTACK

- **Notes on SCAN Mode**
  - If a valid PRF (Pulse Repetition Frequency, or Laser Code) return is not detected (non-flashing GPI), you may enter "Slew" mode. This is done by moving and releasing the slew switch. Upon doing so, the GPI (Gimbal Pointing Indicator) will automatically scan left and right from center +/- 22 degrees. Using the slew switch, the user can also set the depression able that the scan will take place from.
  - When in Slew mode, the GPI will flash if the correct PRF code is detected. If the energy is strong enough, the GPI "X" will turn into a square and the seeker will automatically lock onto the return.

- **Notes on SLAVE Mode**
  - In addition to manually aligning the seeker field of view with the target, you may also Slave the seeker to a SPI or TGP location within 30 degrees of the seeker's boresight. This is done with the "slave to SPI" or "slave to TGP" HOTAS command (China Hat FWD LONG). When commanded, the seeker will perform an auto-track scan of the designated area and attempt to find the coded PRF. If detected (flashing GPI "X"), the user will need to manually designate with a TMS forward short HOTAS command.



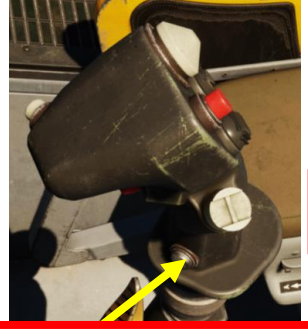


2.11 – AGM-65L LASER MAVERICK TARGETING POD DESIGNATION (LASER)

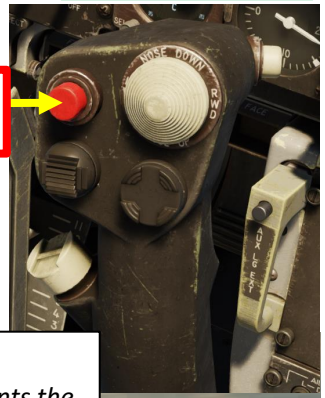
F: PERFORM ATTACK

25. Verify that Laser is firing (blinking "L" on the HUD). If not, press the Nosewheel Steering Button ("Insert" binding) to fire laser and TMS FWD SHORT to attempt to re-acquire the laser with the Maverick.
26. Verify once more that the laser maverick is locked and tracking the laser (white square on MAV page), and that the GPI (Gimbal Pointing Indicator) is within the Launch Constraint Circle.
27. When missile has a good lock and is within range (generally between 3 and 7 nm, use the Dynamic Launch Zone indicator accordingly), press the Weapon Release button (RALT+SPACE) to fire Maverick missile.
28. Missile will launch and track the laser until impact.
29. After missile impact, press the Nosewheel Steering Button again to stop firing the laser.

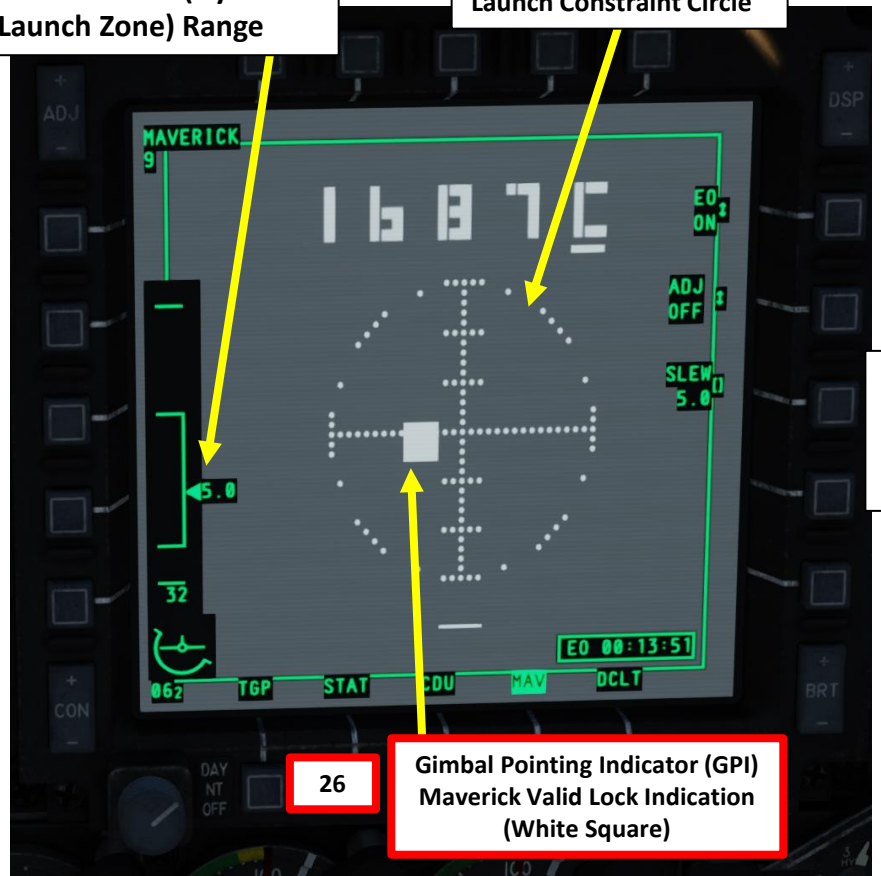
A-10C II Tank Killer Expansion Only



25 / 29
Nosewheel Steering Button



27
Weapon Release Button

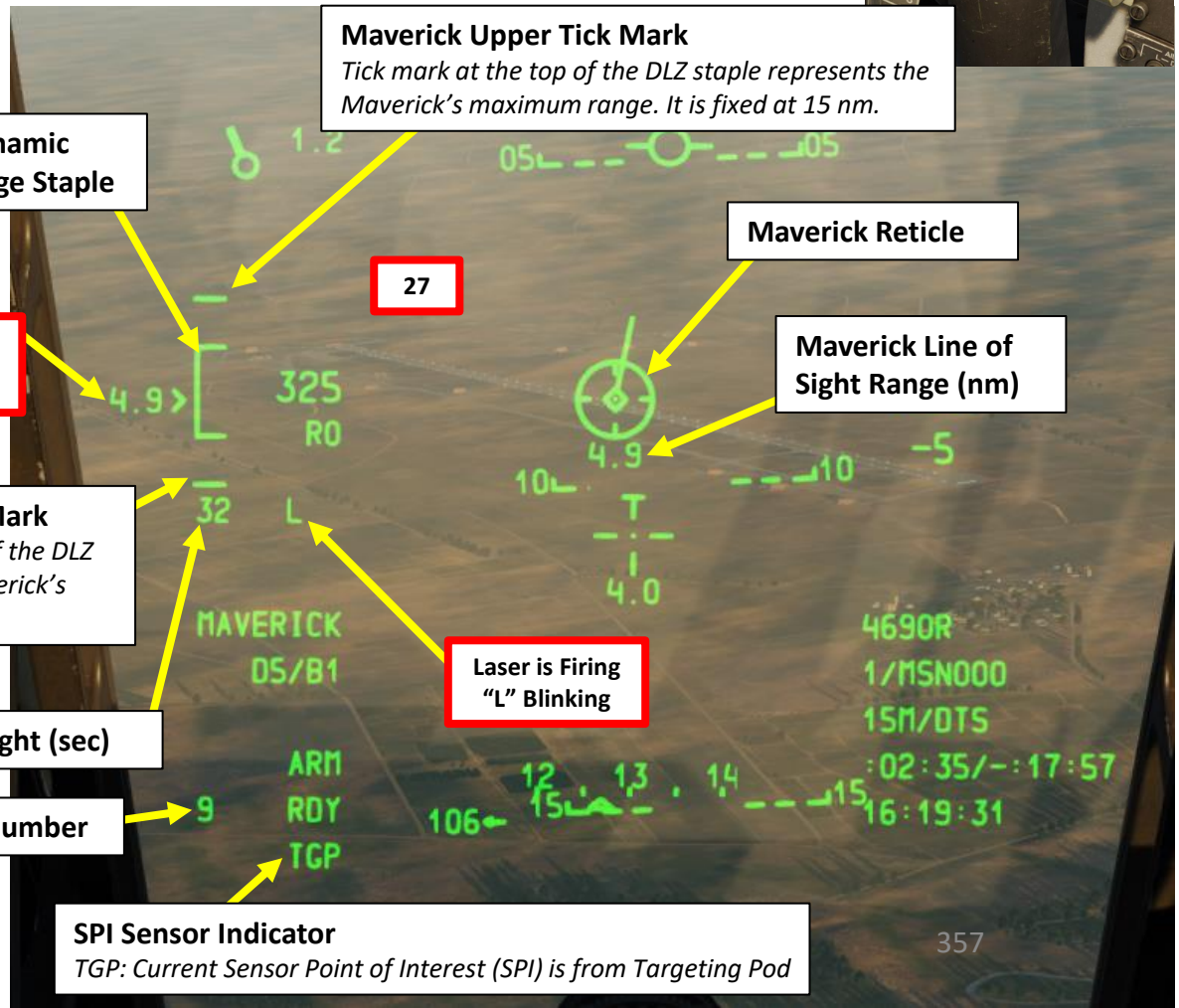


Maverick DLZ (Dynamic Launch Zone) Range

Launch Constraint Circle

26

Gimbal Pointing Indicator (GPI)
Maverick Valid Lock Indication
(White Square)



Maverick Upper Tick Mark
Tick mark at the top of the DLZ staple represents the Maverick's maximum range. It is fixed at 15 nm.

Maverick DLZ (Dynamic Launch Zone) Range Staple

Maverick Reticle

Target Range Caret and Numeric (nm)

Maverick Line of Sight Range (nm)

Maverick Lower Tick Mark
Tick mark at the bottom of the DLZ staple represents the Maverick's minimum range.

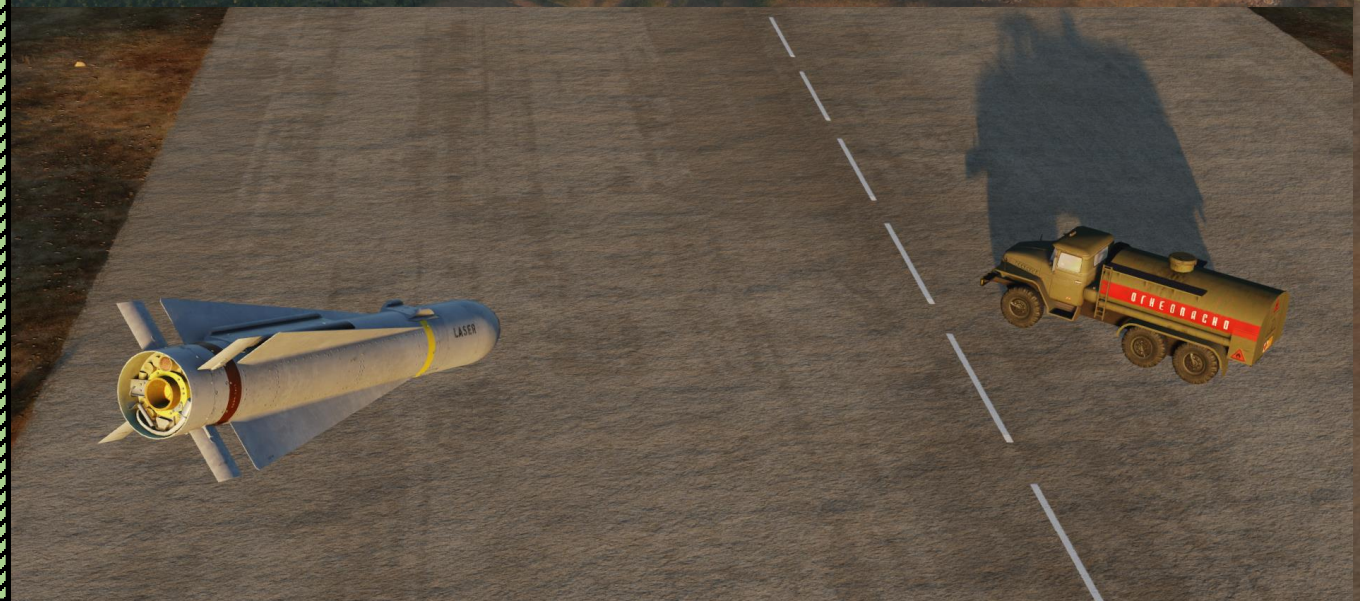
Laser is Firing "L" Blinking

Missile Time of Flight (sec)

Maverick Station Number

SPI Sensor Indicator
TGP: Current Sensor Point of Interest (SPI) is from Targeting Pod

2.11 – AGM-65L LASER MAVERICK TARGETING POD DESIGNATION (LASER)



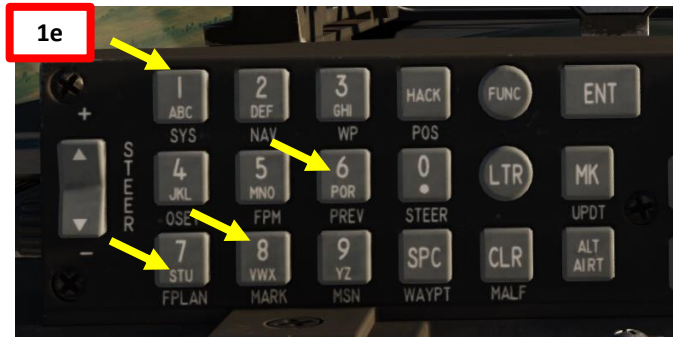
2.12 – GBU-54 LASER JDAM TARGETING POD DESIGNATION (LASER)

A-10C II Tank Killer Expansion Only

Note: *A hybrid of a GBU-38 JDAM and a GBU-12 laser-guided bomb is the GBU-54/A LJDAM. This weapon can act in both INS/GPS and laser-guidance modes, this allowing it launch-and-leave and engaging through cloud/dust as an INS/GPS weapon, and with the precision and ability to engage moving targets that laser-guidance provides. The GBU-54's laser tracking mode will automatically take precedence over the coordinates/TGP method. This is useful when designating a moving target with a targeting pod laser or using laser designators from friendly wingmen or a JTAC.*

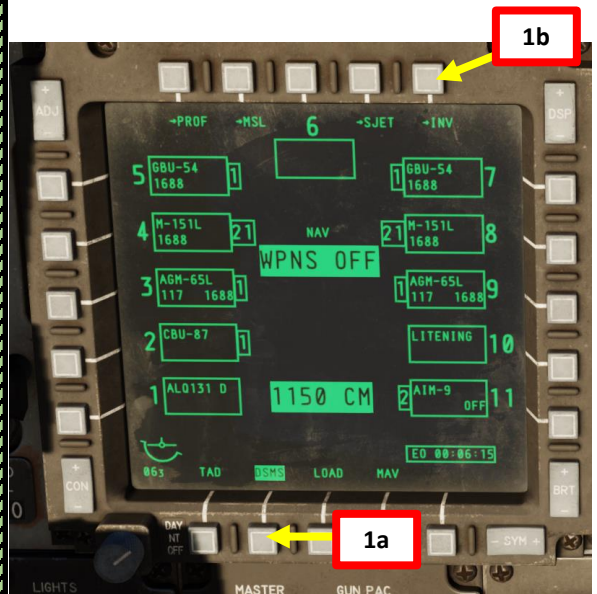
2.12 – GBU-54 LASER JDAM TARGETING POD DESIGNATION (LASER)

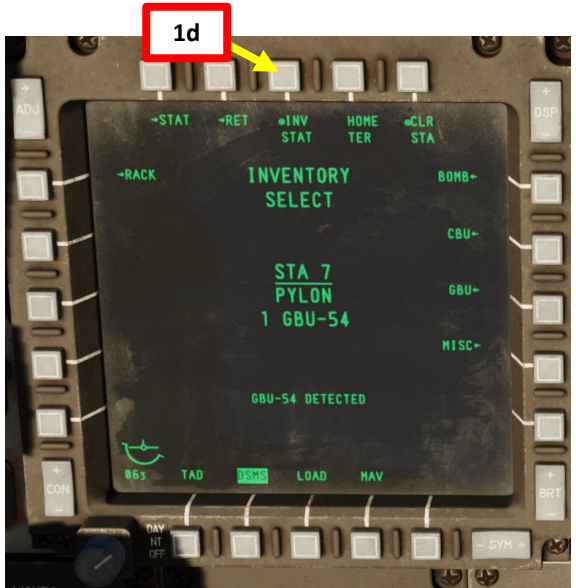
A-10C II Tank Killer Expansion Only

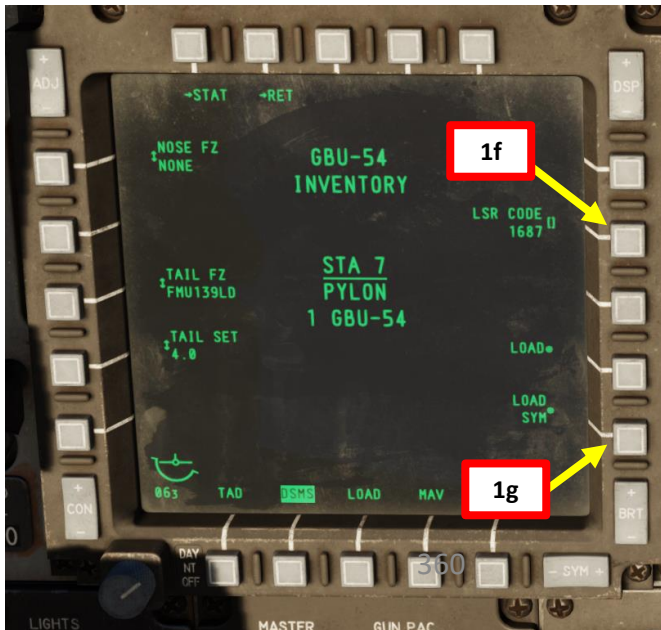


A: PROGRAM GBU-54 LASER CODE (VIA DSMS PAGE)

1. Program the laser code the GBU-54 laser JDAM will track. You can do this with the DSMS page.
   a) Select DSMS (Digital Stores Management System) page
   b) Select "INV" (Inventory) page
   c) Select desired GBU-54 station (Station 7)
   d) Select "INV STAT" (Inventory Station)
   e) Enter desired GBU-54 laser code on the UFC scratchpad (i.e. 1687).
   f) Click on the OSB next to CODE to set new laser code (1687) on the GBU-54.
   g) Click on OSB next to LOAD if you want to load these parameters for this station only. If you have a symmetrical (same) loadout on opposite pylons (e.g., 5 and 7), select LOAD SYM to load these parameters on both Laser JDAM stations.





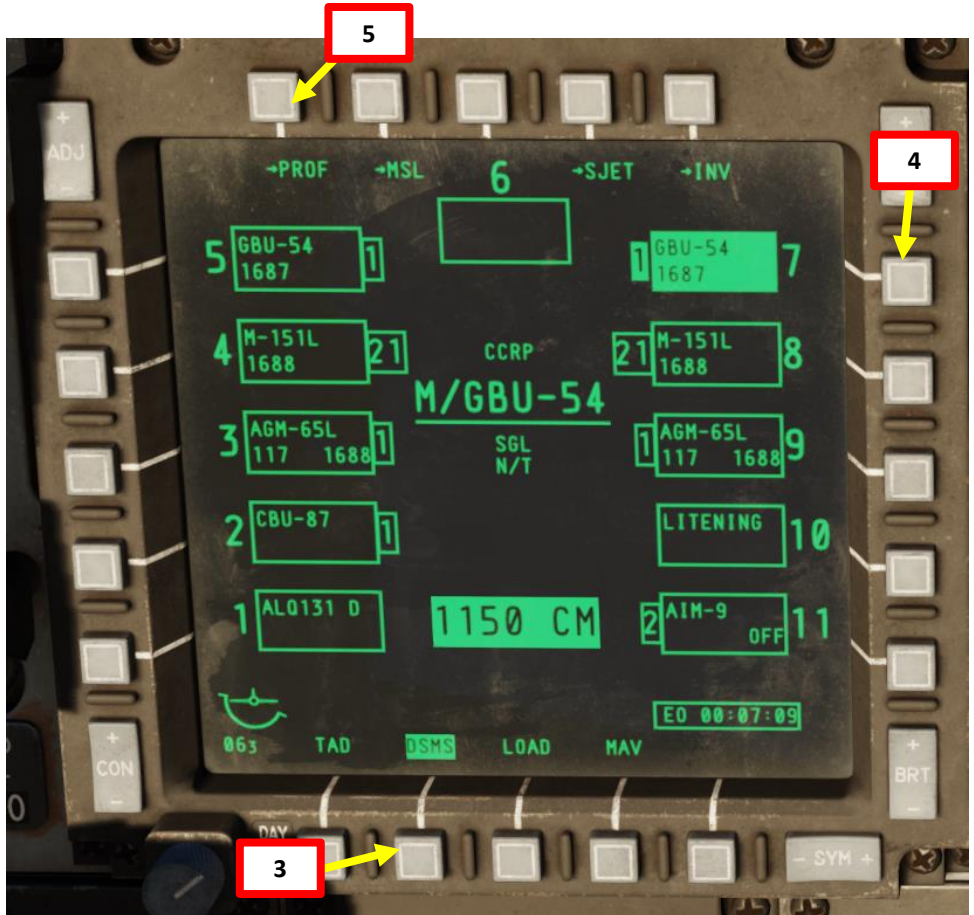


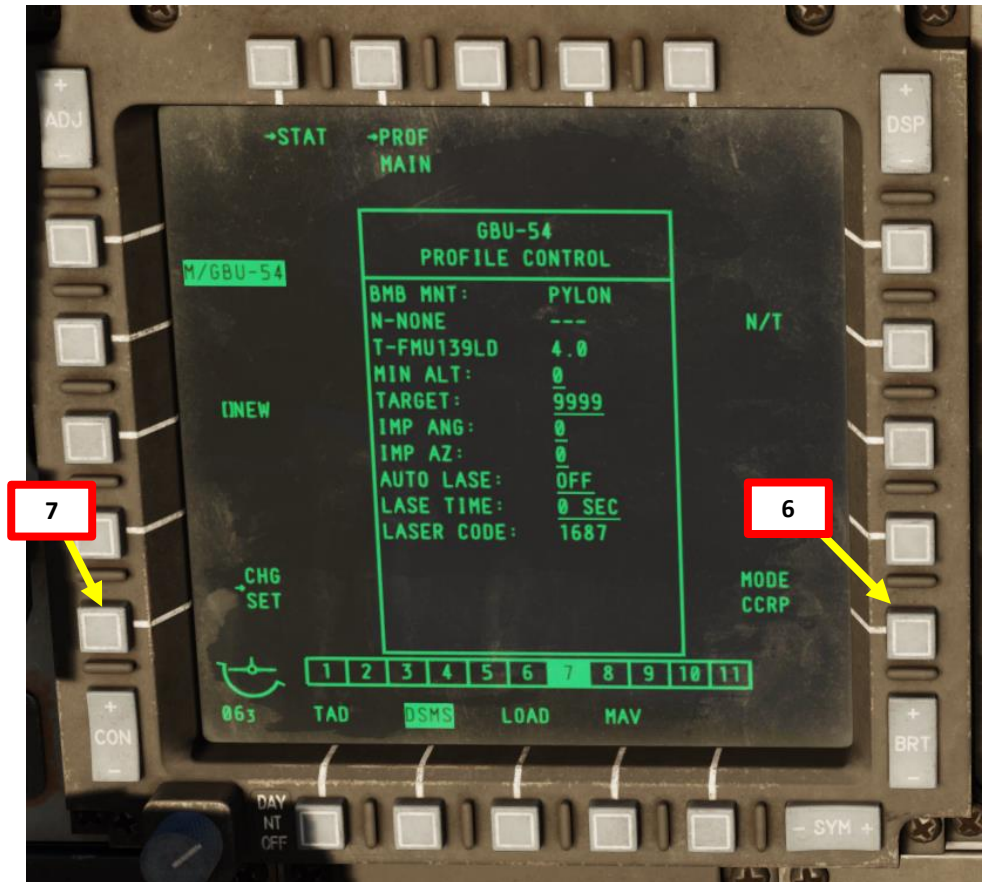
2.12 – GBU-54 LASER JDAM
TARGETING POD DESIGNATION (LASER)

A-10C II Tank Killer Expansion Only

B: SET WEAPON PROFILE, SELECT PROFILE & SELECT WEAPON

2. Set Master Arm Switch ON (UP)
3. Select DSMS (Digital Stores Management System) page
4. Select GBU-54 Bomb (green when selected)
5. Select PROF (Weapon Profile) menu
6. CCRP (Continuously Computed Release Point) Mode is the only selectable mode
7. Select the OSB next to CHG SET (Change Settings) to modify bomb settings.



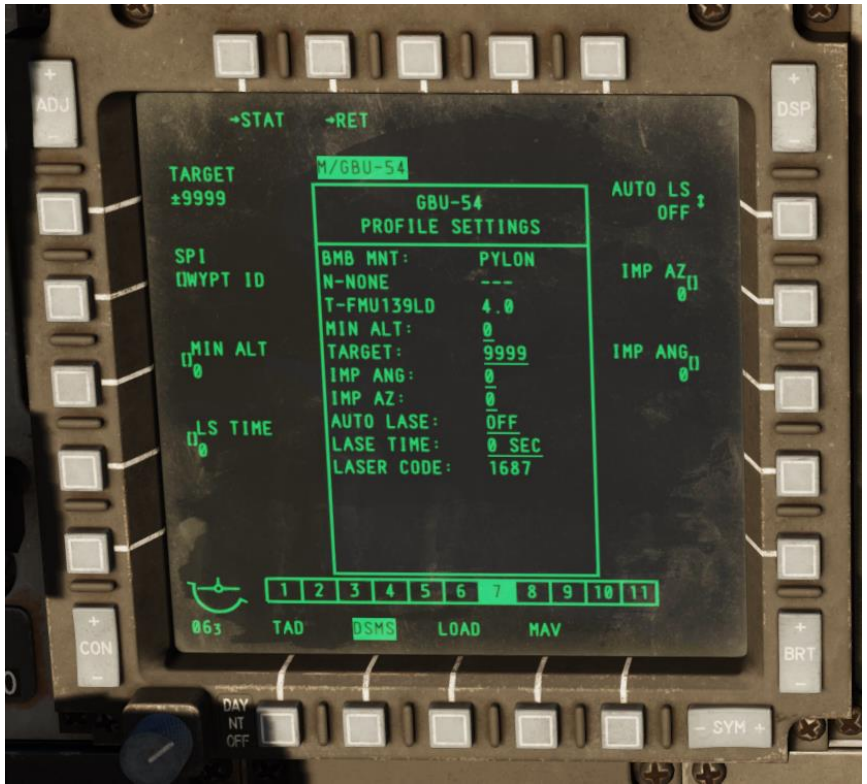


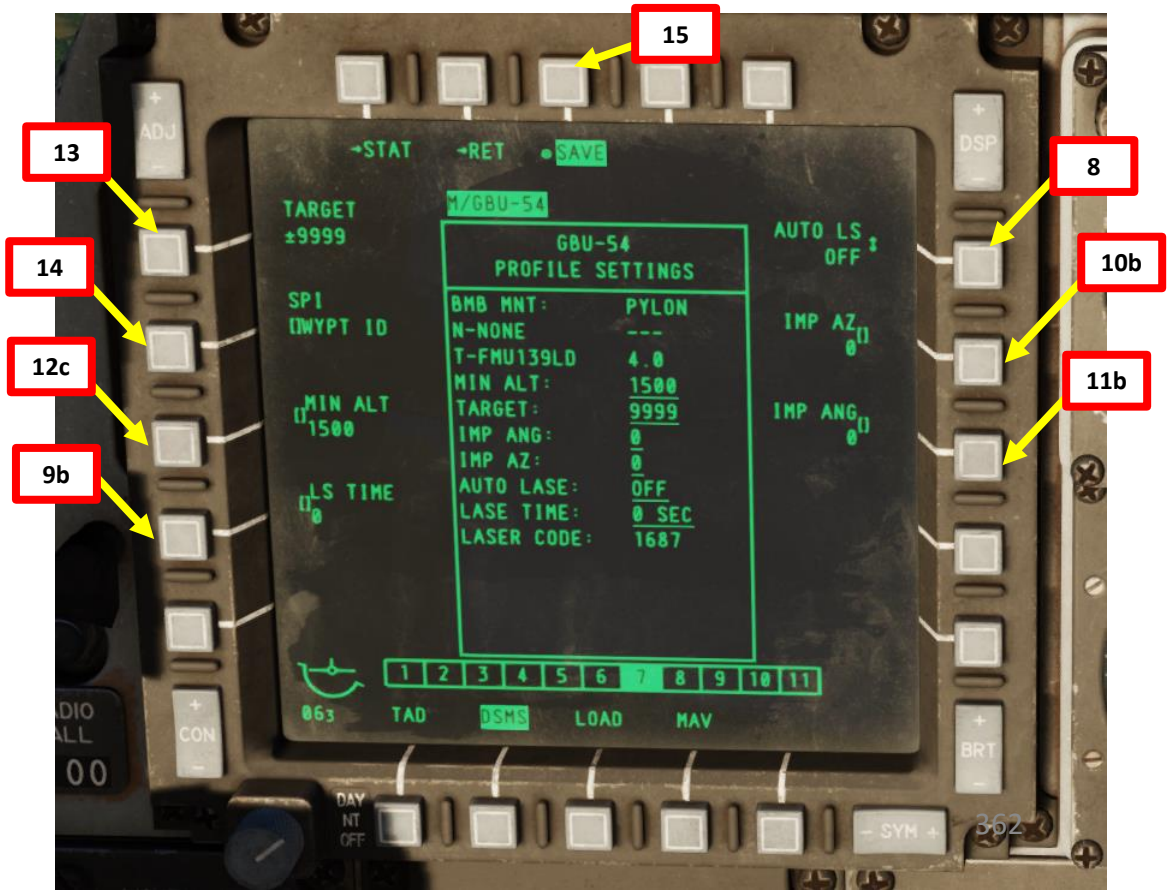
2.12 – GBU-54 LASER JDAM TARGETING POD DESIGNATION (LASER)

A-10C II Tank Killer Expansion Only

B: SET WEAPON PROFILE, SELECT PROFILE & SELECT WEAPON

8. OPTIONAL: If you want to use the auto-lasing function (laser is automatically fired after GBU-54 is launched), toggle the OSB next to AUTO LS. We will leave it OFF.
9. OPTIONAL: If auto-lasing function is set to ON, enter desired "laser on" time (sec) on the UFC scratchpad, then press on the OSB next to LS TIME. Otherwise, leave to 0.
10. OPTIONAL: If you want to set a specific JDAM impact azimuth, enter desired azimuth (deg) on the UFC scratchpad, then press on the OSB next to IMP AZ. We will leave it to 0.
11. OPTIONAL: If you want to set a specific JDAM impact angle, enter desired impact angle (deg) on the UFC scratchpad, then press on the OSB next to IMP ANG. We will leave it to 0.
12. OPTIONAL: If you want to see Minimum Release Altitude cues on the Heads-Up Display, enter Minimum Altitude on the UFC scratchpad, then press on the OSB next to MIN ALT.
13. OPTIONAL: TARGET ID function not yet documented.
14. OPTIONAL: SPI WYPT ID function not yet documented.
15. Press on the OSB next to SAVE to save Weapon Profile.

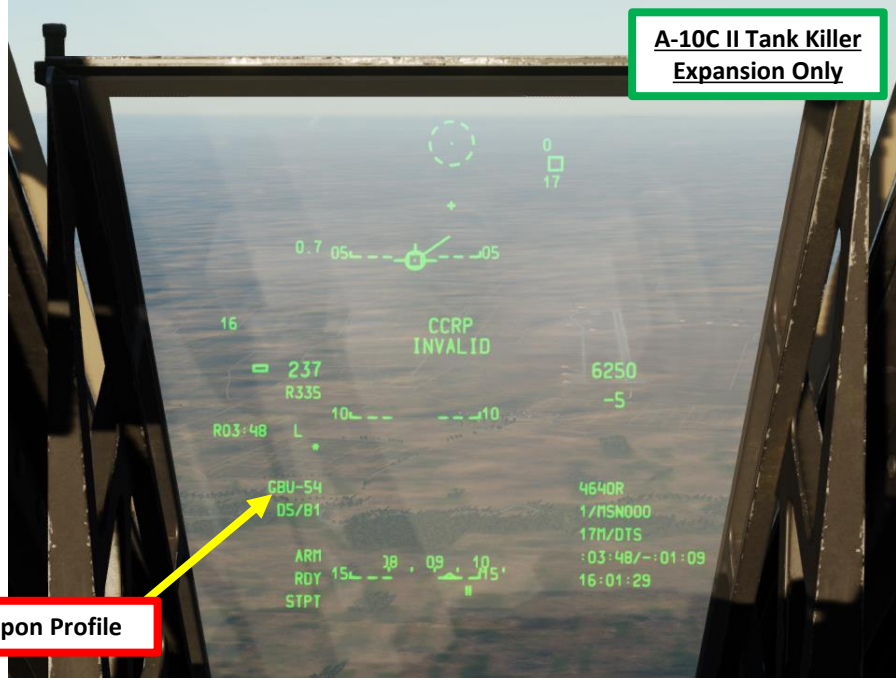


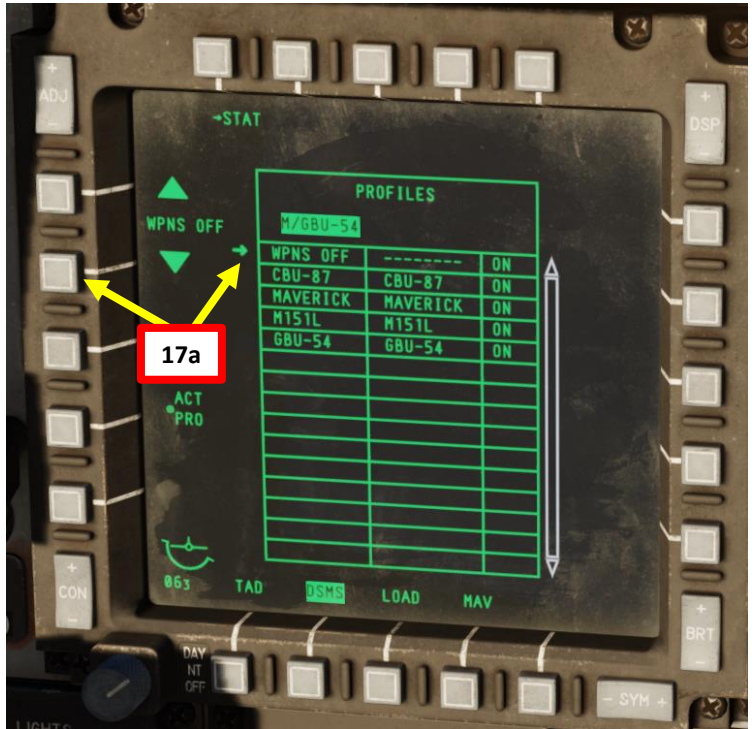


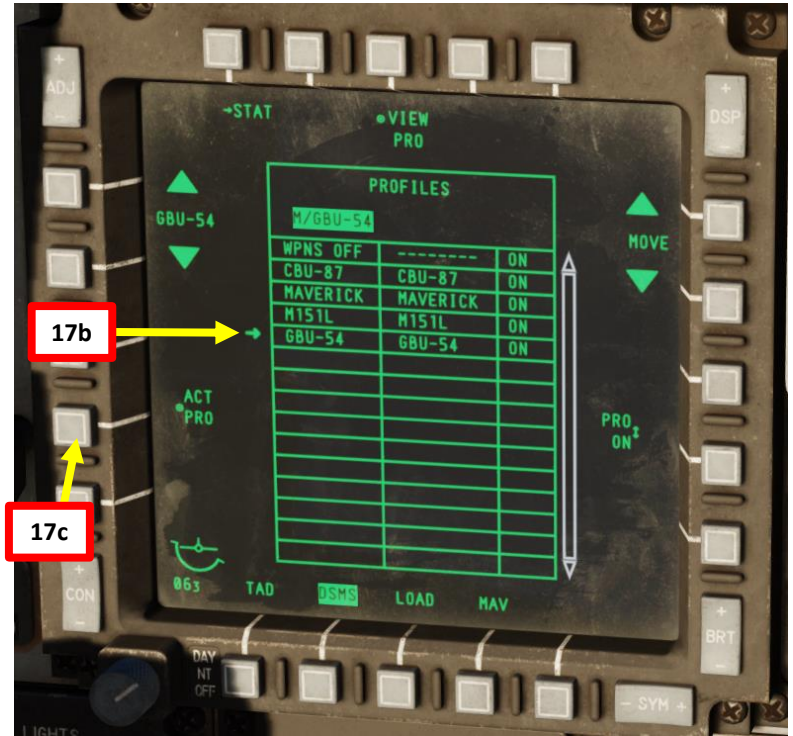
2.12 – GBU-54 LASER JDAM TARGETING POD DESIGNATION (LASER)

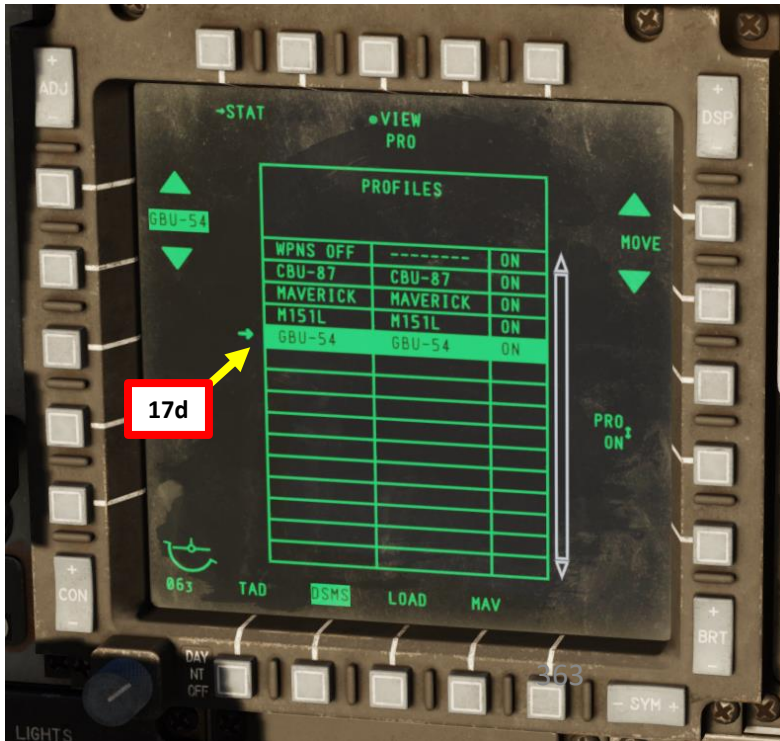
B: SET WEAPON PROFILE, SELECT PROFILE & SELECT WEAPON

16. Once weapon profile is saved, the DSMS page will showcase all different weapon profiles available.
17. Select GBU-54 profile by pressing the Option Select Button Selectors, then press on the OSB next to ACT PRO (Active Profile).
    - While HUD is SOI (Coolie Hat Switch UP), cycle between profiles and stations using the DMS (Data Management Switch) left or right.
18. The GBU-54 Profile will be displayed on the Heads-Up Display.







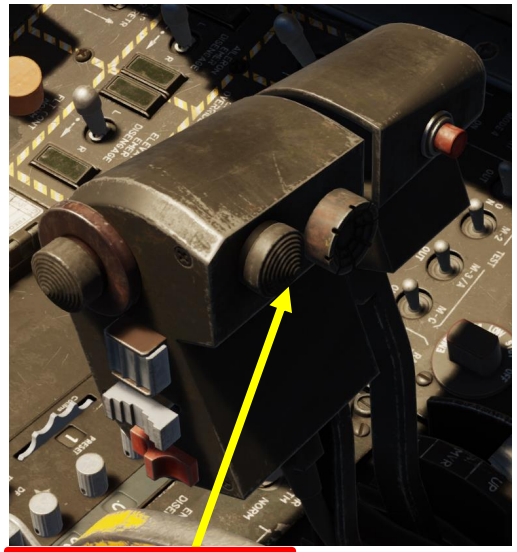


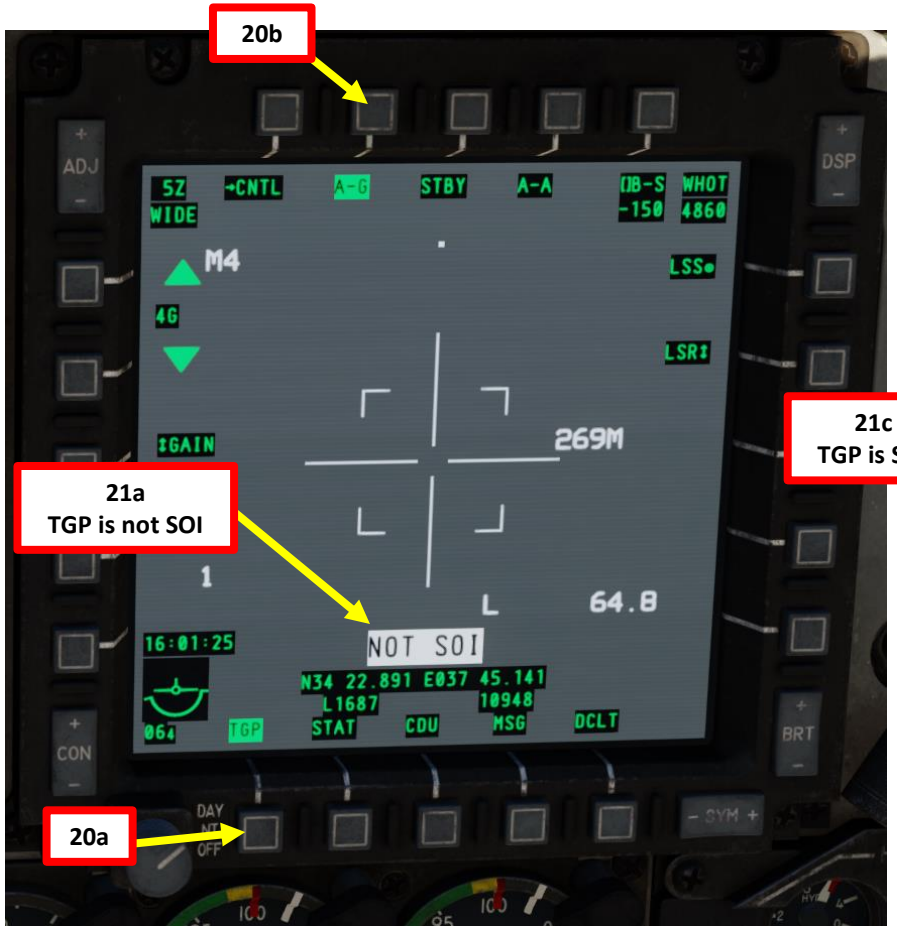
2.12 – GBU-54 LASER JDAM
TARGETING POD DESIGNATION (LASER)

A-10C II Tank Killer Expansion Only

C: DESIGNATE TARGET WITH TARGETING POD

19. On AHCP (Armament HUD Control Panel), set TGP switch ON (UP) to power up the targeting pod. Set the LASER ARM switch to ARM (ON) as well.
20. Press the OSB (Option Select Button) next to TGP (Targeting Pod) to display the TGP Feed Page. Then, select the A-G (Air-to-Ground) Mode.
21. Press the Coolie Hat Switch LONG in the direction of the MFCD that displays your TGP feed (RIGHT since we have the TGP page on the right MFCD). This will set the TGP as the SOI (Sensor of Interest).

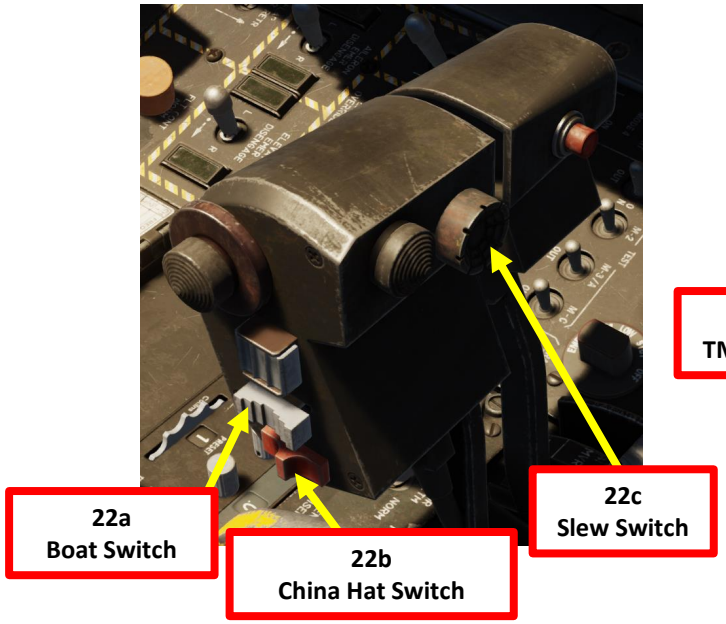


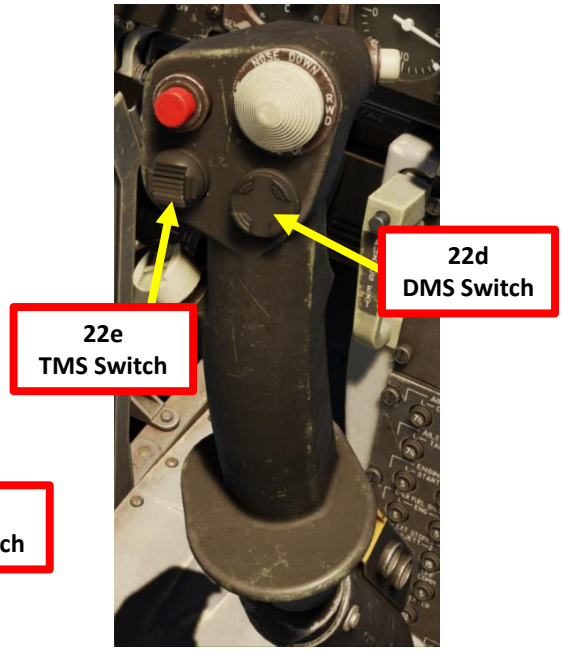


2.12 – GBU-54 LASER JDAM TARGETING POD DESIGNATION (LASER)

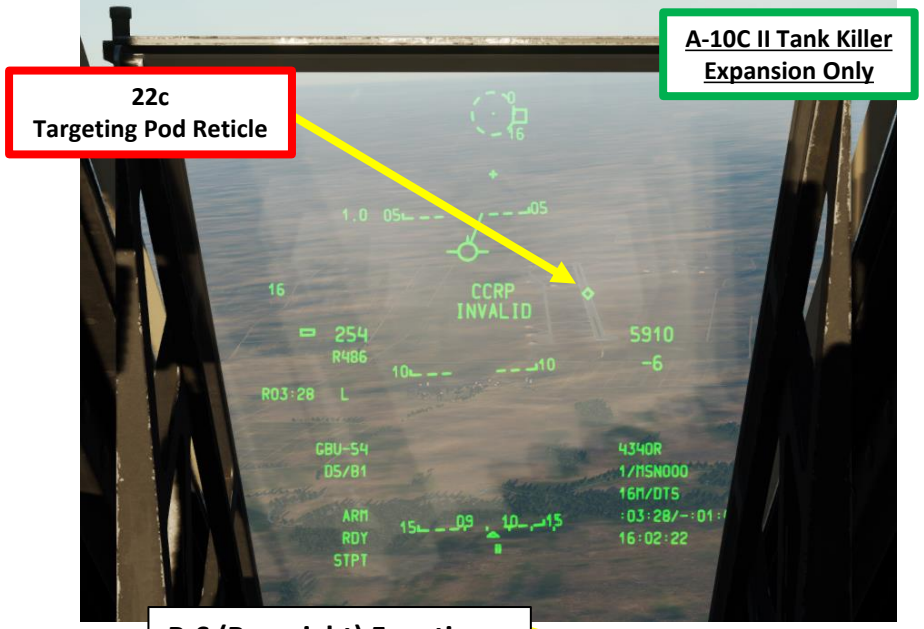
C: DESIGNATE TARGET WITH TARGETING POD

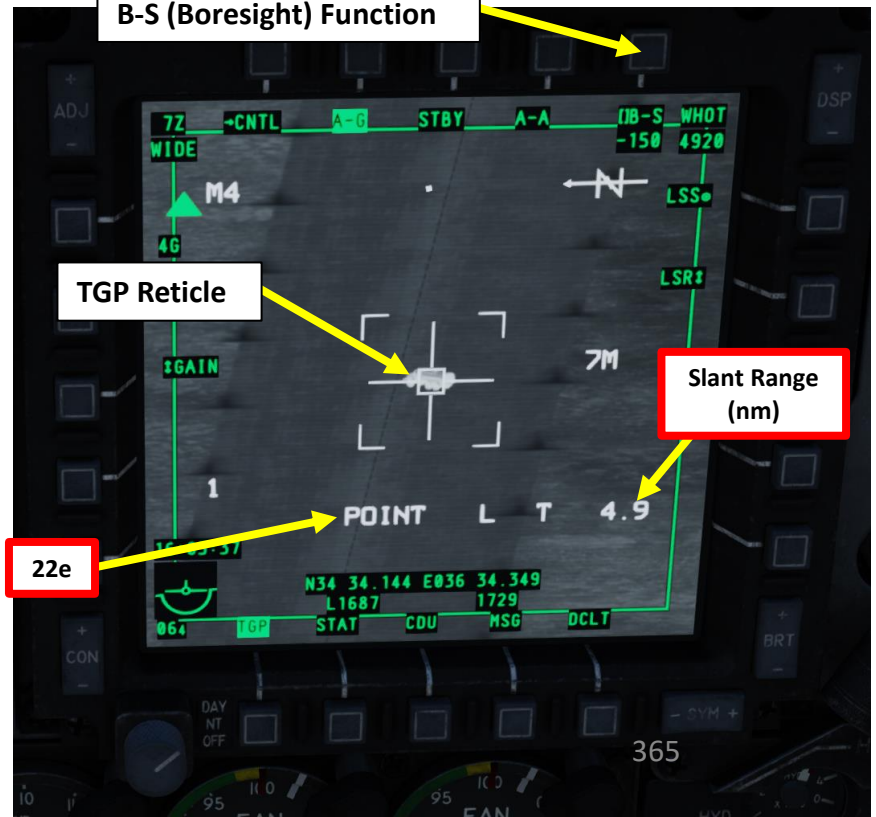
22. Designate target with the Targeting Pod
    a) Select desired Video Mode with the Boat Switch
        - FWD: FLIR BHOT (Forward-Looking Infrared Black Hot)
        - MIDDLE: CCD (Charge Coupled Device/TV)
        - AFT: FLIR WHOT (Forward-Looking Infrared White Hot)
    b) Select Field-of-View Mode with the China Hat Switch
        - FWD SHORT toggles between WIDE and NARROW
    c) Use the Slew Control Switch UP/DOWN/LEFT/RIGHT to set the TGP reticle on the target.
        - If you want to reset the TGP in front of you (boresight): In the TGP page, press the OSB next to B-S (Boresight Function)
    d) Press on the DMS (Data Management Switch) FWD/AFT SHORT to adjust Zoom Level.
    e) Press the TMS (Target Management System) switch FWD SHORT to track the target. This will toggle tracking modes between AREA TRACK (static target) and POINT TRACK (moving target).





A-10C II Tank Killer Expansion Only



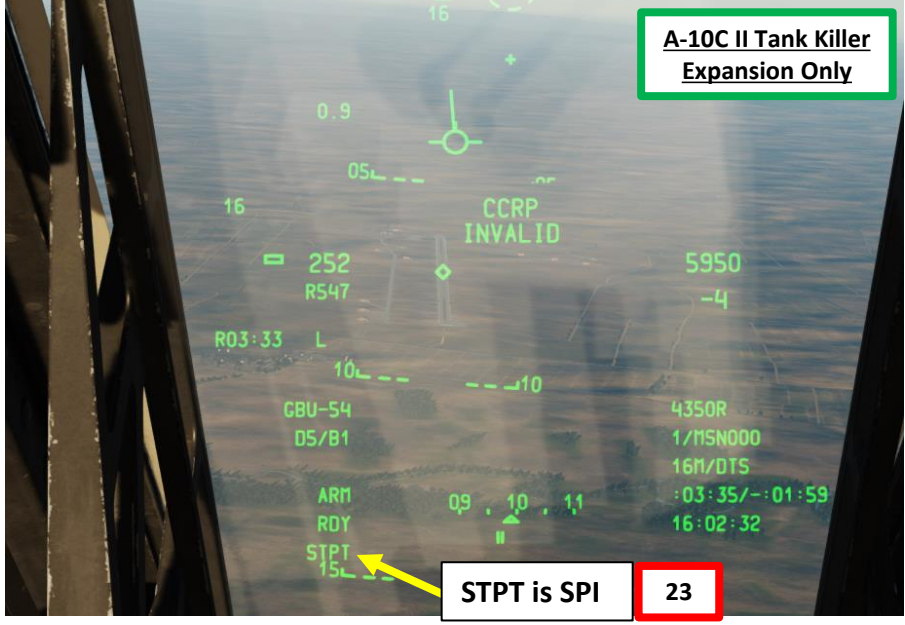


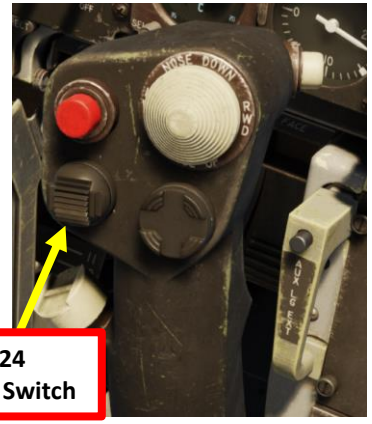
2.12 – GBU-54 LASER JDAM
TARGETING POD DESIGNATION (LASER)

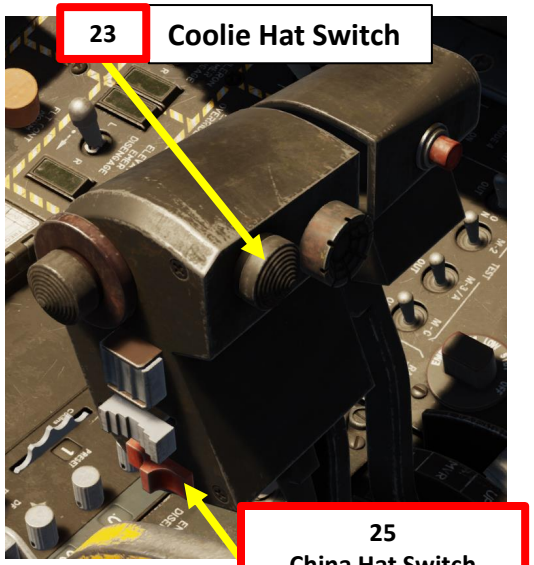
C: DESIGNATE TARGET WITH TARGETING POD

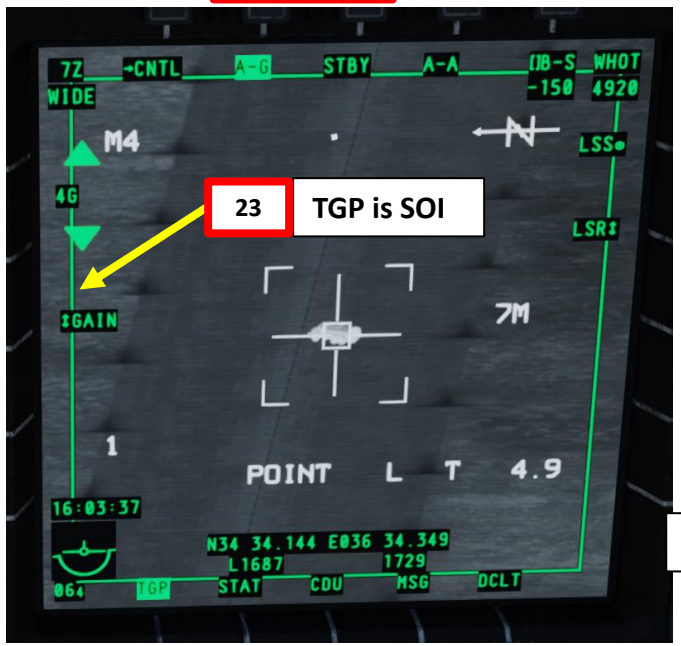
23. Verify TGP is SOI. If it's not, press the Coolie Hat Switch LONG in the direction of the MFCD that displays your TGP feed (RIGHT since we have the TGP page on the right MFCD).
24. Press the TMS (Target Management System) switch FWD LONG to designate the TGP Sensor Point of Interest (SPI).
25. Press the China Hat Switch FWD LONG to slave all sensors to the Sensor Point of Interest (SPI).

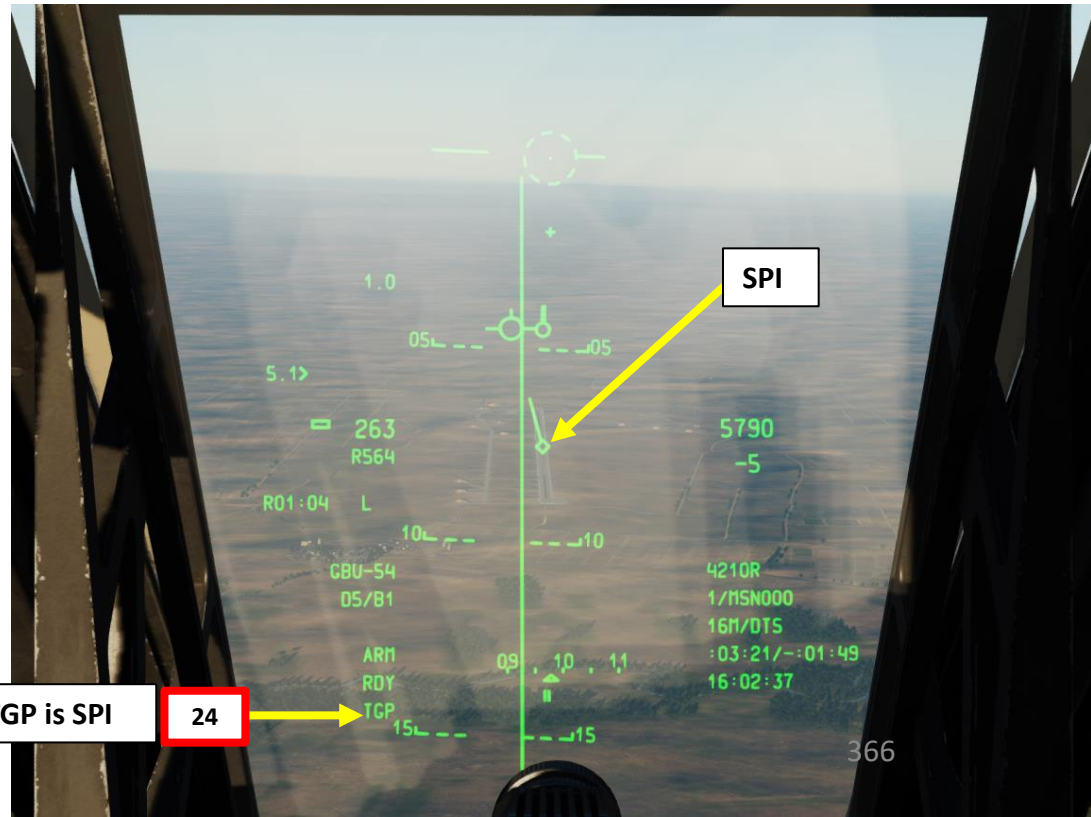
A-10C II Tank Killer Expansion Only









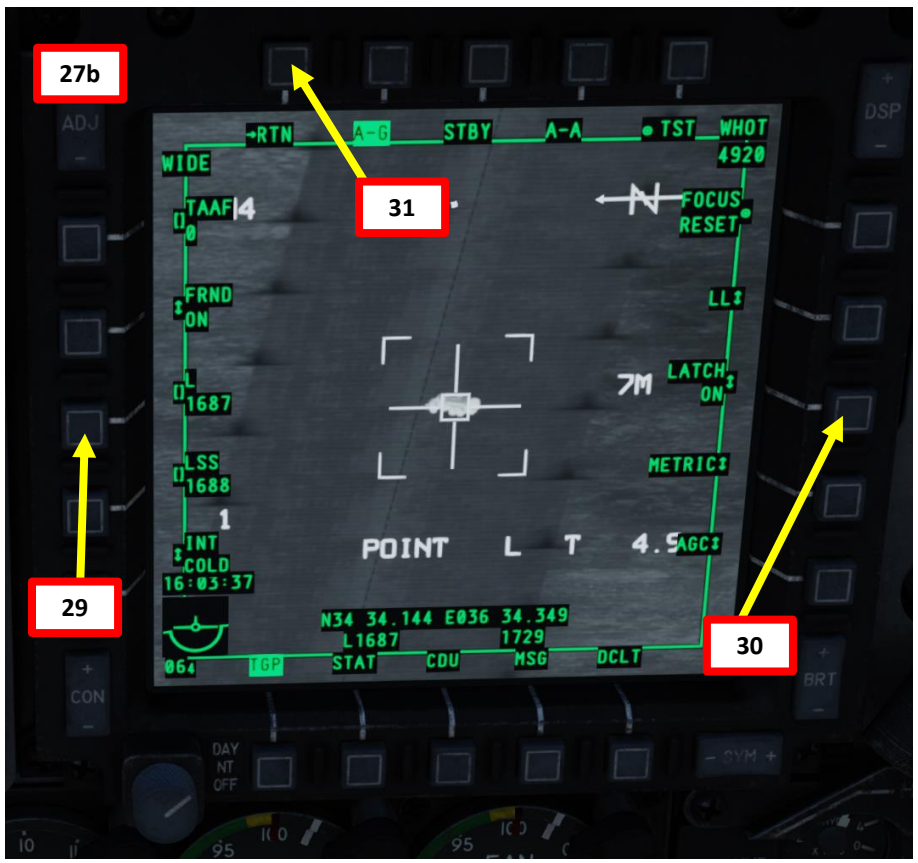


A-10C II Tank Killer Expansion Only

2.12 – GBU-54 LASER JDAM TARGETING POD DESIGNATION (LASER)

D: PREPARE TARGET LASING

26. Select desired Laser Designator Mode (LSR) with OSB.
27. Press the OSB next to CNTL to enter see the TGP AG Control Page.
28. Enter the desired Laser Code on the UFC Scratchpad. We will choose laser code 1687, which we set previously on the GBU-54 stations 5 and 7.
29. Press on the OSB next to "L" (Laser Designation Code) to enter laser code 1687.
30. Select desired LATCH mode with OSB (LATCH ON means the laser is latched once fired by pressing the Nosewheel Steering Button). We will choose LATCH ON.
31. Press OSB next to RTN (Return) to go back to Main TGP page.

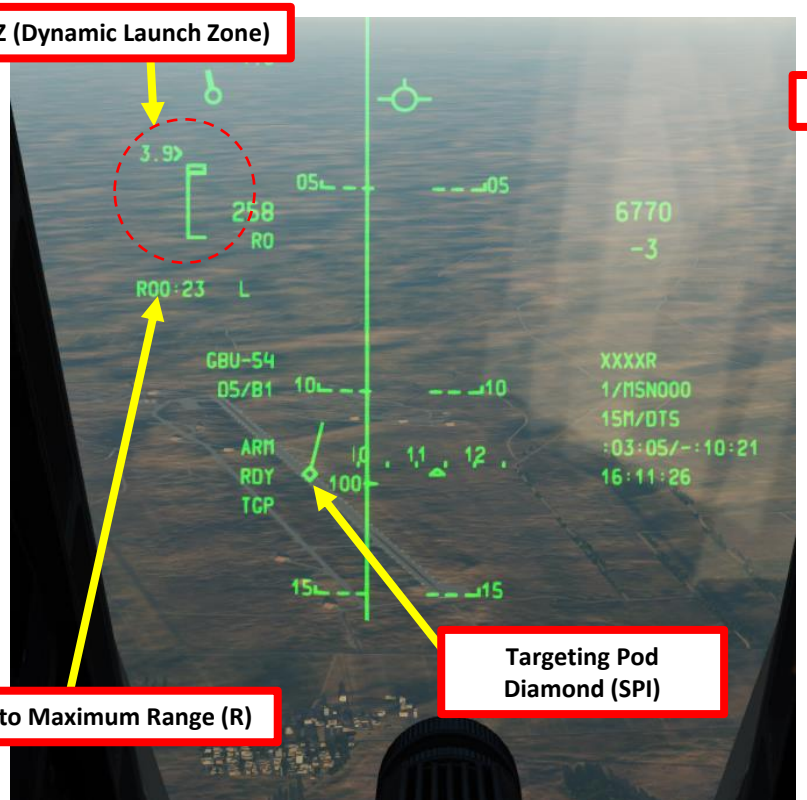


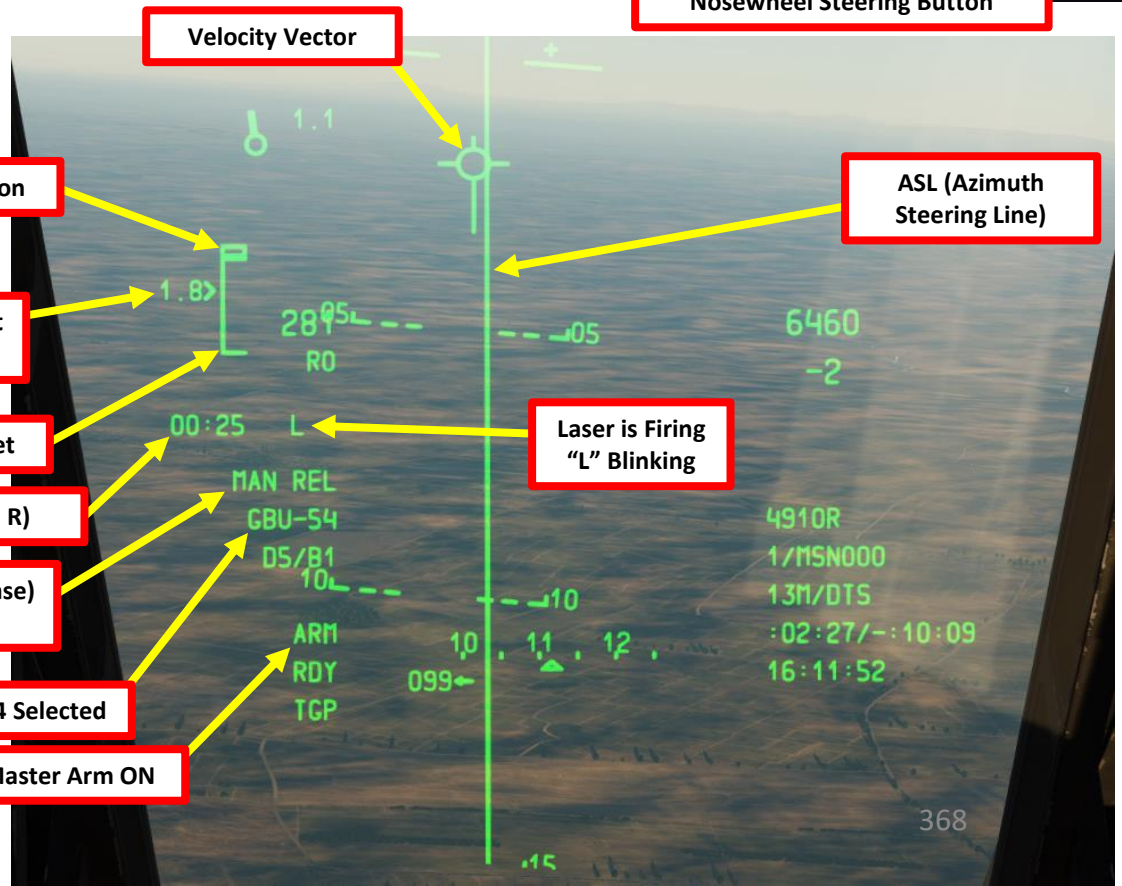
2.12 – GBU-54 LASER JDAM TARGETING POD DESIGNATION (LASER)

F: PERFORM ATTACK AND LASE

32. From an altitude of at least 5000 ft (optimal between 10000 and 15000 ft), fly level and maneuver the aircraft to align the velocity vector with the ASL.
33. The DLZ (Dynamic Launch Zone) current range and caret indication will move down from above the DLZ.
34. Once the current range caret is between the maximum and minimum range indication on the DLZ, the weapon may be released. MAN REL will appear in the In Range Indication field.
35. Press and hold down the Weapon Release button (RALT+SPACE) until JDAM is released.
36. The GBU-54 will home on the target coordinates by itself, guided by its own embedded GPS.
37. Press the Nosewheel Steering Button ("Insert" binding) to fire laser.
38. The GBU-54 will then automatically track the laser (instead of the INS/GPS coordinates) until impact.
39. After JDAM impact, press the Nosewheel Steering Button again to stop firing the laser.

A-10C II Tank Killer Expansion Only





2.12 – GBU-54 LASER JDAM
TARGETING POD DESIGNATION (LASER)

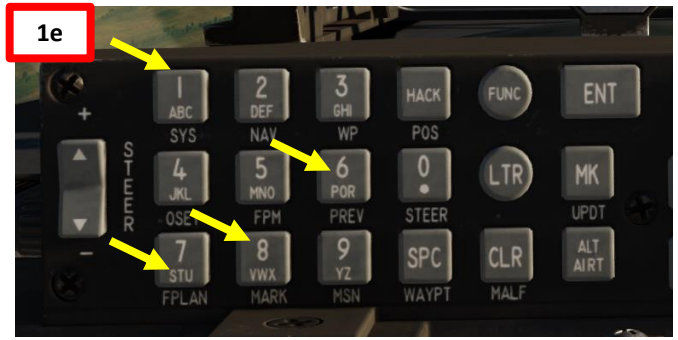
A-10C II Tank Killer Expansion Only

2.13 – APKWS (ADVANCED PRECISION KILL WEAPON SYSTEM) LASER-GUIDED ROCKETS (TARGETING POD DESIGNATION)

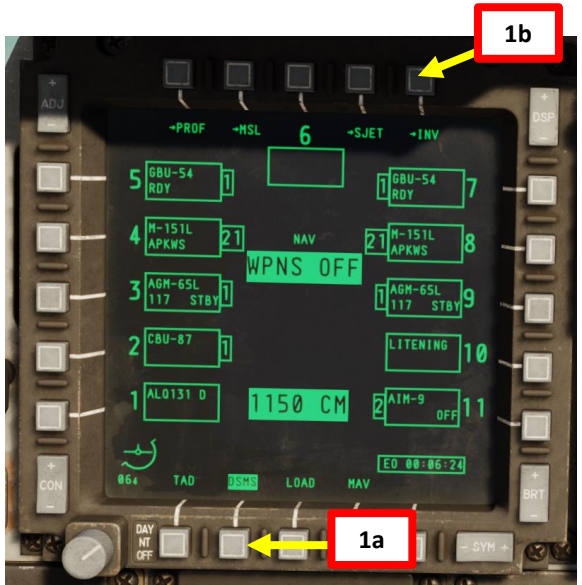
A-10C II Tank Killer Expansion Only

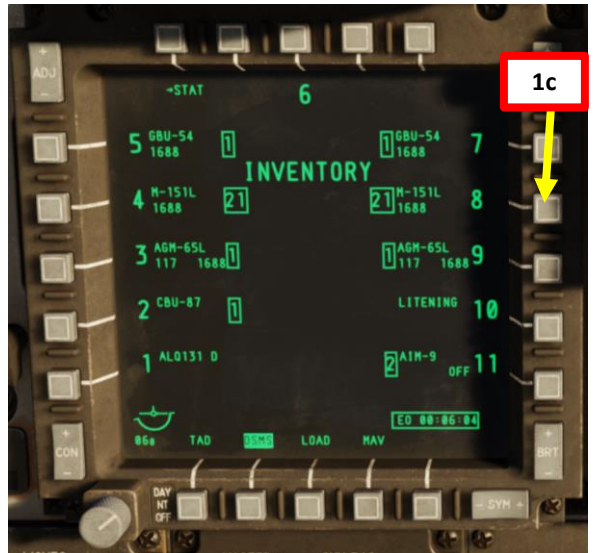
A: PROGRAM APKWS LASER CODE (VIA DSMS PAGE)

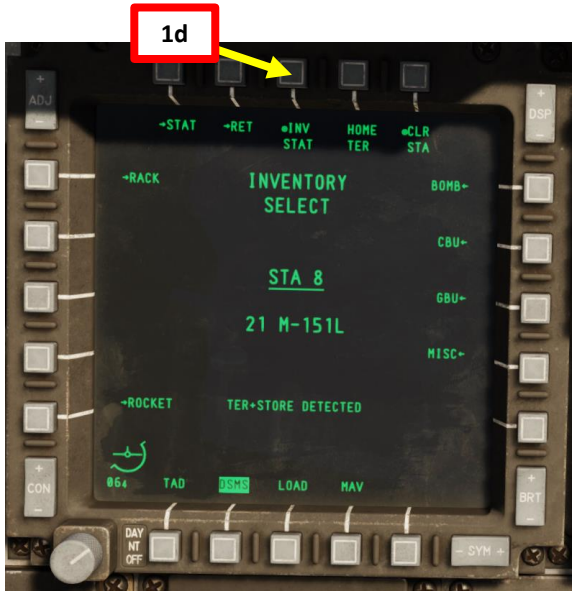
1. Program the laser code the APKWS rocket will track. You can do this with the DSMS page.
   a) Select DSMS (Digital Stores Management System) page
   b) Select "INV" (Inventory) page
   c) Select desired M-151L (or M-282L) APKWS rocket station (Station 8)
   d) Select "INV STAT" (Inventory Station)
   e) Enter desired APKWS laser code on the UFC scratchpad (i.e. 1687).
   f) Click on the OSB next to CODE to set new laser code (1687) on the APKWS rocket.
   g) Click on OSB next to LOAD if you want to load these parameters for this station only. If you have a symmetrical (same) loadout on opposite pylons (e.g. 4 and 8), select LOAD SYM to load these parameters on both APKWS stations.

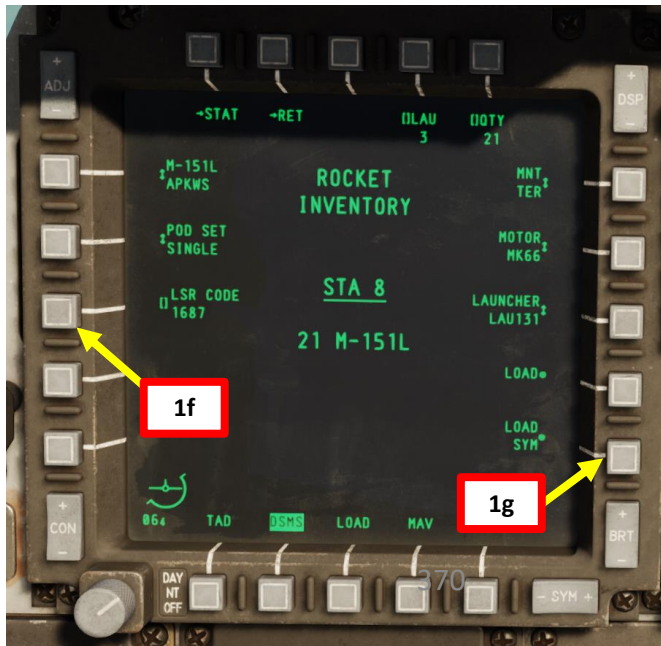


APKWS (Advanced Precision Kill Weapon System): *also displayed as the AGR-20A, the APKWS combines a standard 2.75-inch high explosive rocket with a laser guidance kit and control fins. There are two warhead options: the M-151 (High Explosive) and the M-282 (Penetrator Warhead).*





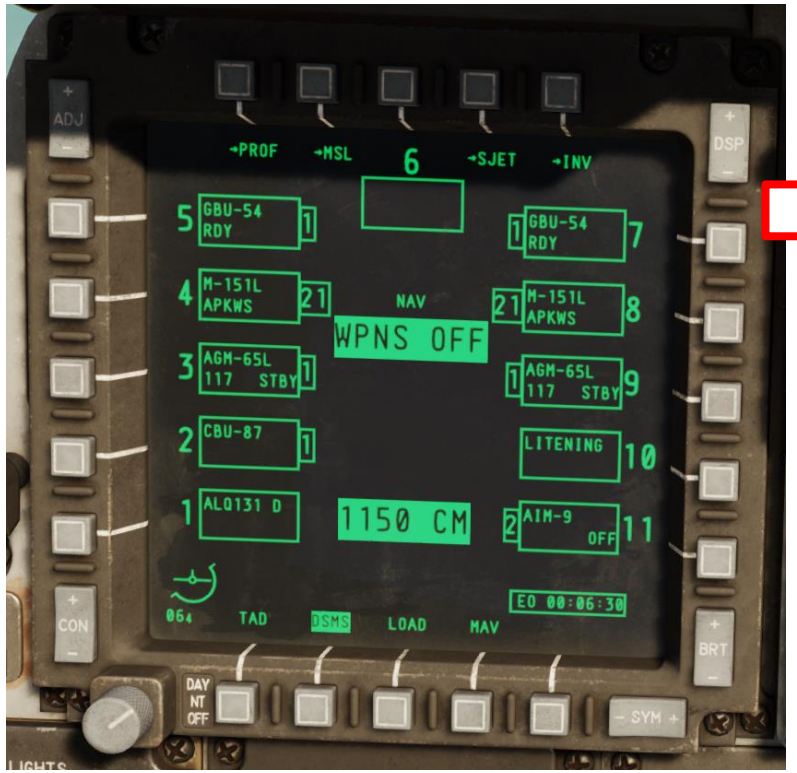




2.13 – APKWS (ADVANCED PRECISION KILL WEAPON SYSTEM) LASER-GUIDED ROCKETS (TARGETING POD DESIGNATION)

B: SELECT WEAPON

2. Set Master Arm Switch ON (UP)
3. Select DSMS (Digital Stores Management System) page
4. Select M-151L (or M-282L) APKWS Rockets (green when selected)
5. Select PROF (Weapon Profile) menu



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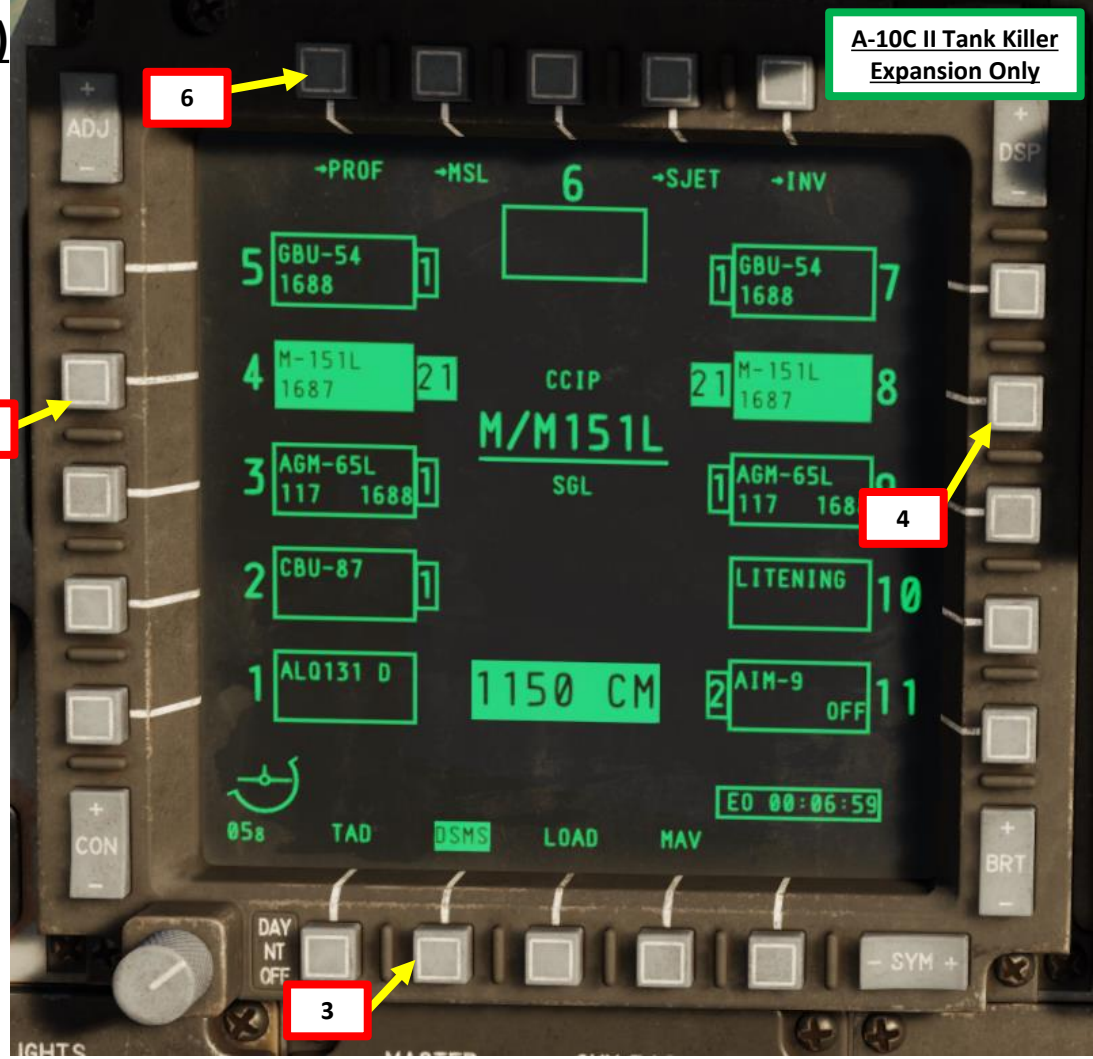


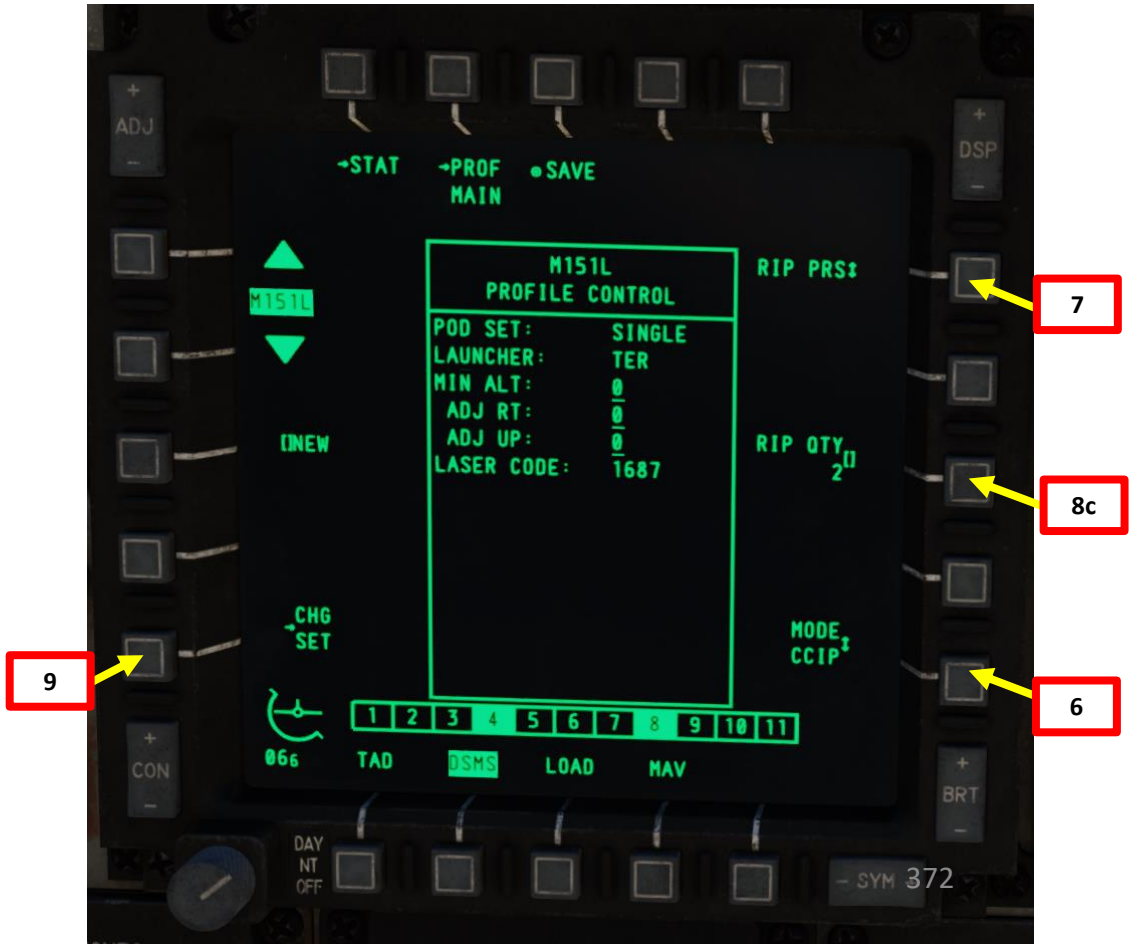
4
Selected Stations

2.13 – APKWS (ADVANCED PRECISION KILL WEAPON SYSTEM) LASER-GUIDED ROCKETS (TARGETING POD DESIGNATION)

A-10C II Tank Killer Expansion Only

C: SET WEAPON PROFILE

6. Set CCIP (Continuously Computed Impact Point) Mode
7. Set Release Type
    - SGL (Single): Single Rocket Launch
    - PRS (Pairs): Rockets launched in Pairs
    - RIP SGL (Ripple Single): Each press of the weapon release button will launch the set number of rockets set from the RIP QTY (Ripple Quantity) setting
    - RIP PRS (Ripple Pairs): Each press of the weapon release button will launch the number of rockets specified in the RIP PRS setting, in pairs
8. If required, set Rocket Ripple Quantity by typing the desired quantity on the UFC scratchpad (2), then pressing the OSB (Option Select Button) next to RIP QTY.
9. Select the OSB next to CHG SET (Change Settings) to modify rocket settings.

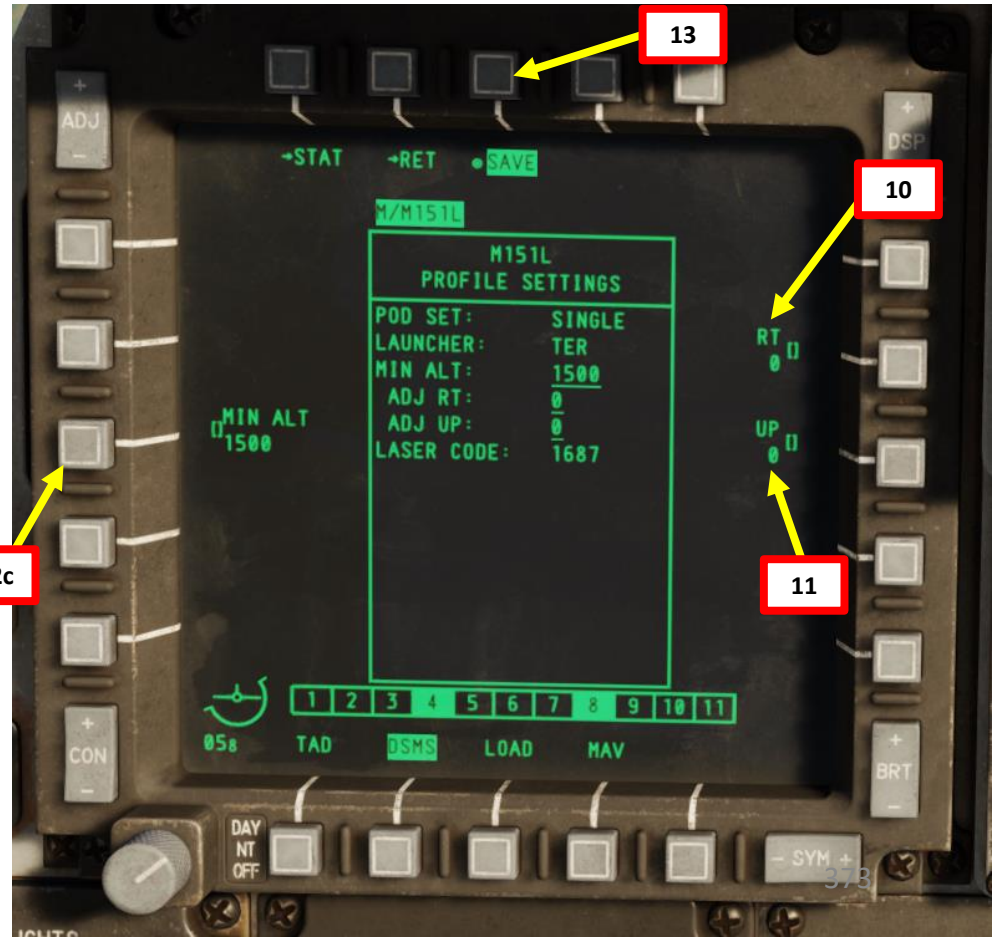


2.13 – APKWS (ADVANCED PRECISION KILL WEAPON SYSTEM) LASER-GUIDED ROCKETS (TARGETING POD DESIGNATION)

A-10C II Tank Killer Expansion Only

C: SET WEAPON PROFILE

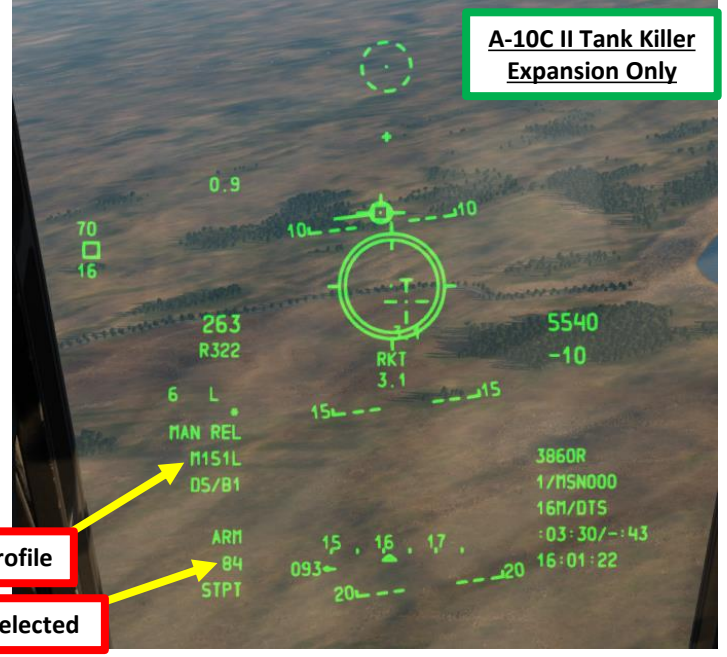
10. OPTIONAL: If using an horizontal offset (we aren't), enter Horizontal Offset value (in mils) on the UFC scratchpad, then press on the OSB next to RT (Right Adjustment). Value must be between -15 and +15 mils.
11. OPTIONAL: If using a vertical offset (we aren't), enter Vertical Offset value (in mils) on the UFC scratchpad, then press on the OSB next to UP (Upwards Adjustment). Value must be between -15 and +15 mils.
12. OPTIONAL: If you want to see Minimum Release Altitude cues on the Heads-Up Display, enter Minimum Altitude on the UFC scratchpad, then press on the OSB next to MIN ALT.
13. Press on the OSB next to SAVE to save Weapon Profile.

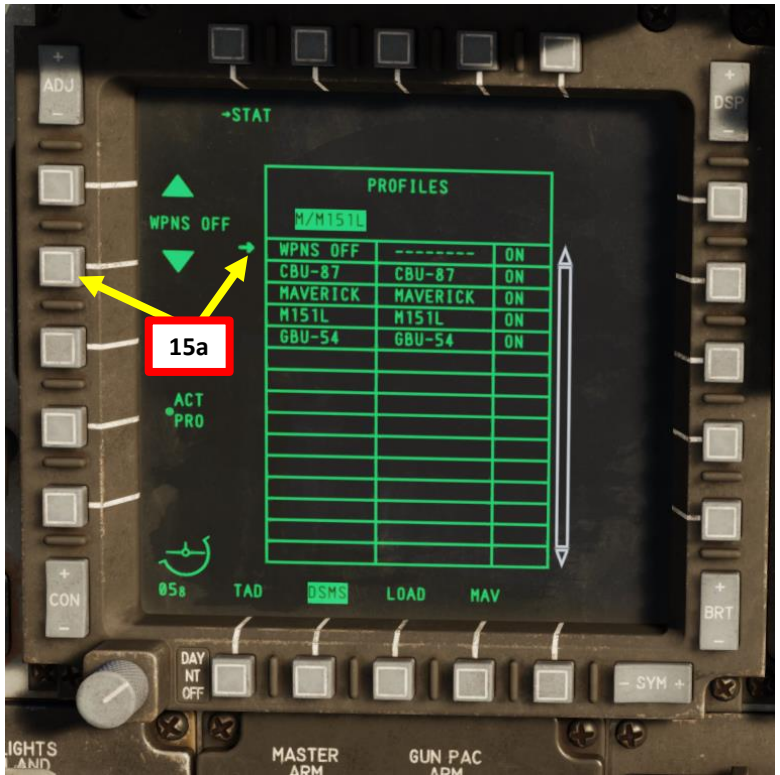


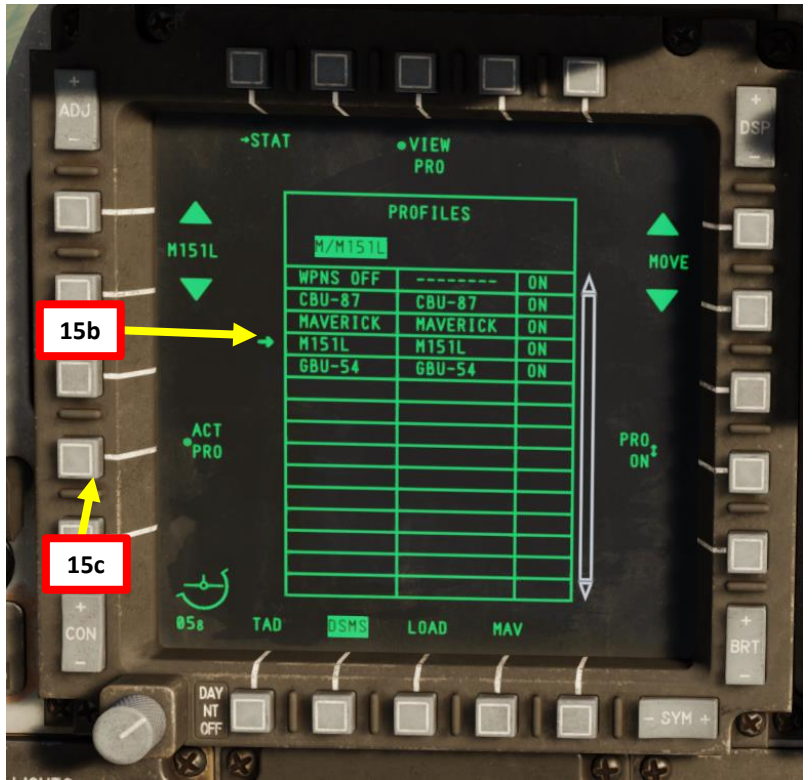
2.13 – APKWS (ADVANCED PRECISION KILL WEAPON SYSTEM) LASER-GUIDED ROCKETS (TARGETING POD DESIGNATION)

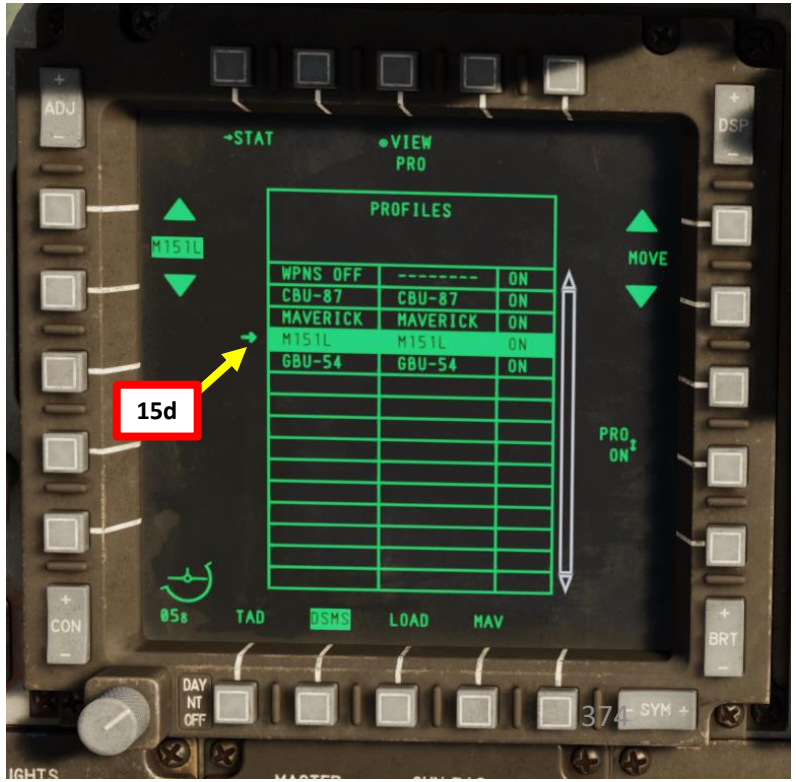
D: SELECT WEAPON PROFILE

14. Once weapon profile is saved, the DSMS page will showcase all different weapon profiles available.
15. Select M-151L (or M-282L) profile by pressing the Option Select Button Selectors, then press on the OSB next to ACT PRO (Active Profile).
    - While HUD is SOI (Coolie Hat Switch UP), cycle between profiles and stations using the DMS (Data Management Switch) left or right.
16. The M-151L (or M-282L) Profile will be displayed on the Heads-Up Display.







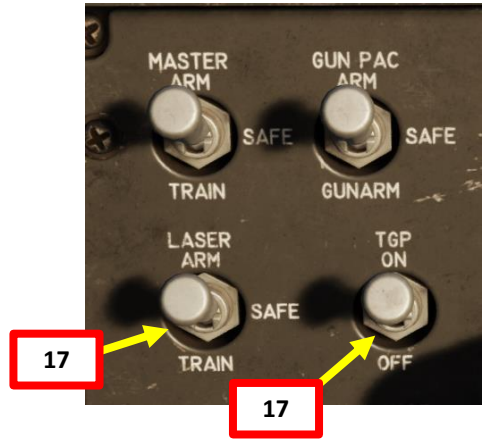


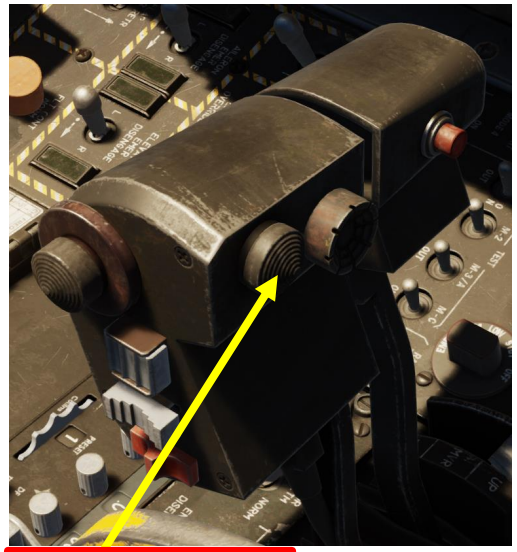
2.13 – APKWS (ADVANCED PRECISION KILL WEAPON SYSTEM) LASER-GUIDED ROCKETS (TARGETING POD DESIGNATION)

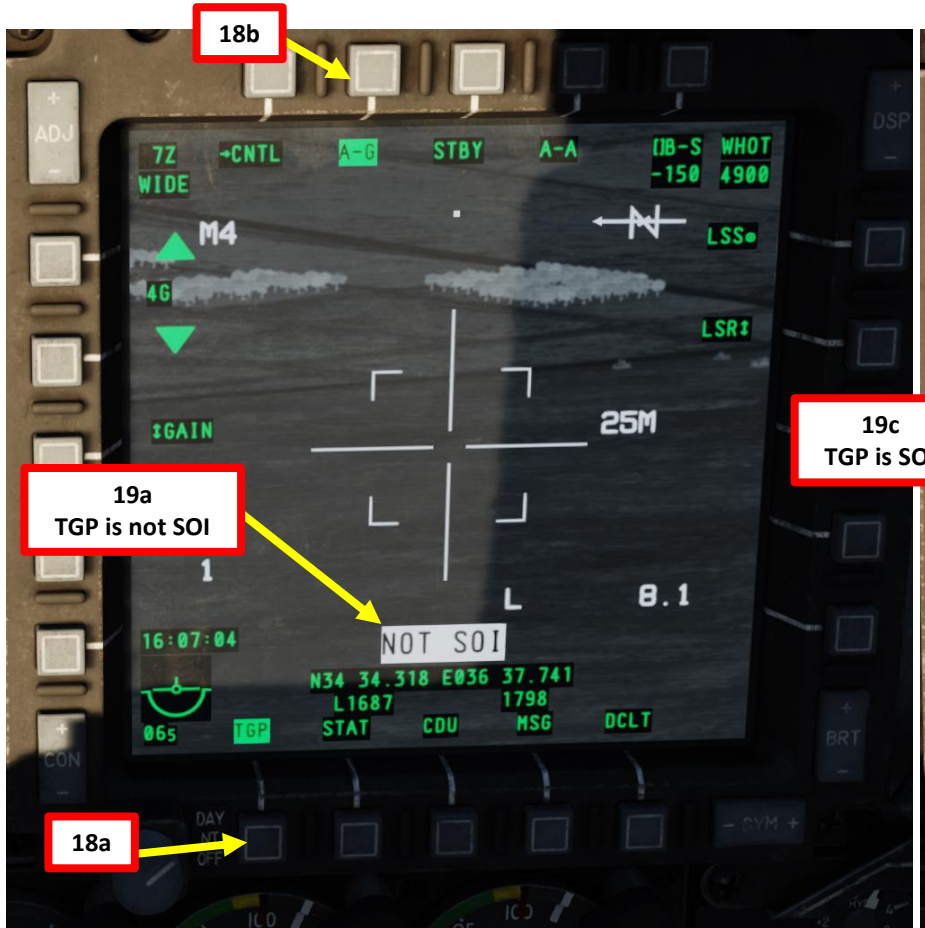
A-10C II Tank Killer Expansion Only

E: DESIGNATE TARGET WITH TARGETING POD

17. On AHCP (Armament HUD Control Panel), set TGP switch ON (UP) to power up the targeting pod. Set the LASER ARM switch to ARM (ON) as well.
18. Press the OSB (Option Select Button) next to TGP (Targeting Pod) to display the TGP Feed Page. Then, select the A-G (Air-to-Ground) Mode.
19. Press the Coolie Hat Switch LONG in the direction of the MFCD that displays your TGP feed (RIGHT since we have the TGP page on the right MFCD). This will set the TGP as the SOI (Sensor of Interest).



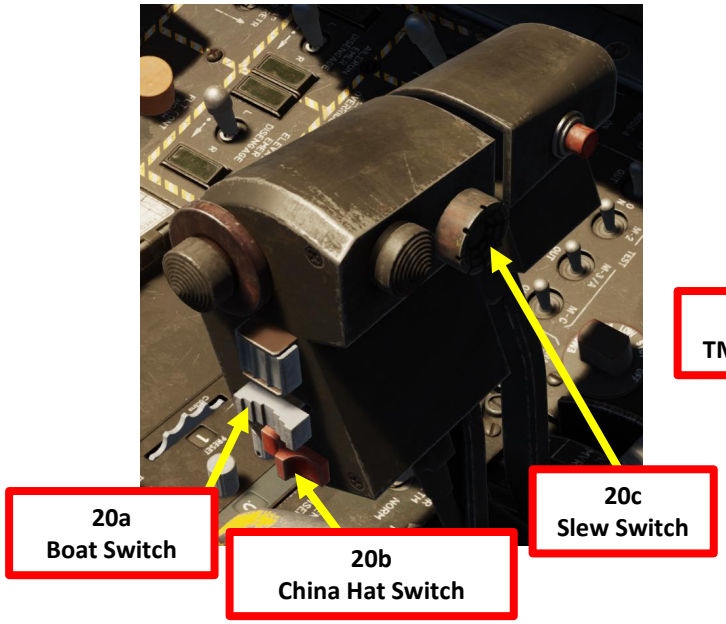


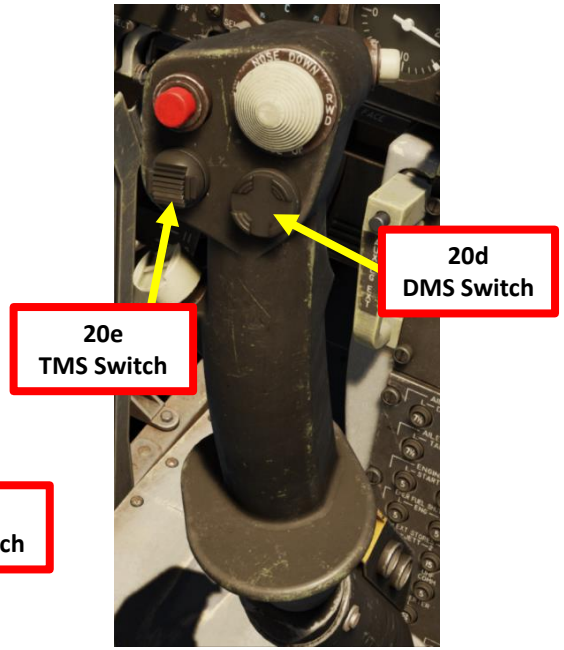


2.13 – APKWS (ADVANCED PRECISION KILL WEAPON SYSTEM) LASER-GUIDED ROCKETS (TARGETING POD DESIGNATION)

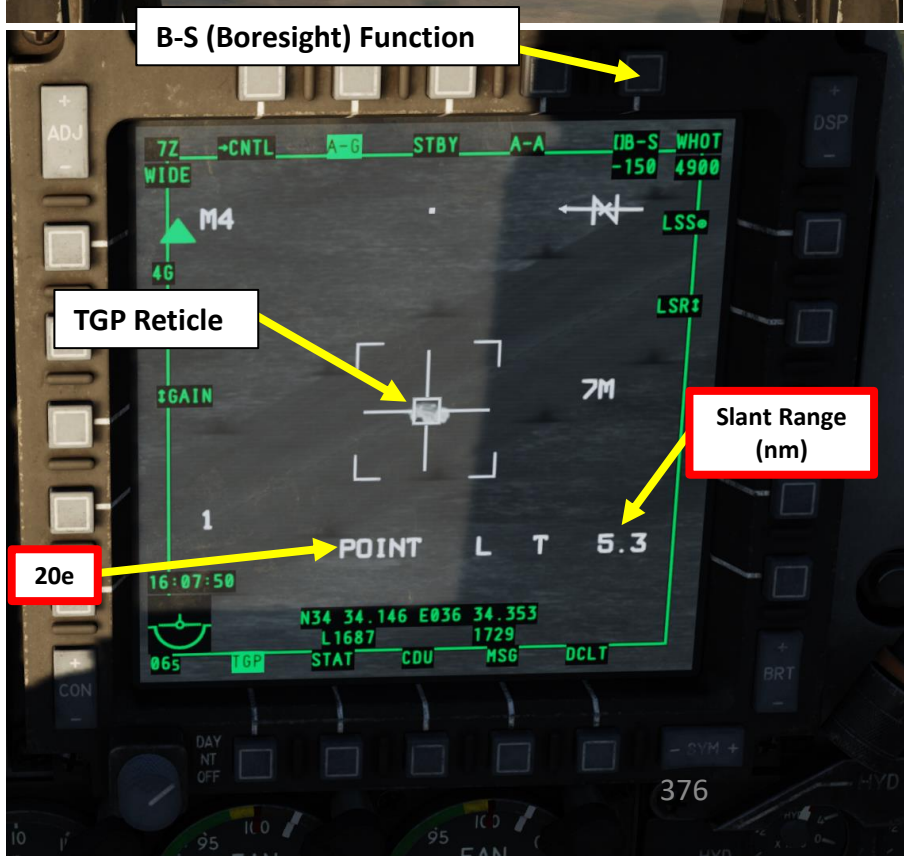
E: DESIGNATE TARGET WITH TARGETING POD

20. Designate target with the Targeting Pod
    a) Select desired Video Mode with the Boat Switch
        - FWD: FLIR BHOT (Forward-Looking Infrared Black Hot)
        - MIDDLE: CCD (Charge Coupled Device/TV)
        - AFT: FLIR WHOT (Forward-Looking Infrared White Hot)
    b) Select Field-of-View Mode with the China Hat Switch
        - FWD SHORT toggles between WIDE and NARROW
    c) Use the Slew Control Switch UP/DOWN/LEFT/RIGHT to set the TGP reticle on the target.
        - If you want to reset the TGP in front of you (boresight): In the TGP page, press the OSB next to B-S (Boresight Function)
    d) Press on the DMS (Data Management Switch) FWD/AFT SHORT to adjust Zoom Level.
    e) Press the TMS (Target Management System) switch FWD SHORT to track the target. This will toggle tracking modes between AREA TRACK (static target) and POINT TRACK (moving target).





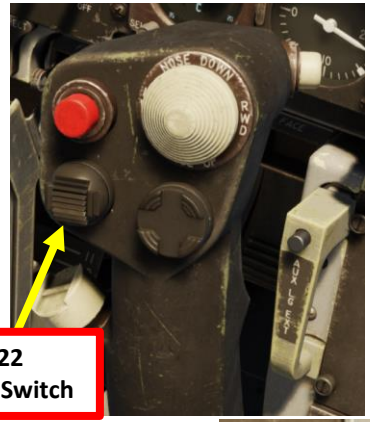
A-10C II Tank Killer Expansion Only

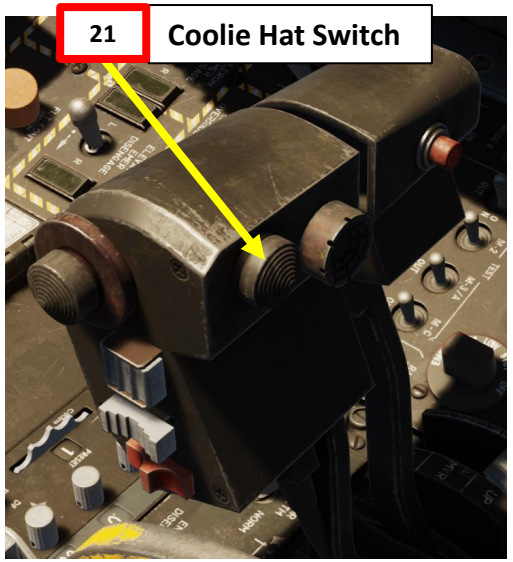


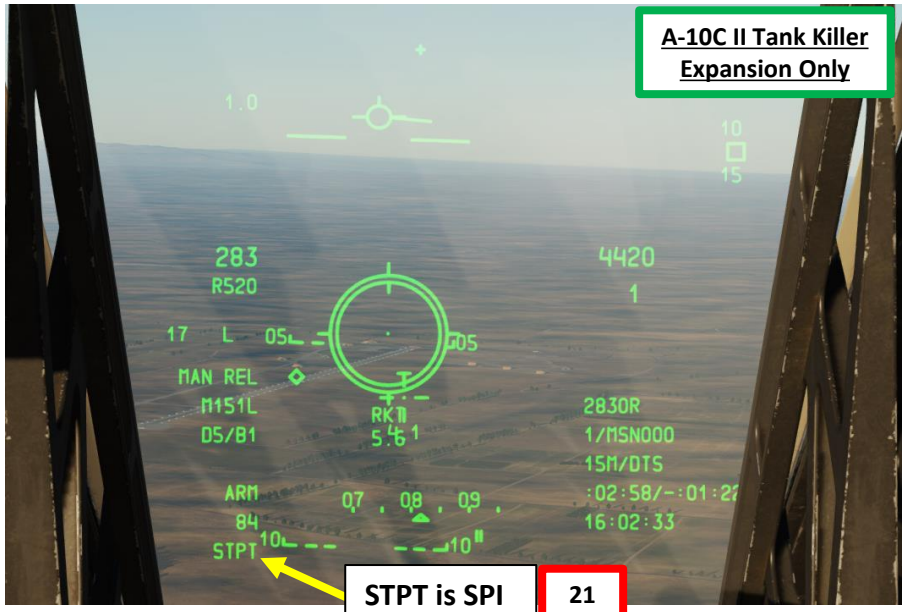
2.13 – APKWS (ADVANCED PRECISION KILL WEAPON SYSTEM) LASER-GUIDED ROCKETS (TARGETING POD DESIGNATION)

E: DESIGNATE TARGET WITH TARGETING POD

21. Verify TGP is SOI. If it's not, press the Coolie Hat Switch LONG in the direction of the MFCD that displays your TGP feed (RIGHT since we have the TGP page on the right MFCD).
22. Press the TMS (Target Management System) switch FWD LONG to designate the TGP Sensor Point of Interest (SPI).





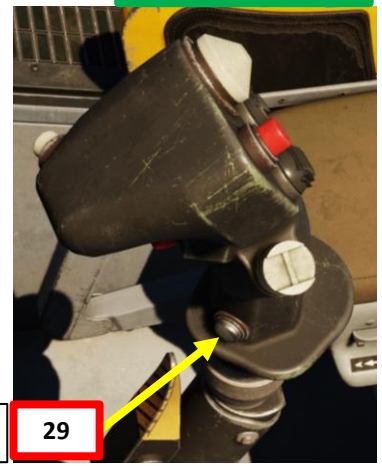


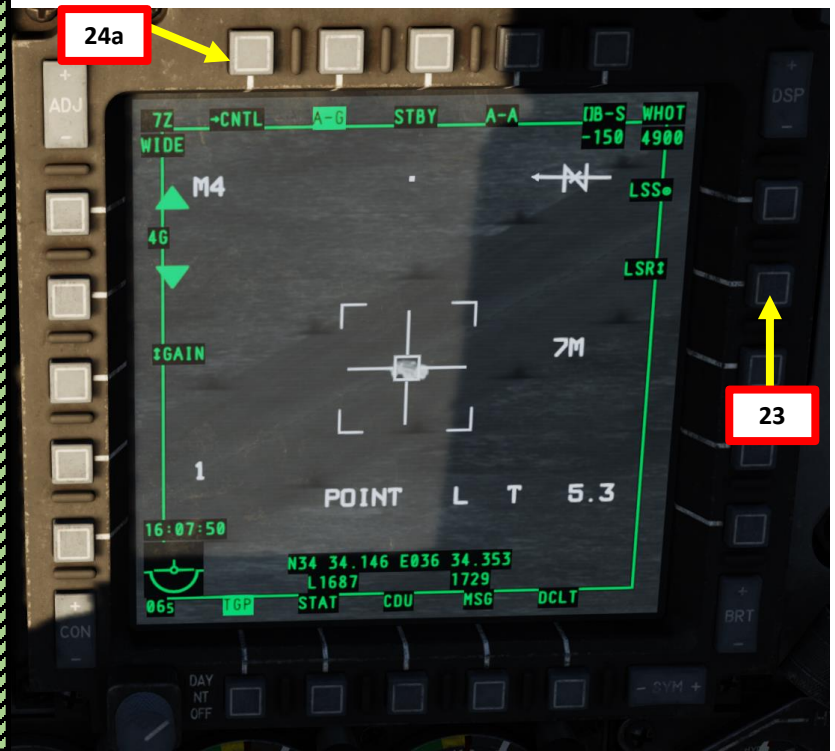
2.13 – APKWS (ADVANCED PRECISION KILL WEAPON SYSTEM) LASER-GUIDED ROCKETS (TARGETING POD DESIGNATION)

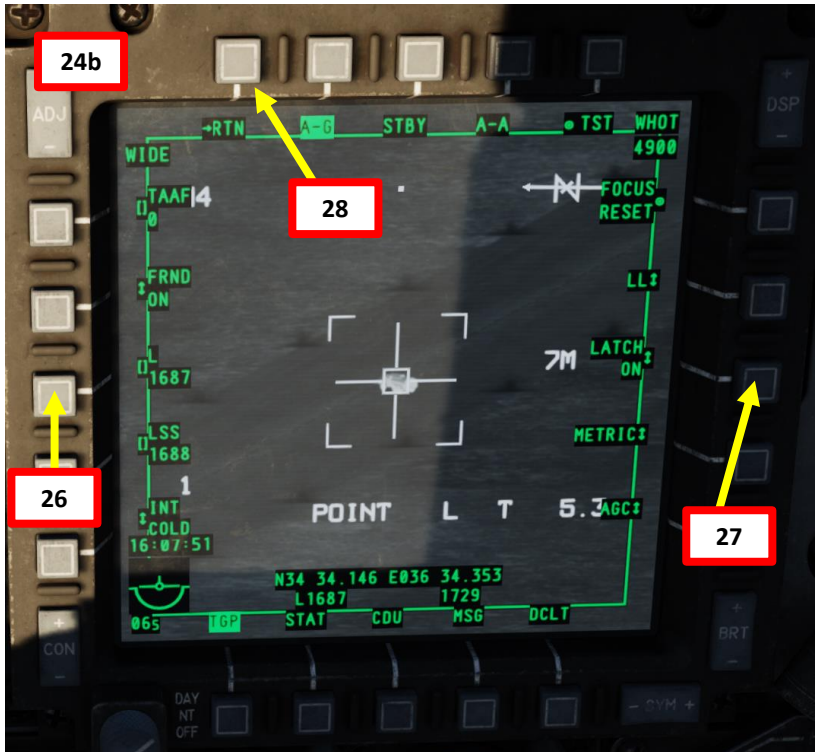
F: LASE TARGET

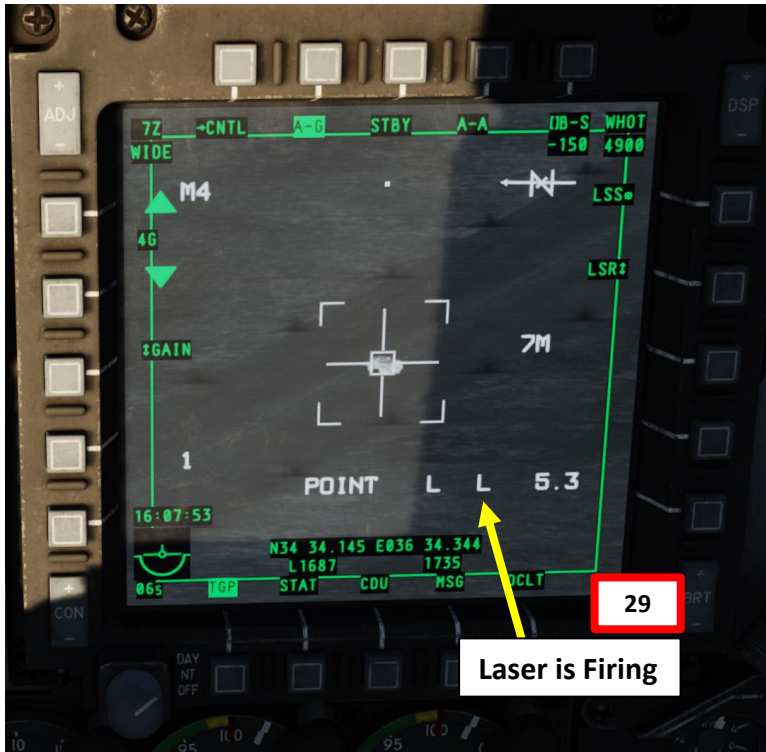
23. Select desired Laser Designator Mode (LSR) with OSB.
24. Press the OSB next to CNTL to enter see the TGP AG Control Page.
25. Enter the desired Laser Code on the UFC Scratchpad. We will choose laser code 1687, which we set previously on the APKWS stations 4 and 8.
26. Press on the OSB next to "L" (Laser Designation Code) to enter laser code 1687.
27. Select desired LATCH mode with OSB (LATCH ON means the laser is latched once fired by pressing the Nosewheel Steering Button). We will choose LATCH ON.
28. Press OSB next to RTN (Return) to go back to Main TGP page.
29. Press the Nosewheel Steering Button ("Insert" binding) to fire laser.

A-10C II Tank Killer Expansion Only







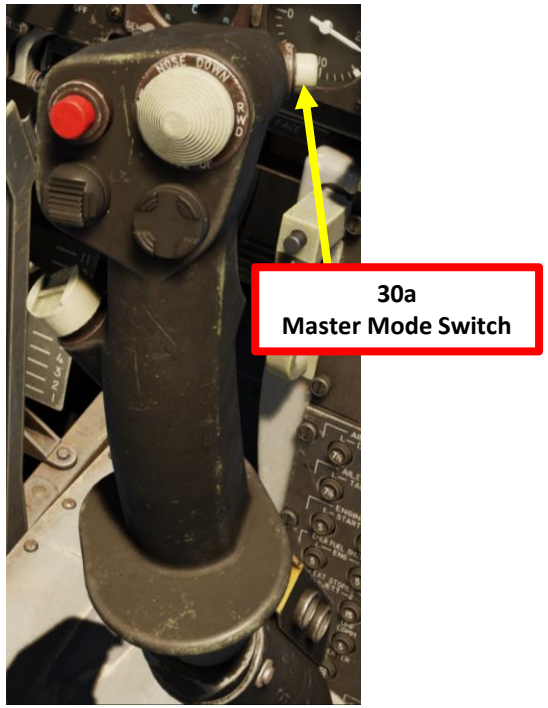


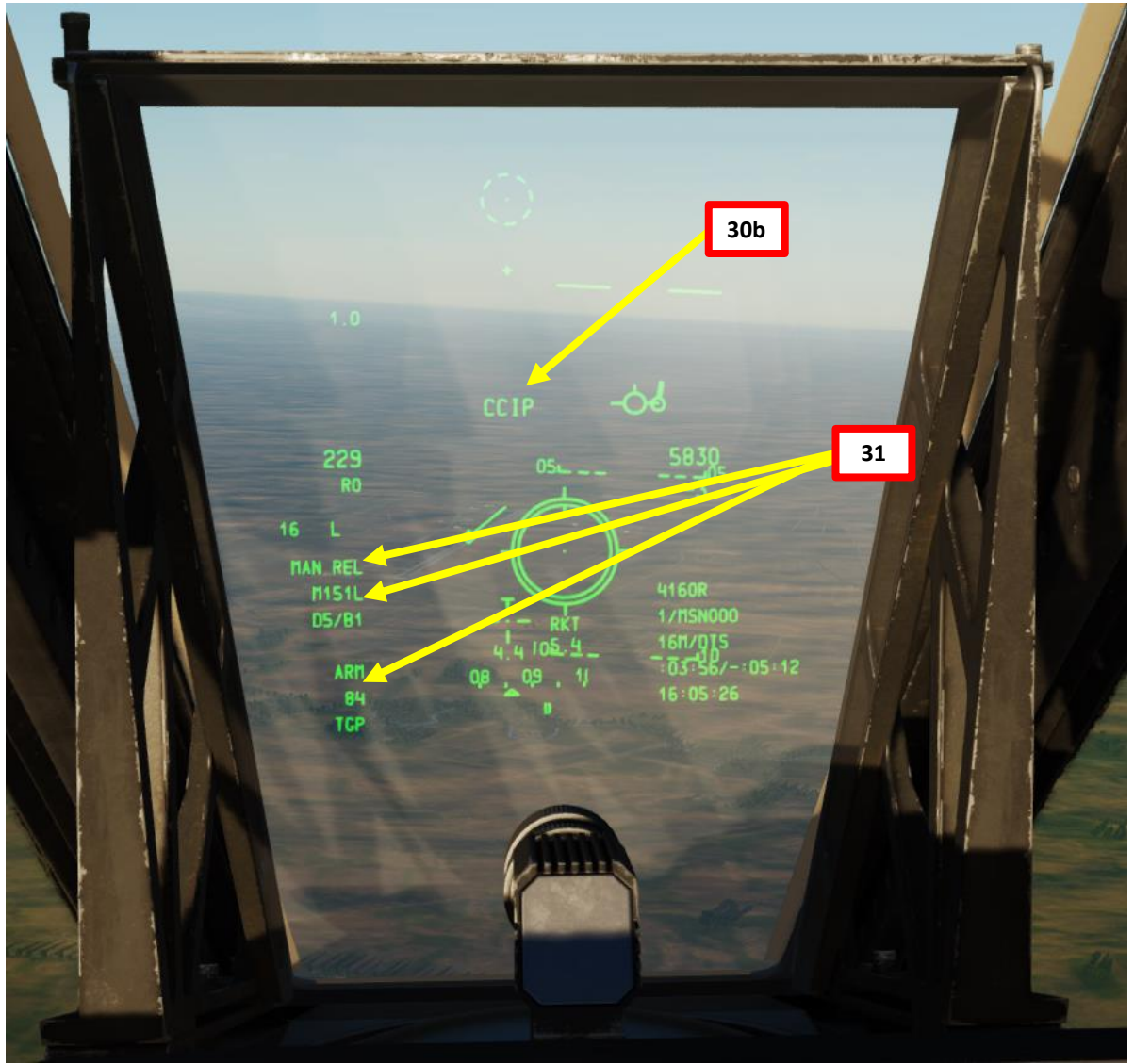
2.13 – APKWS (ADVANCED PRECISION KILL WEAPON SYSTEM) LASER-GUIDED ROCKETS (TARGETING POD DESIGNATION)

A-10C II Tank Killer Expansion Only

G: PERFORM ATTACK

30. Press the Master Mode button until the CCIP HUD Mode is selected.
31. Verify on the Heads-Up Display that MAN REL mode, CCIP release, M-151L profile and ARM status are displayed.



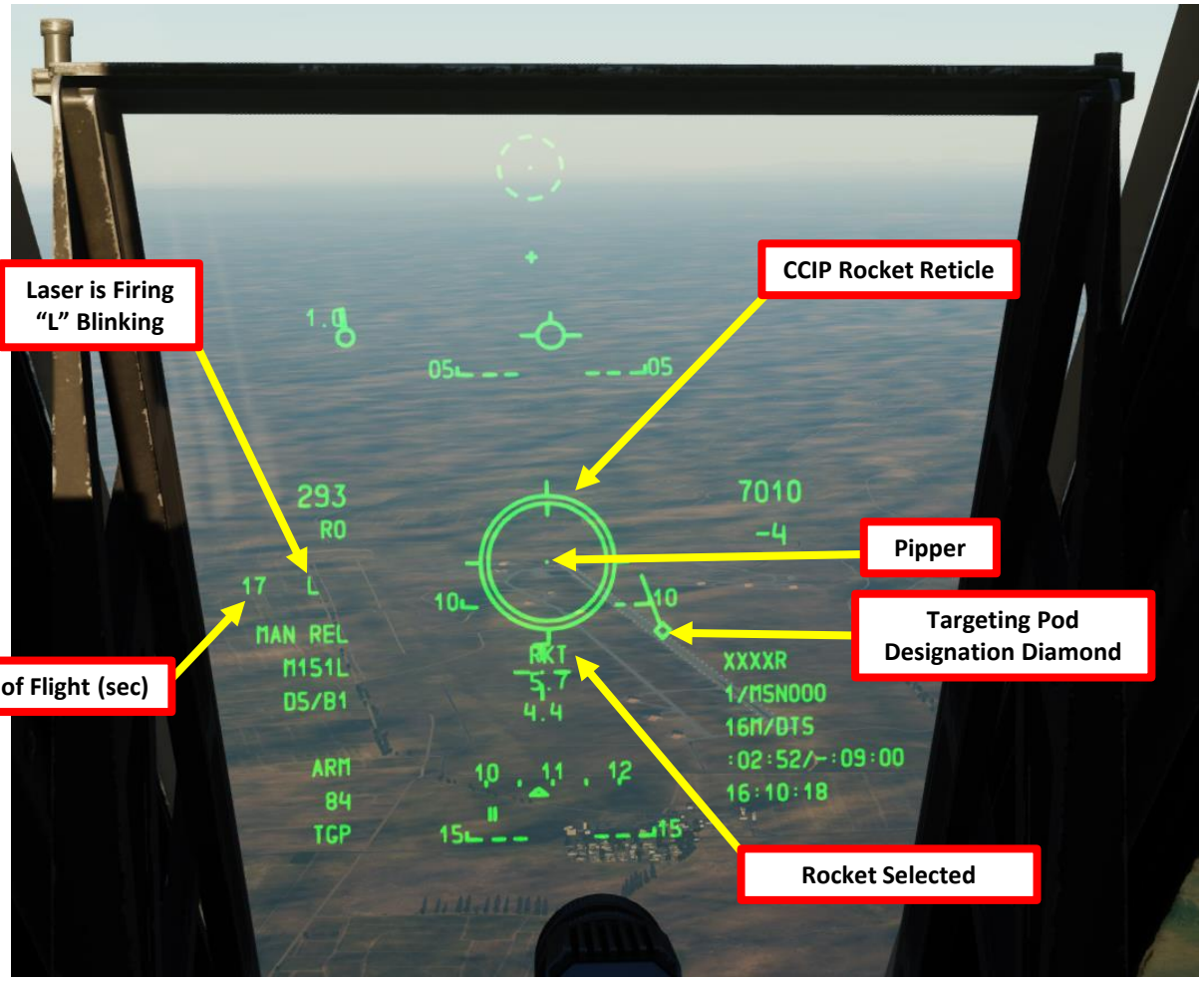


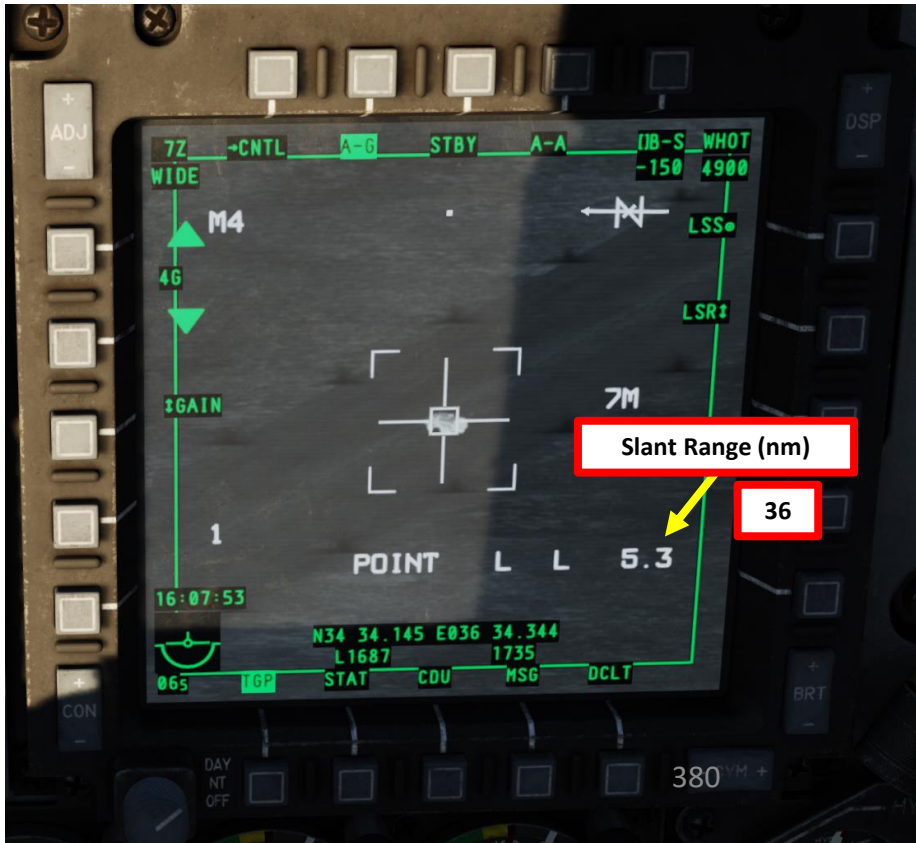
2.13 – APKWS (ADVANCED PRECISION KILL WEAPON SYSTEM) LASER-GUIDED ROCKETS (TARGETING POD DESIGNATION)

G: PERFORM ATTACK

32. Perform a shallow dive between 10 and 45 deg from at least 10000 ft.
33. A CCIP Rocket Reticle & Pipper will appear when you are not yet close enough to the target.
34. Verify that Laser is firing (blinking "L" on the HUD). If not, press the Nosewheel Steering Button ("Insert" binding) to fire laser.
35. When the slant range to target is less than 10 nm, place the center of the CCIP Reticle on the target.
36. At a slant range of around 5.5 to 5.0 nm, hold down the Weapon Release button (RALT+SPACE) to launch rockets.
37. Rockets will launch and track the laser until impact.
38. After rocket impact, press the Nosewheel Steering Button again to stop firing the laser.

A-10C II Tank Killer Expansion Only





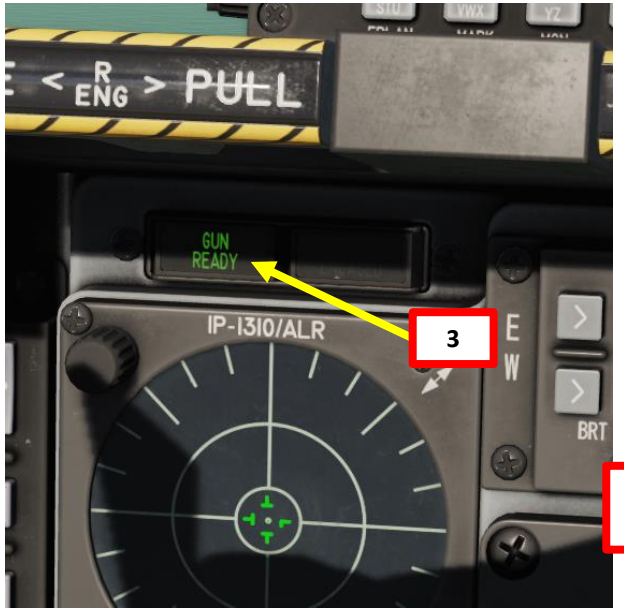
2.13 – APKWS (ADVANCED PRECISION KILL WEAPON SYSTEM) LASER-GUIDED ROCKETS (TARGETING POD DESIGNATION)

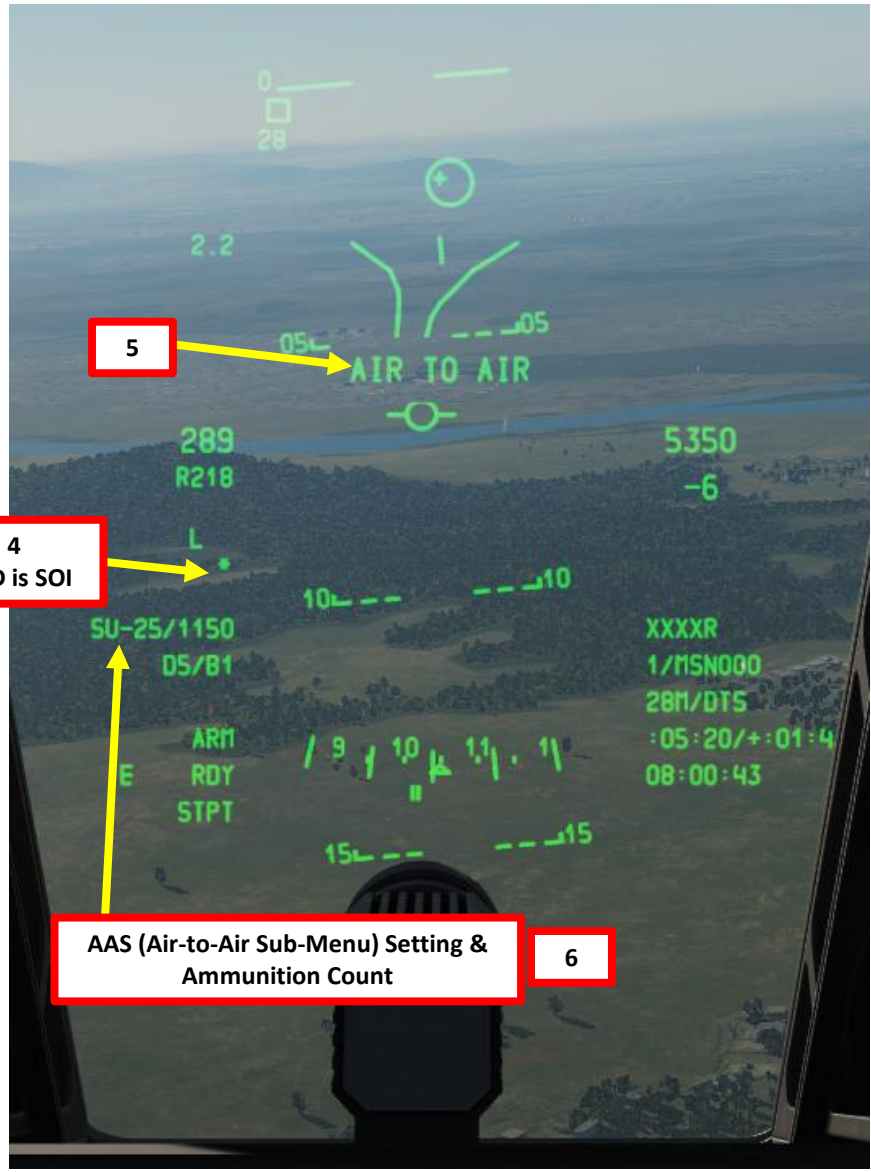
A-10C II Tank Killer Expansion Only

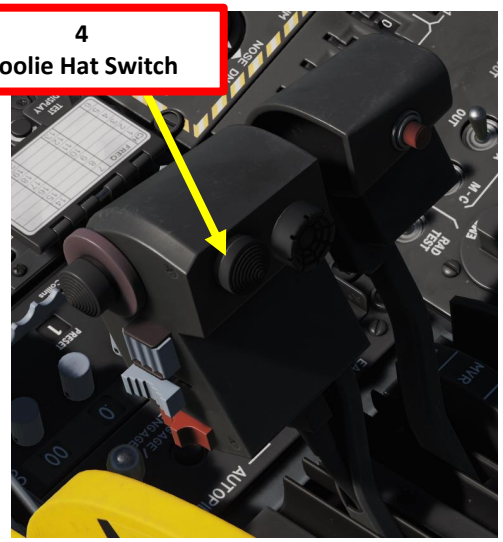
3.1 – GAU-8 GUN (AIR-TO-AIR)

A - GUN PROCEDURE

1. Set Master Arm Switch ON (UP)
2. Set GUN/PAC (Precision Attitude Correction) Switch to GUNARM (DOWN)
3. Confirm that GUN READY indication is visible
4. Press Coolie Hat UP Short to set the Heads-Up Display as the SOI (Sensor of Interest). Asterisk will indicate HUD is SOI.
5. press & hold approx. 3 seconds the Master Mode Switch to enter Air-to-Air Master Mode
6. Use DMS (Data Management Switch) LEFT/RIGHT to cycle through the AAS (Air-to-Air Sub-menu) aircraft options to match the aircraft you are engaging. In our case, we will choose a profile set for the Su-25.

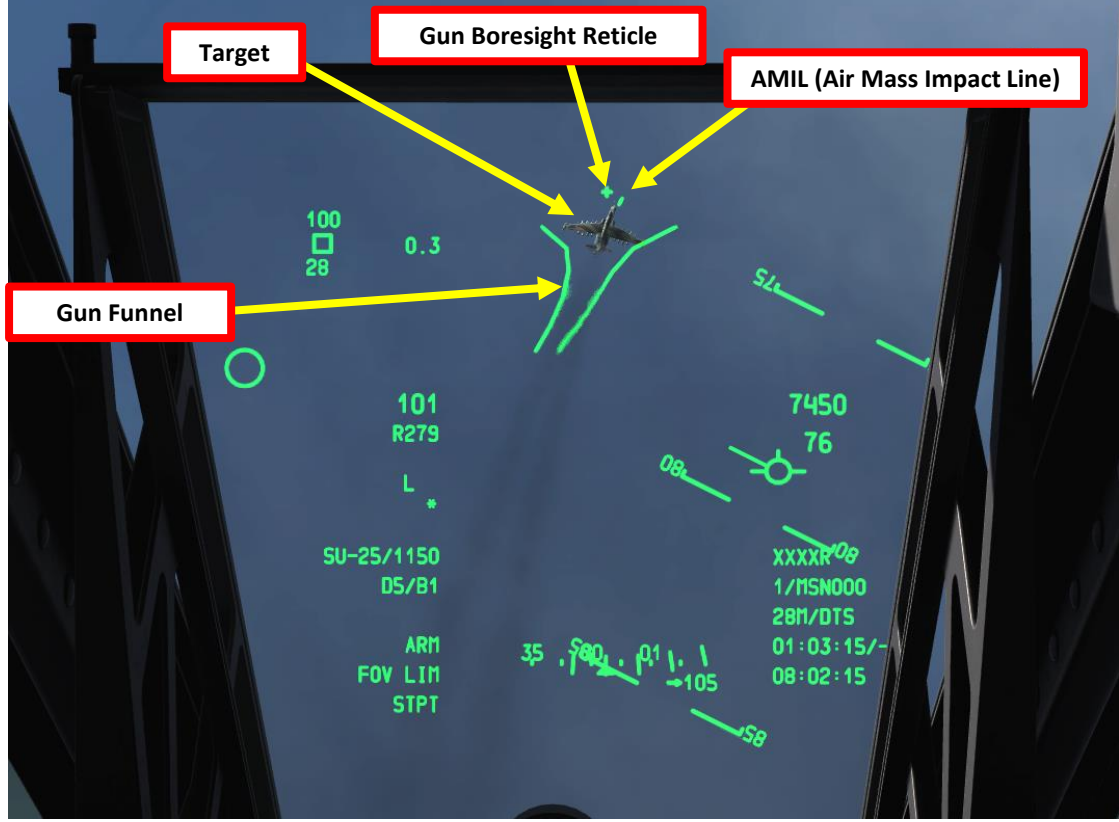


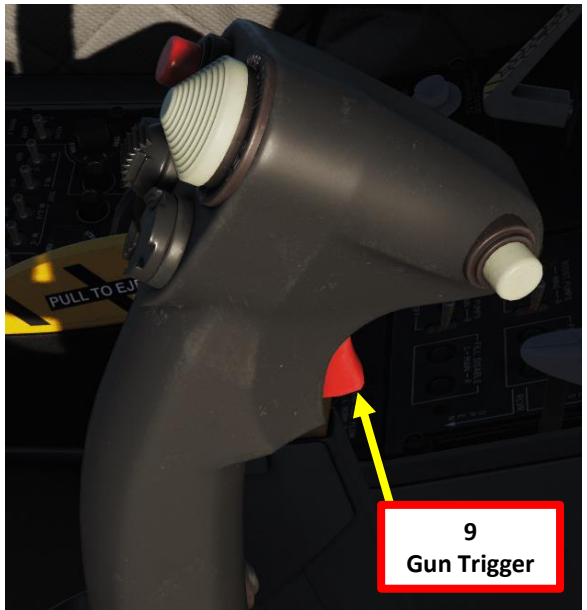




3.1 – GAU-8 GUN (AIR-TO-AIR)
A - GUN PROCEDURE

7. When you have selected the correct AAS (Air-to-Air Sub-Menu) setting and have the target within the funnel with just the wing/rotor tips touching the sides of the funnel, you can fire the gun.
8. You can also use the AMIL (Air Mass Impact Line) to assist in gun aiming. This is a vertical line which represents the lead angle due to trajectory shift and gravity drop of rounds from close range out to approximately 2 seconds time of flight. The top of the AMIL shows where the bullets will be just after the firing burst and the distance they will fall towards the earth after 2 seconds due to deceleration and gravity drop.
9. Depress trigger (second detent) to fire a short 1-second gun burst

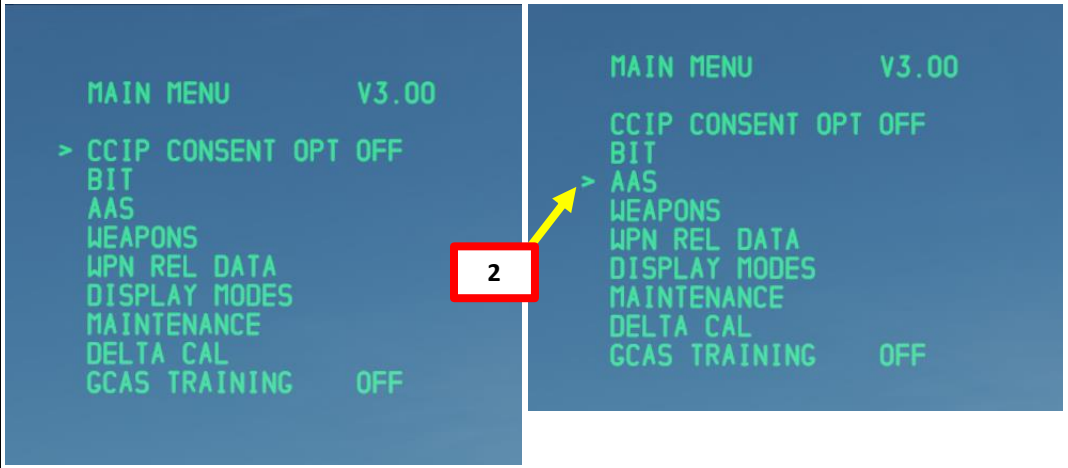


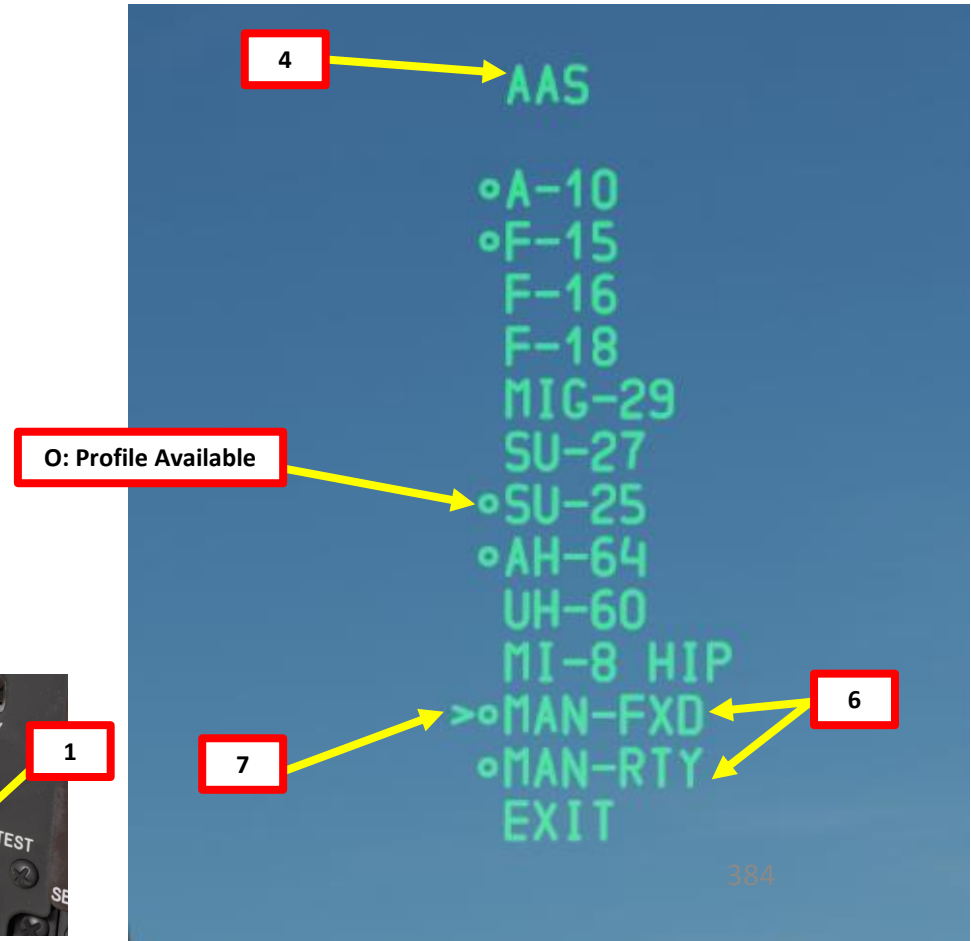


3.1 – GAU-8 GUN (AIR-TO-AIR)
B - SETTING GUN FUNNEL WINGSPAN

To set up **custom wingspan values** for the gun funnel:

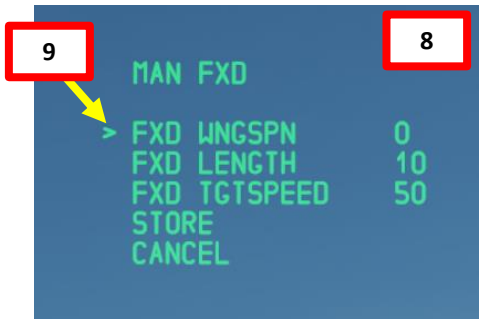
1. Set IFFCC (Integrated Flight & Fire Control Computer) to TEST (MIDDLE) position by Left Clicking on the switch.
2. Select AAS (Air-to-Air Sub-Menu) option with the SEL Rocker Key.
3. Press ENT to enter AAS menu.
4. The AAS menu determines what preset wingspan profiles are programmed and which ones are available via the DMS (Data Management Switch).
5. Select the profiles you want to have access to by moving the cursor with the SEL rocker key, then press ENT to make them available or not (o = available).
6. MAN-FXD is a programmable profile for Fixed Wing aircraft, while MAN-RTY is a programmable profile for Rotary aircraft like helicopters.
7. We want to program a custom profile for a MiG-21. Select MAN-FXD menu with the SEL rocker key, then press ENT.

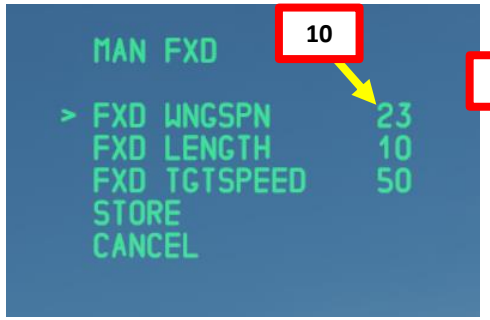


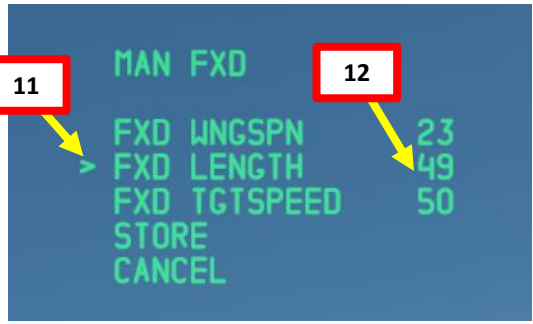


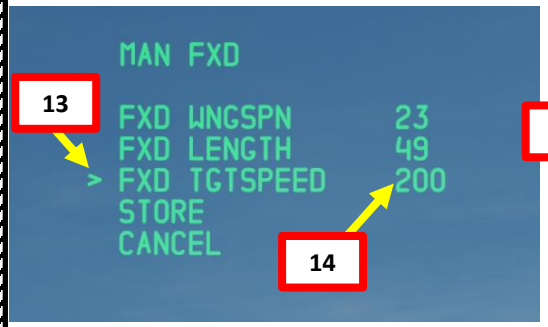
3.1 – GAU-8 GUN (AIR-TO-AIR)
B - SETTING GUN FUNNEL WINGSPAN

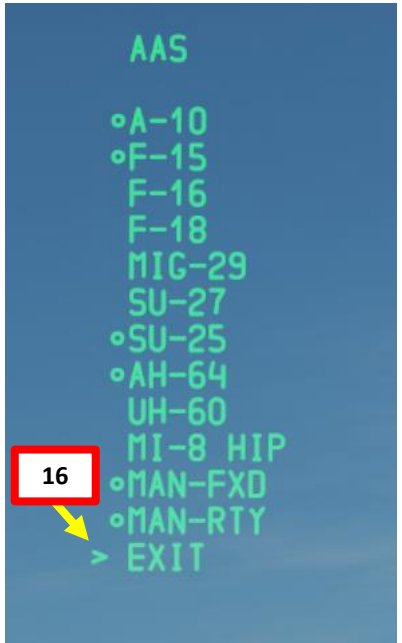
8. In the MAN FXD menu, we need to set the target's wingspan (in feet), length (in feet) and approximate airspeed (in knots).
9. FXD WNGSPN field is already selected.
10. Set FXD WNGSPN to the MiG-21's wingspan of 23 ft with the DATA rocker switch.
11. Select FXD LENGTH field with the SEL rocker switch.
12. Set FXD LENGTH to the MiG-21's length of 49 ft.
13. Select FXD TGTSPEED field with the SEL rocker switch.
14. Set FXED TGTSPEED to an approximate speed of 200 kts.
15. Select STORE option with the SEL rocker switch, then press ENT.
16. Select EXIT AAS menu with the SEL rocker switch, then press ENT.
17. Set IFFCC switch to ON (UP) position by Right Clicking on the switch. HUD will revert to its normal mode.

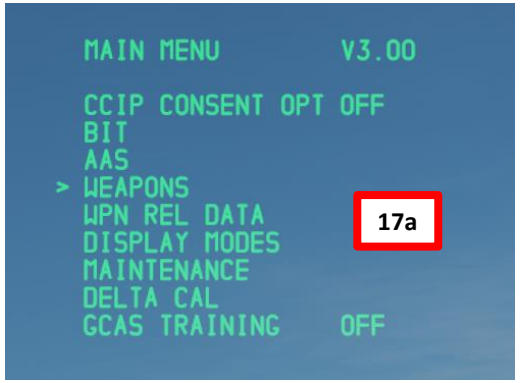






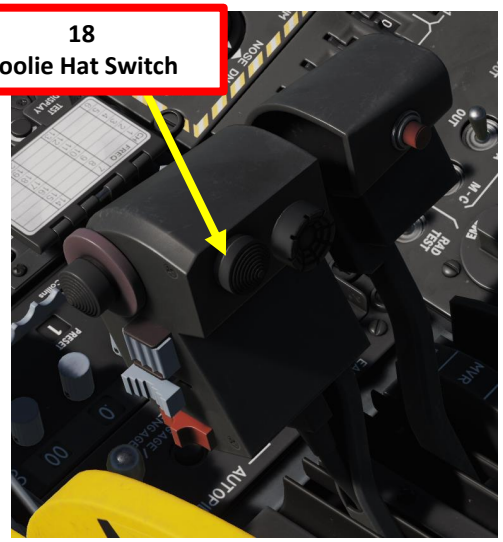






3.1 – GAU-8 GUN (AIR-TO-AIR)
B - SETTING GUN FUNNEL WINGSPAN

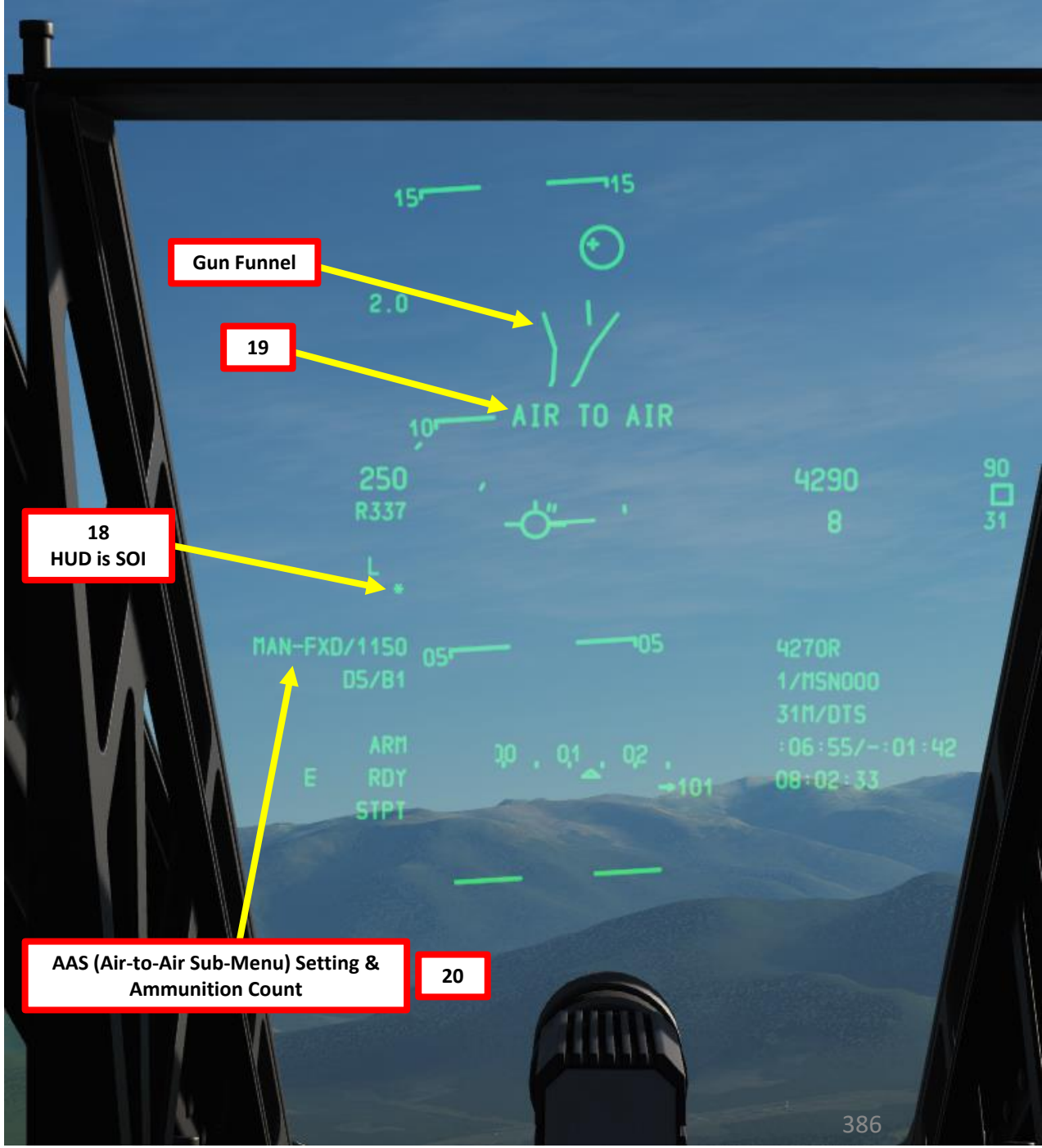
18. Press Coolie Hat UP Short to set the Heads-Up Display as the SOI (Sensor of Interest). Asterisk will indicate HUD is SOI.
19. press & hold approx. 3 seconds the Master Mode Switch to enter Air-to-Air Master Mode
20. Use DMS (Data Management Switch) LEFT/RIGHT to cycle through the AAS (Air-to-Air Sub-menu) aircraft options to match the aircraft you are engaging. In our case, we will choose the custom profile set for the MiG-21, which is MAN-FXD.



18
Coolie Hat Switch

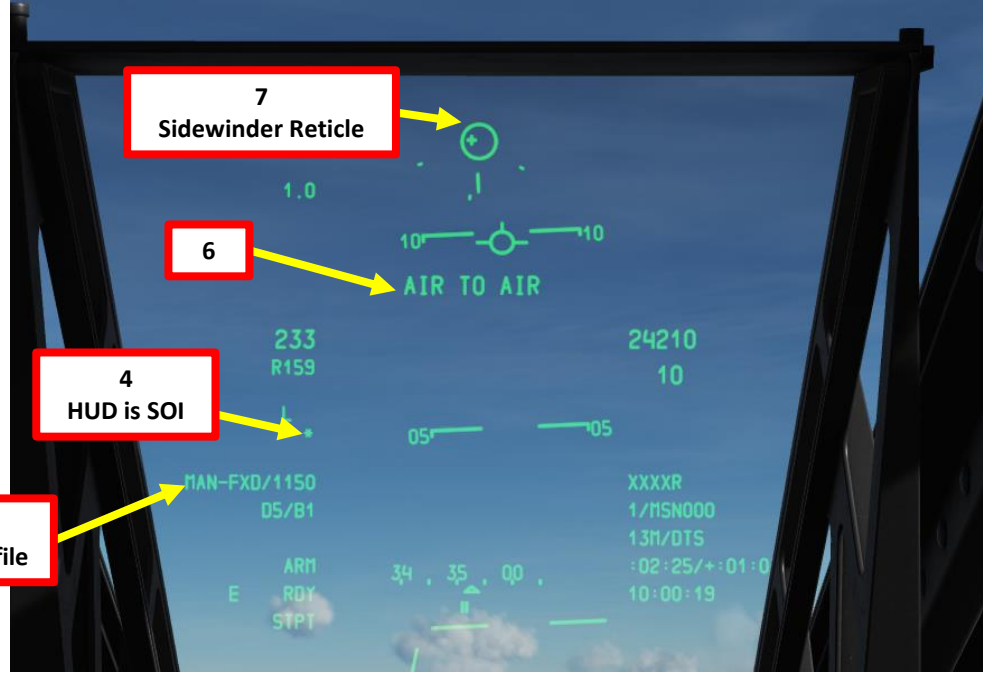
20
DMS Switch

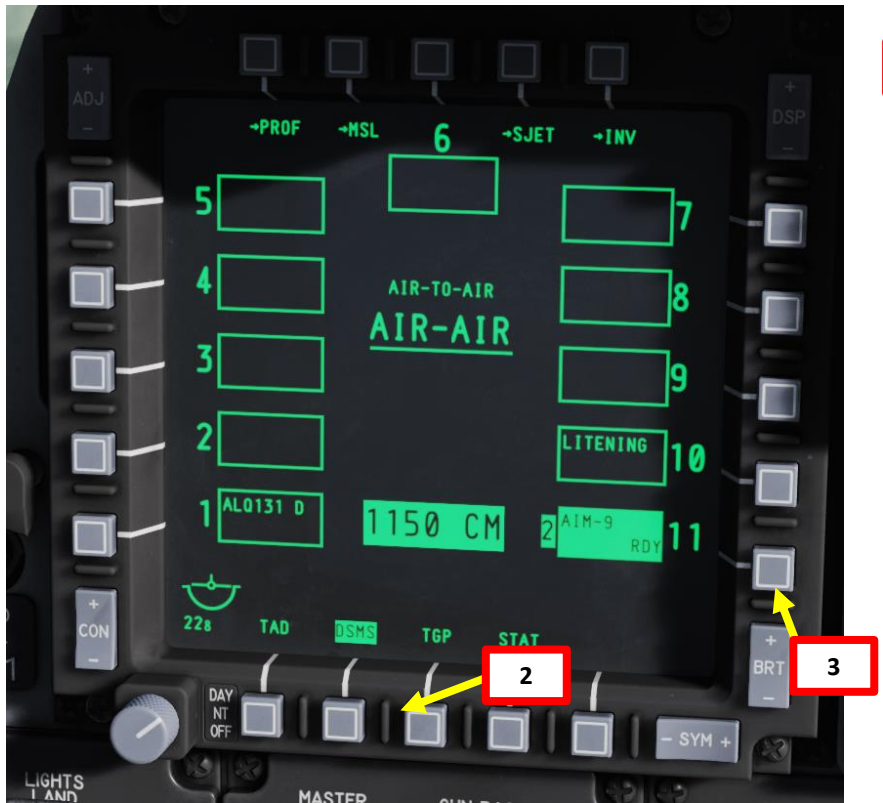
19
Master Mode Switch

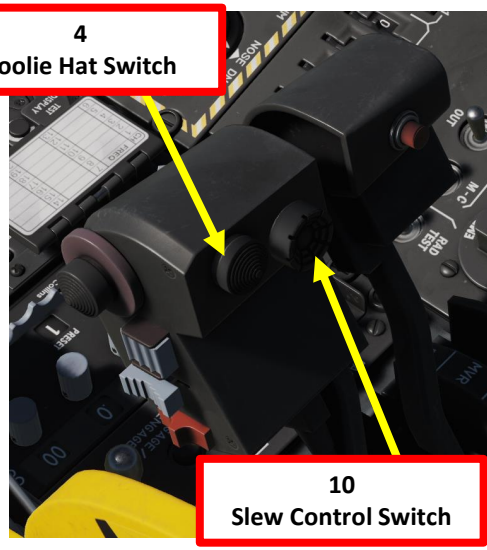


3.2 – AIM-9 SIDEWINDER

1. Set Master Arm Switch ON (UP)
2. Select DSMS (Digital Stores Management System) page
3. Select AIM-9 Air-to-Air Missile (green when selected).
4. Press Coolie Hat UP Short to set the Heads-Up Display as the SOI (Sensor of Interest). Asterisk will indicate HUD is SOI.
5. Use DMS (Data Management Switch) LEFT/RIGHT to select desired weapon profile.
6. Press & hold approx. 3 seconds the Master Mode Switch to enter Air-to-Air Master Mode
7. Sidewinder missile reticle is caged in boresight mode by default. This mode is quite limiting but is useable if you steer the aircraft to set the reticle on a target.
8. Press TMS (Target Management System) switch FWD SHORT to uncage Sidewinder. Reticle will start moving and actively look for heat signatures to track.
    - Note: if you want to cage the missile, press the TMS Switch AFT SHORT.
9. While missile is searching, you will hear a low-pitch growl.
10. You can slew the Sidewinder reticle using the Slew Control Switch.







3.2 – AIM-9 SIDEWINDER

11. When Sidewinder tracks a heat signature, the reticle will lock on the target and a high-pitch growl will be heard.
12. Press the Weapon Release button (RALT+SPACE) to fire Maverick missile.

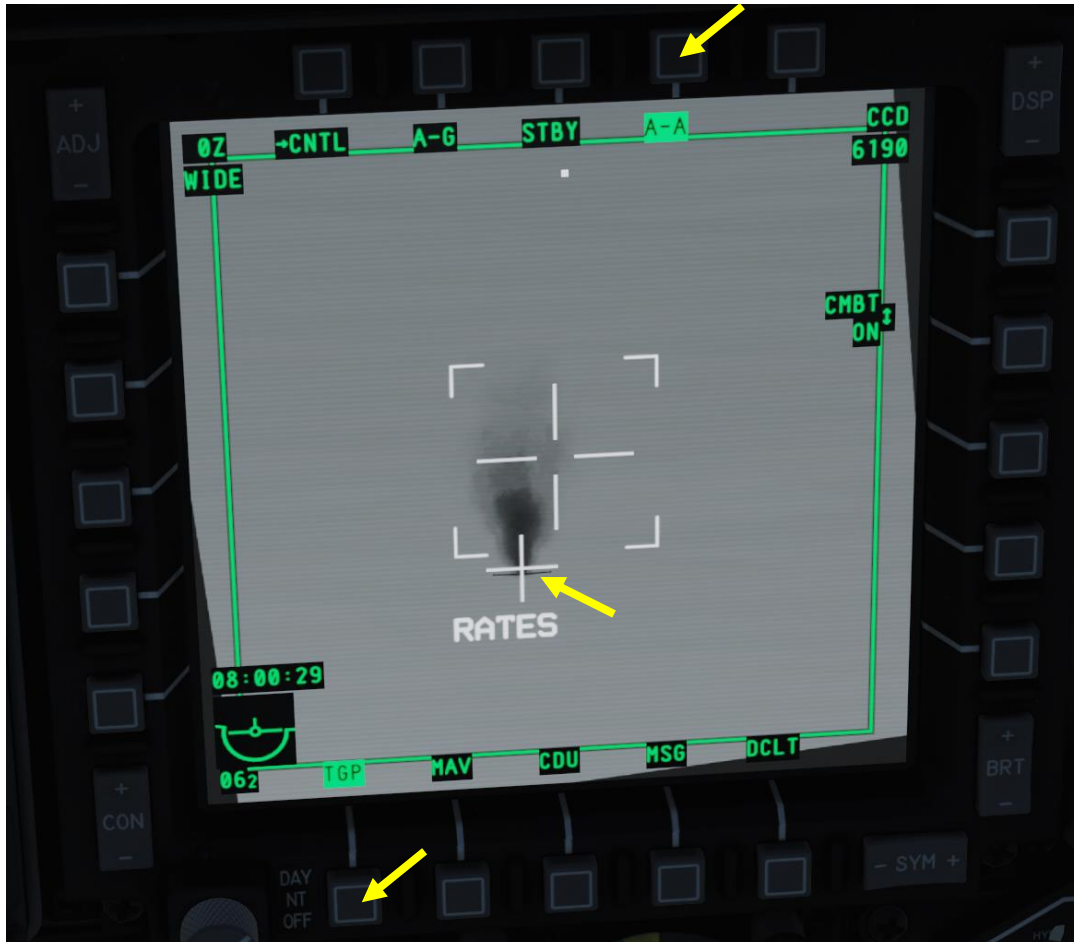
12
Weapon Release Button

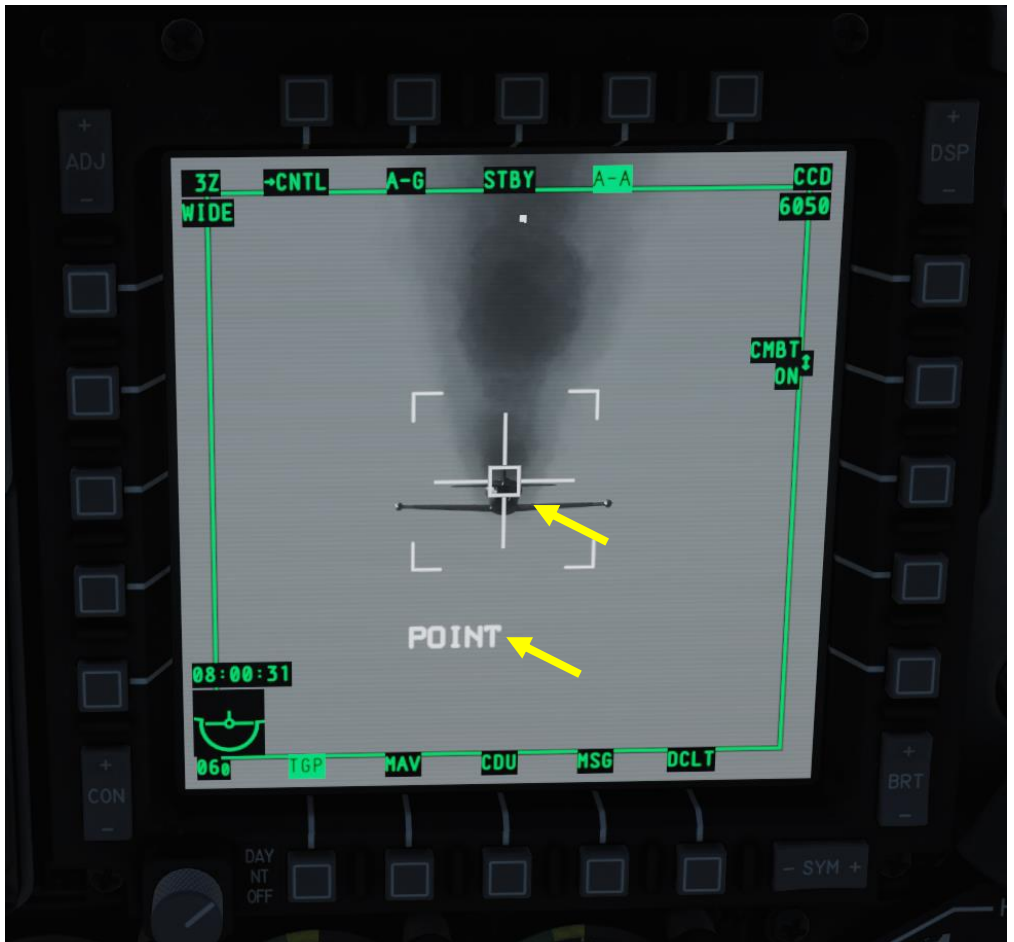
11
Sidewinder reticle locked on target (high pitch growl)

3.2 – AIM-9 SIDEWINDER

Note:

- You can also use the targeting pod in AA (Air-to-Air) mode to spot a target. When A-A is first entered, the TGP will enter A-A boresight mode. From the boresight mode, you may slew the TGP crosshair using the slew switch. When slewing, the TGP camera moves in a space stabilized manner.
- If the valid air target passes within the narrow field of view area (represented by the four corner markers), the TGP will attempt to track the target and place a cross "+" on it. If the target flies outside the narrow field of view area, the cross will disappear.
- If you then command **TMS Forward Short** HOTAS command (command point track), the target will be centered in the crosshair and a box will be drawn around the target to conform to its size. When in this mode, "POINT" will be displayed as well as the tracking cross. To exit POINT track, the user may command INR track (with **TMS Forward Short**) and return to RATES mode.

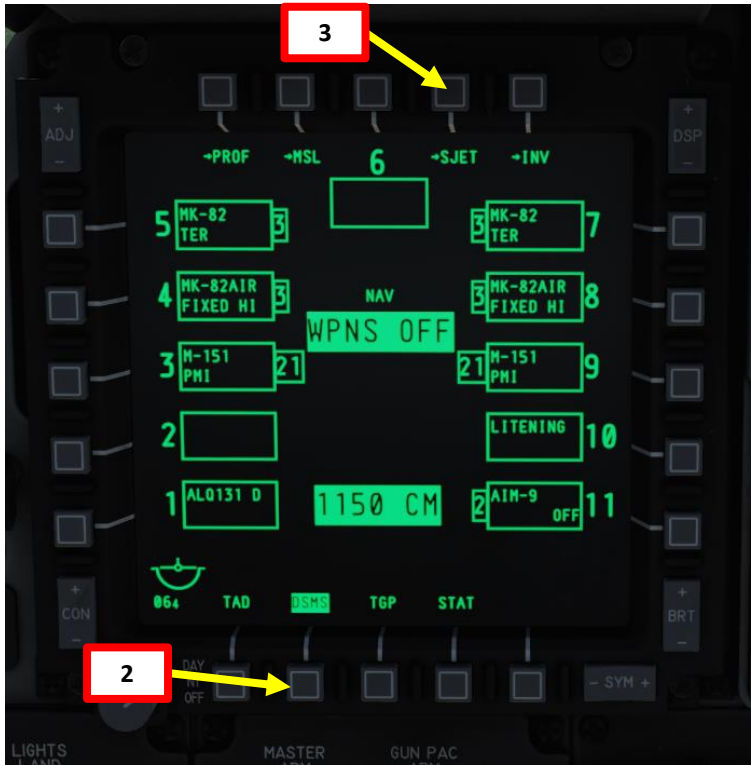




4 – ORDNANCE JETTISON

4.1 - SELECTIVE JETTISON

1. Set Master Arm Switch ON (UP)
2. Select DSMS (Digital Stores Management System) page
3. Press OSB next to SJET (Selective Jettison)
4. Select desired station with the OSB (Option Select Button) next to it. DSMS store will flash when selected.
5. Select Jettison Mode
   - RACK: jettisons weapon launcher rack as well as weapon store
   - STR: jettisons weapon store but not the rack
   - MSL: fires Maverick missile without arming or guiding it
6. Select Fuze Option Mode (only applicable if STR (Store) mode is selected)
   - SAFE: store disarmed
   - NOSE ARM: nose fuze is armed
   - TAIL ARM: tail fuze is armed
   - ARMED: N/T (Nose/Tail) fuze is armed
7. Press the Weapon Release button (RALT+SPACE) to drop ordnance



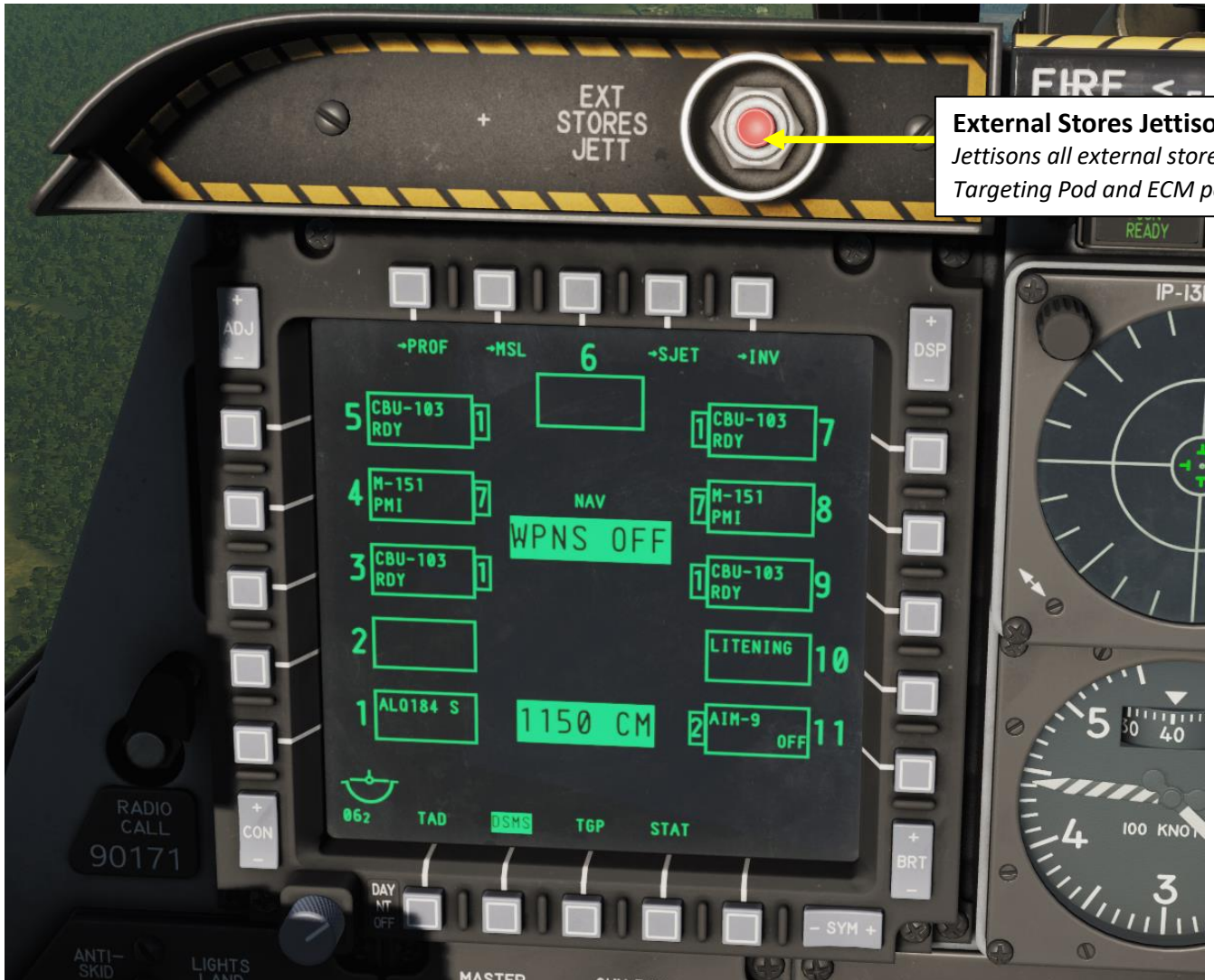
4 – ORDNANCE JETTISON
4.1 - SELECTIVE JETTISON

4 – ORDNANCE JETTISON

4.2 - EMERGENCY STORES JETTISON

Pressing the “EXT STORES JETT” button will jettison all stores (excluding the Targeting Pod and ECM pod) on stations 1 through 11.

Once pressed, and regardless of landing gear handle position, all stores will be released in station priority order.



COUNTERMEASURES

COUNTERMEASURES – INTRODUCTION

Countermeasures are very simple to use. You have three countermeasure types at your disposal: flares, chaff and an ECM (Electronic Countermeasure) jammer. We will explore together what is used against what, and how.

Missiles can generally track you using 2 things: radar signature (radar waves are sent on you and you reflect them, which is called a "radar signature") and heat signature (like the exhaust of your engines). Countermeasures will only be effective against the kind of weapon it was meant to counter; a heat-seeking missile will not care if you deploy electronic countermeasures against it since it tracks heat, not radar signatures. This is why it is important to know what is attacking you in order to counter it properly. This is what the **RWR (Radar Warning Receiver)** is for: to help you know what is firing at you so you can take the adequate action to counter it.

Flares are used against missiles that track heat (infrared or IR) signatures. Instead of going for the heat signature generated by your engines, a missile will go for a hotter heat source like flares.

Chaff is a form of "passive" jamming. Passive (reflected) jamming is when a deceptive object or device reflects radar waves. Chaff is simply a bundle of small pieces of metal foil with reflective coating, which creates clusters of radar signatures that prevent a radar to get a solid lock on the aircraft itself.

The **AN/ALQ-131 ECM jammer pod** is a form of "continuous" jamming, also called "active" or "transmitted" jamming. This device transmits its own synchronized radar waves back at your enemy's radar receiver to simulate erroneous radar wave returns. Simply put, active jamming will try to drown a radar in white noise.

In order to use these three forms of countermeasures, you can use "countermeasure programs", routines that will deploy a number of flares/chaff for a number of cycles at a given interval. A detailed list of these programs is shown next page.

COUNTERMEASURES – CONTROLS

CMSP (Countermeasure Signal Processor) Panel

A-10C Legacy Only

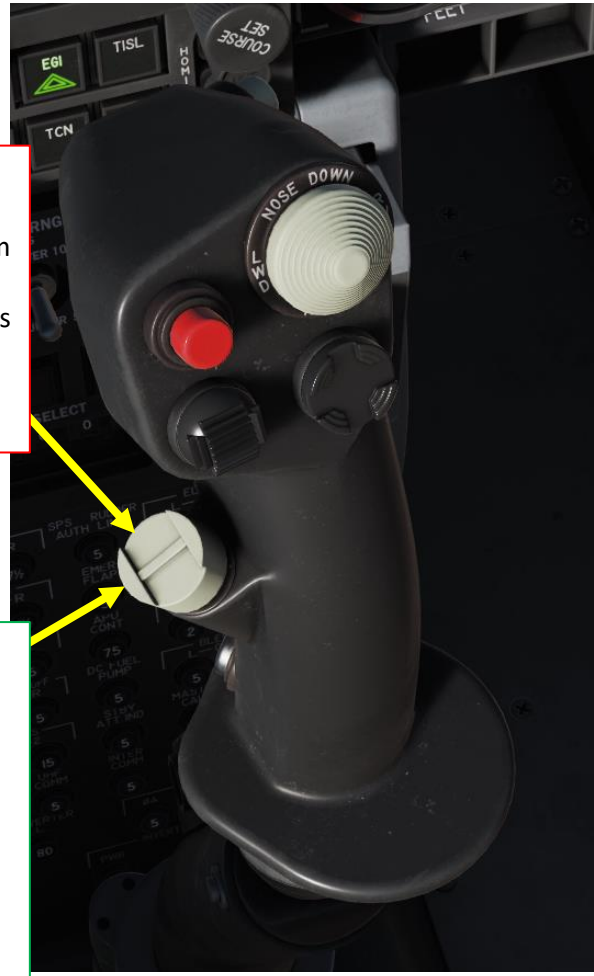
CMS (Countermeasures Switch)

- **DOWN/DEPRESSED**: ECM ON/OFF Toggle
- **FORWARD**: Initiate countermeasure program (deploys flares/chaff routine)
- **AFT**: Terminate countermeasure program (cancels flares/chaff routine)
- **RIGHT**: Next countermeasure program
- **LEFT**: Previous countermeasure program

A-10C II Tank Killer Expansion Only

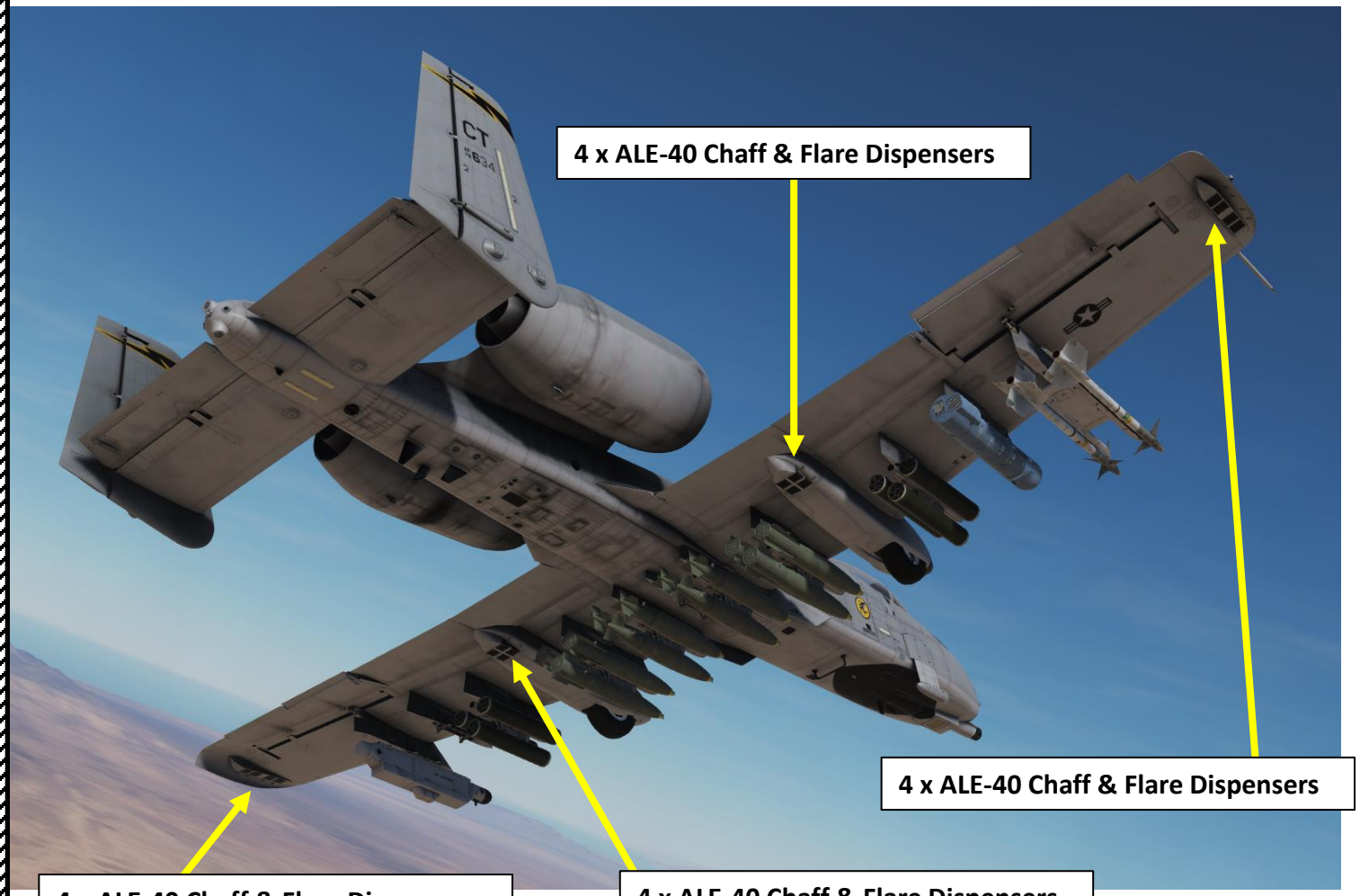
CMS (Countermeasures Switch)

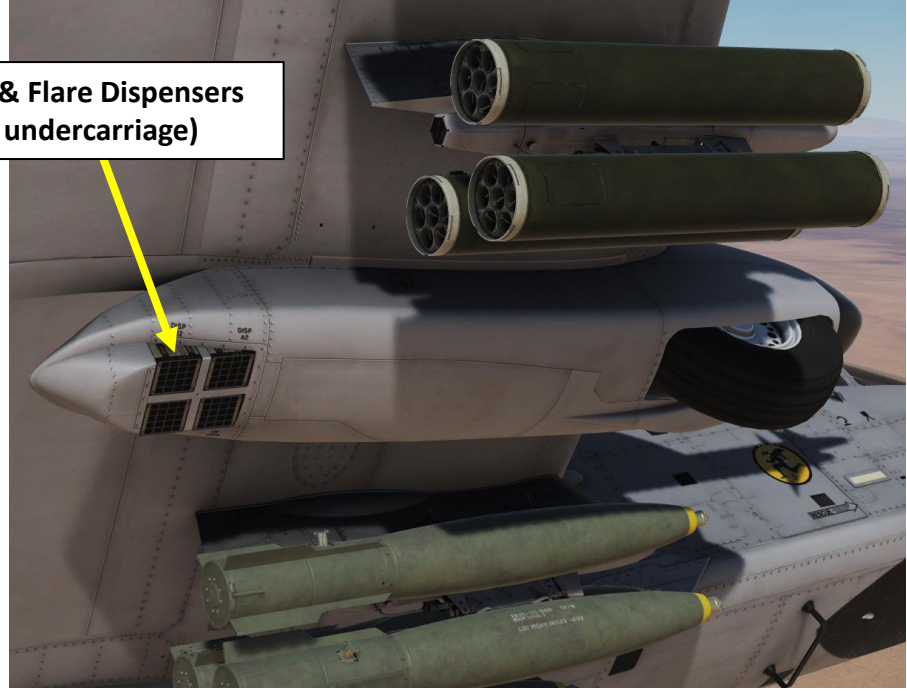
- **DOWN/DEPRESSED**
  - **SHORT**: Activate/Deactivate Selected Countermeasure Program
  - **LONG**: ECM ON/OFF Toggle
- **FORWARD**
  - **SHORT:** Dispenses Single Flare
  - **LONG:** Next countermeasure program
- **AFT**:
  - **SHORT:** Dispenses Single Chaff
  - **LONG:** Previous countermeasure program
- **RIGHT**: Dispenses 6 Chaff
- **LEFT**: Dispenses 6 Flares



COUNTERMEASURES – DISPENSERS

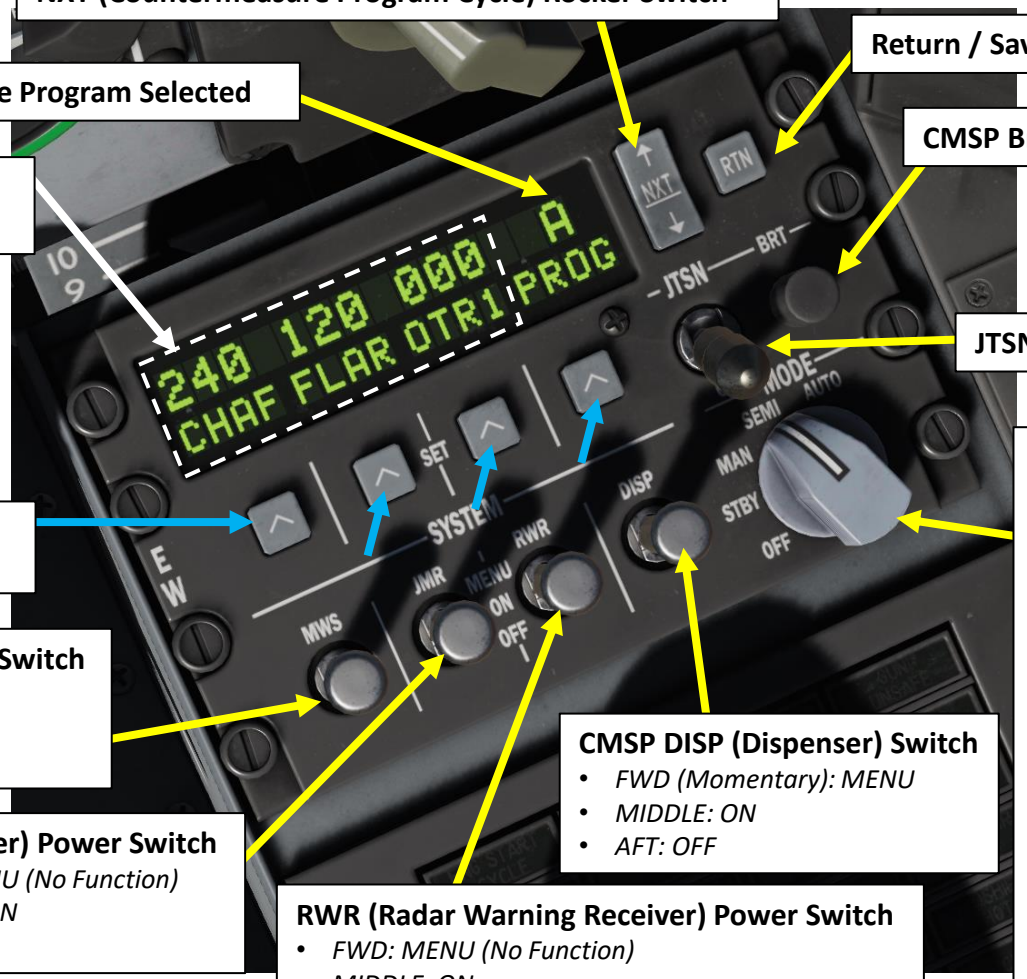
The A-10 has four sets of chaff and flare dispensers. Two sets are on the wingtips and these are generally loaded with chaff cartridges. The other two sets are housed in the rear of the main landing gear wheel bays, and these are generally loaded with flares.





CMSP (COUNTERMEASURE SIGNAL PROCESSOR) PANEL

The CMSP (Countermeasure Signal Processor) panel is located on the forward right console and is your primary means of selecting and programming the CMS (Countermeasures Set) system.



NXT (Countermeasure Program Cycle) Rocker Switch

Return / Save Program Button

Countermeasure Program Selected

CMSP Brightness Control Knob

Chaff/Flare/Other Countermeasure System Status Counters

JTSN (Countermeasure Jettison) Switch

CMS (Countermeasures Set) Mode Selector

- ***OFF***
- ***STBY****: Power is applied to the CMSP and CMSC and they are fully functional and can be adjusted, but dispensing chaff and flares is not possible and the ECM and MWS will not take any active measures.*
- ***MAN****: Manual Mode means that you must manually run the selected chaff/flare or ECM program with the Countermeasure Switch on the HOTAS*
- ***SEMI****: Semi-Automatic mode will automatically select the best chaff/flare program according to the detected radar. However, it is up to you to start and stop the countermeasure release program*
- ***AUTO****: system will automatically select the best chaff/flare and ECM program and initiate and stop the program*

SET Option Select Buttons (OSBs)

Selects items on the Alphanumeric Display window

MWS (Missile Warning System) Power Switch

- *FWD: MENU (No Function)*
- *MIDDLE: ON*
- *AFT: OFF*

CMSP DISP (Dispenser) Switch

- *FWD (Momentary): MENU*
- *MIDDLE: ON*
- *AFT: OFF*

JMR (Jammer) Power Switch

- *FWD: MENU (No Function)*
- *MIDDLE: ON*
- *AFT: OFF*

RWR (Radar Warning Receiver) Power Switch

- *FWD: MENU (No Function)*
- *MIDDLE: ON*
- *AFT: OFF*

CMSP (COUNTERMEASURE SIGNAL PROCESSOR) PANEL

The DISP (Dispenser) Switch has two main functionalities listed below.

CMSP DISP (Dispenser) Switch ON
MIDDLE: ON

When the DISP switch is in the ON position (after a 5 second RDY indication), the alphanumeric display will change to allow you to view remaining chaff and flare stores. When ON, CHAF, FLAR, OTR1 and PROG are displayed left to right across the bottom on the display window. Above each of these on the top line is a numeric that indicates how many of the expendables remain on the aircraft or the selected dispenser program. The numeric will flash when it is being dispensed.

CMSP DISP (Dispenser) Switch ON
FWD (Momentary): MENU

When placed momentarily in the Up Menu position, you may program how the CMS releases chaff and flares for the selected program (A-Z). Along the bottom of the display are fields for CHAF, FLAR, INTV and CYCL.

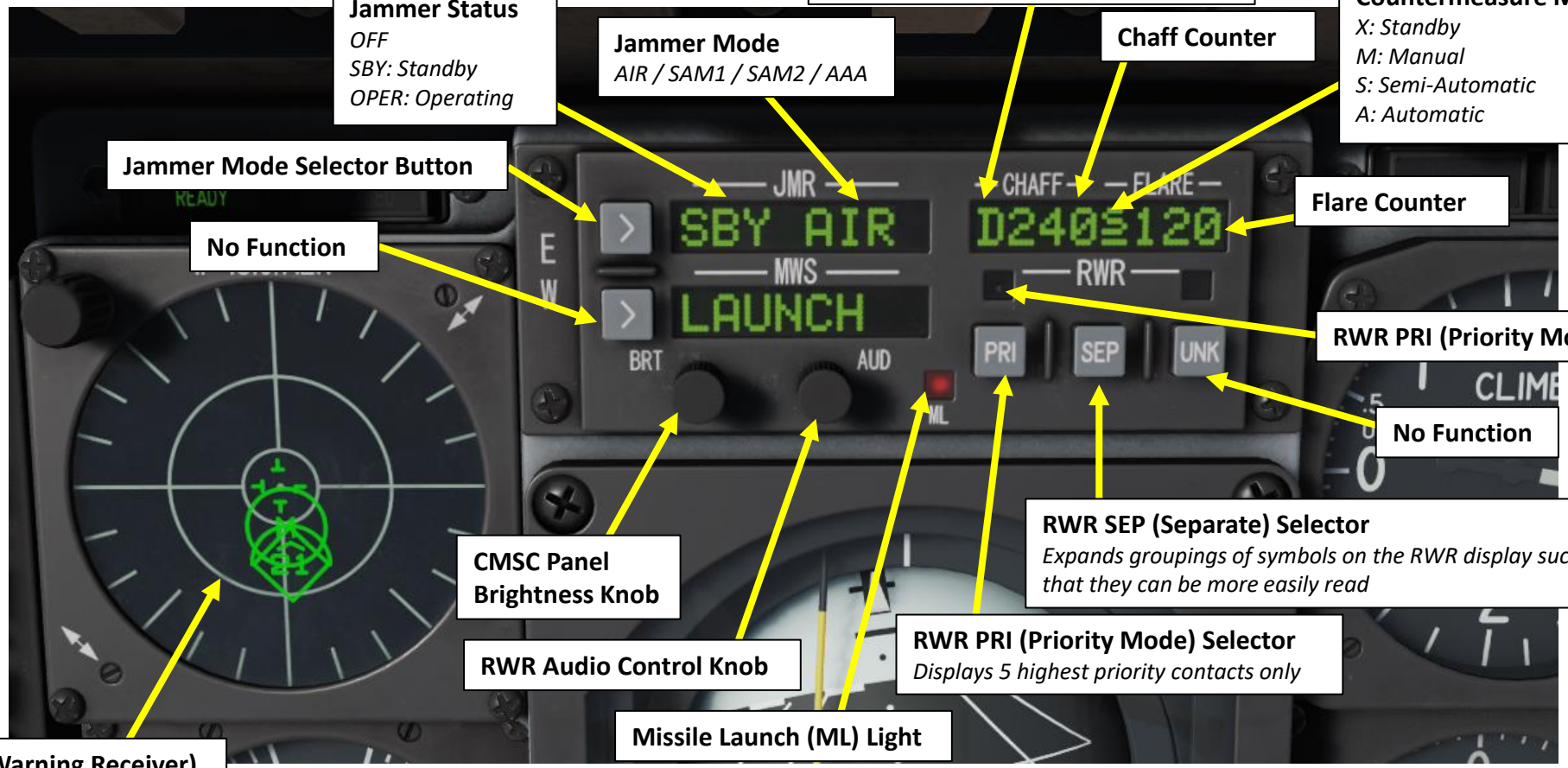
- ***CHAF**. The Chaff field allows you to determine the number of chaff bundles that will be released in the current program. To set, you will press the SET button underneath the CHAF label and the numeric will flash indicating it can be adjusted. You may then use the NXT button to increase or decrease the amount.*
- ***FLAR**. The Flare field allows you to determine the number of flares that will be released in the current program. To set, you will press the SET button underneath the FLAR label and the numeric will flash indicating it can be adjusted. You may then use the NXT button to increase or decrease the amount.*
- ***INTV**. The Interval field allows you to set the time between countermeasure releases in the current program. This can be set the same way as chaff and flares but in increments of .25 seconds from .25 to 5.*
- ***CYCL**. The Cycle field allows you to set the number of times the program will repeat itself.*

NXT (Countermeasure Program Cycle) Rocker Switch

SET Option Select Buttons (OSBs)
Selects items on the Alphanumeric Display window

CMSC (COUNTERMEASURE SET CONTROL) PANEL

The CMSC (Countermeasure Set Control) panel allows you to control some aspects of the azimuth indicator display, view chaff and flare status, and change electronic countermeasure (EC) and MWS (Missile Warning System) functions.



COUNTERMEASURE PROGRAMS

Here are the Countermeasure switch (CMS) functions:

- **A-10C LEGACY:**
  - PRESSED DOWN: ECM (Electronic Countermeasure/Jammer) ON/OFF
  - FORWARD: Initiate countermeasure program (deploys flares/chaff routine)
  - AFT: Terminate countermeasure program (cancels flares/chaff routine)
  - RIGHT: Next countermeasure program
  - LEFT: Previous countermeasure program

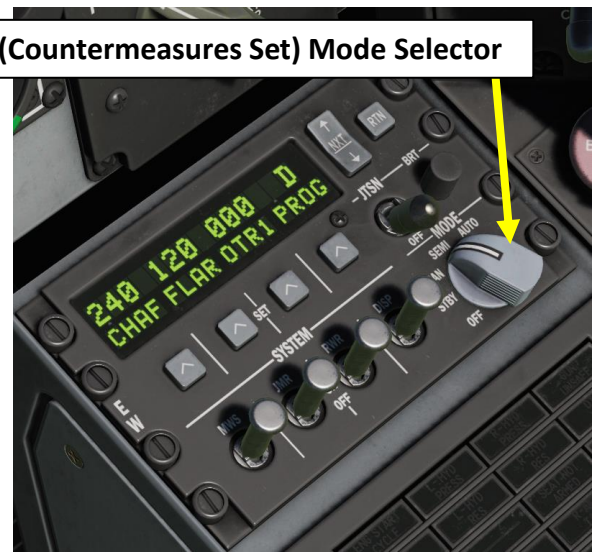
- **A-10C II TANK KILLER EXPANSION:**
  - PRESSED DOWN:
    - SHORT: Initiate/Terminate countermeasure program (deploys/cancels flares/chaff routine)
    - LONG: ECM (Electronic Countermeasure/Jammer) ON/OFF
  - FORWARD:
    - SHORT: Dispenses Single Flare
    - LONG: Next countermeasure program
  - AFT:
    - SHORT: Dispenses Single Chaff
    - LONG: Previous countermeasure program
  - RIGHT: Dispenses 6 Chaff
  - LEFT: Dispenses 6 Flares

You can program your own "countermeasure program" if you wish, it is explained in the main DCS A-10C manual.

The four main programs you should be using are:

- Program A: Old generation radar SAM site
- Program B: New generation radar SAM site
- Program C: IR heat-seeking SAM site
- Program D: Unknown/Miscellaneous

You can choose between a MANUAL mode (recommended) or the AUTO mode, which automatically chooses the best countermeasure program for you. I generally select program D since it counters pretty much anything. It might consume a significant number of flares/chaff, but **it is better to be out of countermeasures than to be out of A-10**.



When in MAN or SEMI modes, press CMS Forward to start the program. Press CMS Aft to cease the program.

If in AUTO mode, you do not have direct control of the program selection or activation.

PROG	CHAFF QTY	FLARE QTY	INTERVAL (SEC)	CYCLE
A	2	0	1	10
B	4	0	0.5	10
C	0	4	1	10
D	2	2	1	10
E	2	2	0.5	10
F	4	4	1	10
G	4	4	0.5	10
H	1	0	1	1
I	2	0	1	1
J	0	1	1	1
K	0	2	1	1
L	1	0	1	20
M	0	1	1	20

Table 1. Default Programs

ELECTRONIC COUNTERMEASURE (ECM) JAMMER

You have four main ECM jammer modes:

- **AIR**: counters most air-to-air radars
- **SAM1**: counters older-generation SAM systems like the SA-3, SA-6 and SA-8
- **SAM2**: counters newer-generation SAM systems like 2S6, SA-16, SA-11, SA-10 and SA-15
- **AAA**: counters radar-directed gun systems like the ZSU-23-4 and the ZU-23.

You can switch between jammer modes using the jammer mode selector button next to the RWR. The jammer mode indicator tells you the mode you are using and the status of the jammer. For instance, “OPR SAM1” means that you are using (operating) your ECM program SAM1. “SBY” means that your ECM is not actively jamming enemy radar. Keep that in mind.

Jammer Status
OFF
SBY: Standby
OPER: Operating

Jammer Mode
AIR / SAM1 / SAM2 / AAA

Countermeasure Mode
X: Standby
M: Manual
S: Semi-Automatic
A: Automatic

Jammer Mode Selector Button

Selected Countermeasure Program

CMS (Countermeasures Switch)
- **DOWN**: ECM ON/OFF
- **RIGHT**: Next countermeasure program
- **LEFT**: Previous countermeasure program

A-10C Legacy Only

A-10C II Tank Killer Expansion Only

CMS (Countermeasures Switch)
- **DOWN/DEPRESSED**
  - **LONG**: ECM ON/OFF Toggle
- **FORWARD**
  - **LONG:** Next countermeasure program
- **AFT**:
  - **LONG:** Previous countermeasure program

AN/ALQ-131 ECM (Electronic Countermeasure) Pod

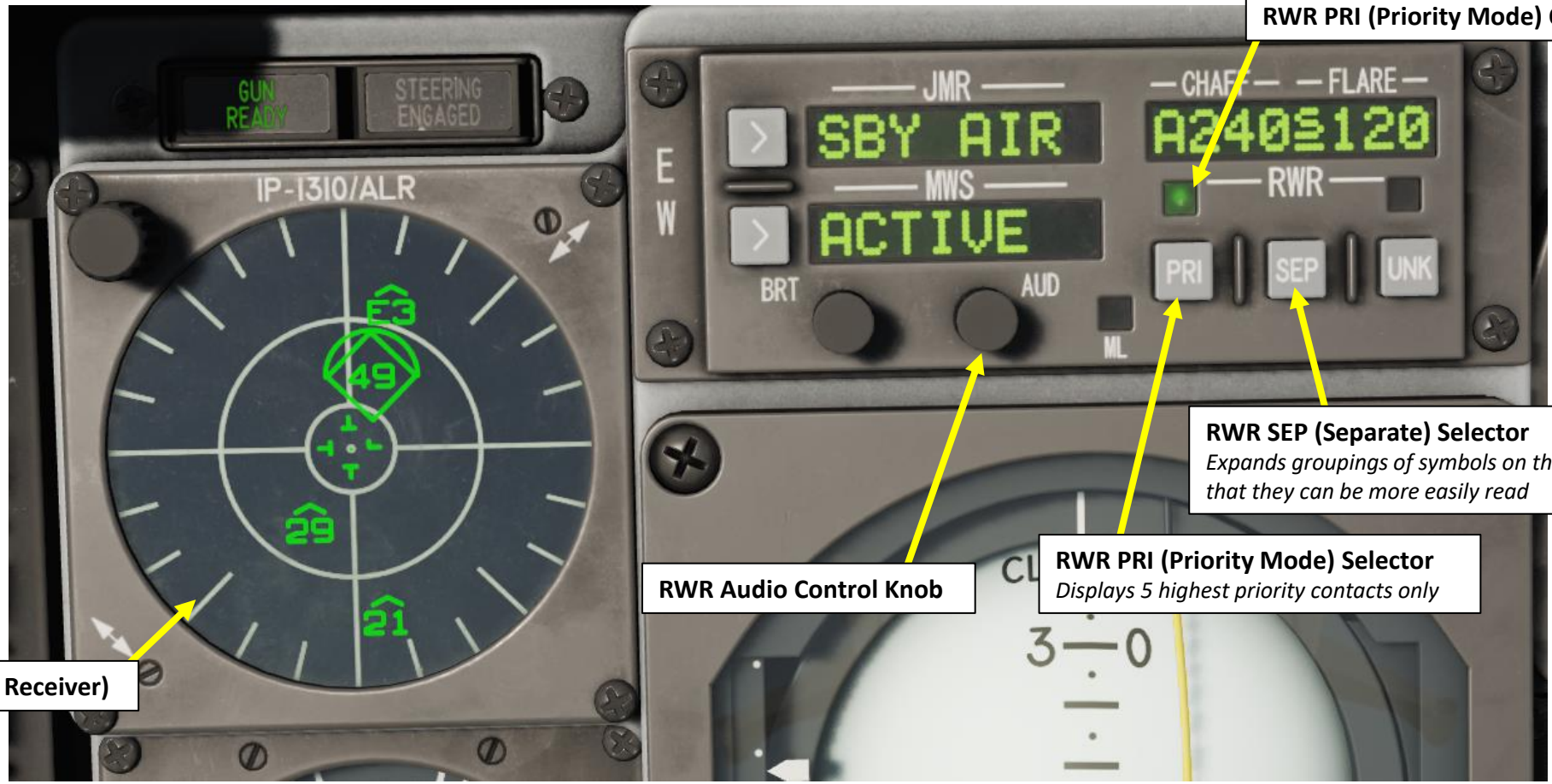
RWR (RADAR WARNING RECEIVER)

Your RWR (Radar Warning Receiver) will tell you what are the radar emitting signatures around you with a top-down view, both friendly and enemy contacts. The closer the symbol to the center of the circle, the stronger the radar signal strength.

A symbol **without a circle** around it means that the radar is in search mode (in other words: not tracking you yet).

A symbol with a **steady circle** around it indicates that the radar is tracking/locked on to your aircraft. A missile is not heading your way yet, but it can be any second now if the symbol is an enemy SAM site.

A symbol with a **flashing circle** around it indicates that the radar is supporting a missile that has been launched at you. You are about to receive a missile right up the arse. This is where you pop chaff, flares, ECM and start your evasive manoeuvers.



RWR SYMBOL LIST

List made by .408-X~RAY

RWR	Name
3	S125 TR SNR
6	Kub STR 9S91
8	Osa 9A33
10	RLS 5H63C
10	S300PS TR 30N6
11	BUK LL
11	Buk LN 9A310M1
11	F-111
12	RLS 9C32 1
12	S300V 9A82
12	S300V 9A83
13	C-130
13	Strela-9A35M3
14	F-14
15	F-15
15	Tor 9A331
16	F-16
17	C-17
18	FA-18
22	Tu-22M3
23	MIG-23
24	Su-24
25	MiG-25P
29	MIG-29
29	Su-27
29	Su-33
30	Su-30
31	MiG-31
34	Su-34
39	Su-39
40	Spruance
48	Vinson
49	Perry
50	A-50
52	B-52
76	IL-76
78	IL-78
95	Tu-95
A	Gepard
A	Vulcan M163
A	ZSU 23 4 Shilka
AE	Ticonderoga
AN	AN-26B
AN	AN-30M

RWR	Name
AV	AV-8B
B1	B-1
BB	S300PS SR 64H6E
BD	RLO 9C15MT
BJ	Tu-160
CD	Bobruisk
CD	Bora
CS	S300PS SR 5N66M
DE	Dog Ear
DT	Osa
E2	E-2C
E3	E-3
E6	EA-6B
F2	F-2
F4	F-4E
F5	F-5E
GR	Roland rdr
HA	Hawk SR ANMPQ 50
HK	Hawk TR ANMPQ 46
HN	Grozny
HN	Orel
HN	Skory
HP	Albatros
HS	RLO 9C19M2
KC	KC-10
KC	KC-135
M2	Mirage
PP	Veter
PS	Molniya
PT	Patriot STR ANMPQ 53
RO	Roland ADS
S	EWR 1L13
S	EWR 55G6
S	S125 SR P 19
S3	S-3
S6	Tunguska 2S6
SC	Ametyst
SD	Buk SR 9S18M1
SW	Kuznecow
T2	Moscow
TP	Neustrash
TP	Rezky
TS	Azov
Tu	Tu-142

Threat Symbology

The following are the indicated threat symbols.

-  - Primary threat as dictated by the RWR.
-  - Threat is tracking/locked on your aircraft.
-  - Newest threat detected.
-  - Airborne threat.

Example

- 

- AAA threat that is tracking/locked onto your aircraft and is the primary threat.
- 

- SA-10 "Big Bird" search RADAR that is not tracking/locked onto your aircraft. It is the newest threat present, however it is not the primary threat.

Note: “U” symbol stands for “Unknown”, which is sometimes attributed to ships.

MWS (MISSILE WARNING SYSTEM)

The MWS (Missile Warning System) will indicate whether a missile is heading straight to your face or not. If the MWS warning light (red) is lit, immediately start evasive manoeuvers and deploy countermeasures ASAP. You can have three different messages:

- ACTIVE: MWS system is active
- LAUNCH: A missile is launched and heading towards you
- OFF: Your MWS system is off

The Radar Warning Receiver will display the direction of the missile launch with a “M” with a circle.

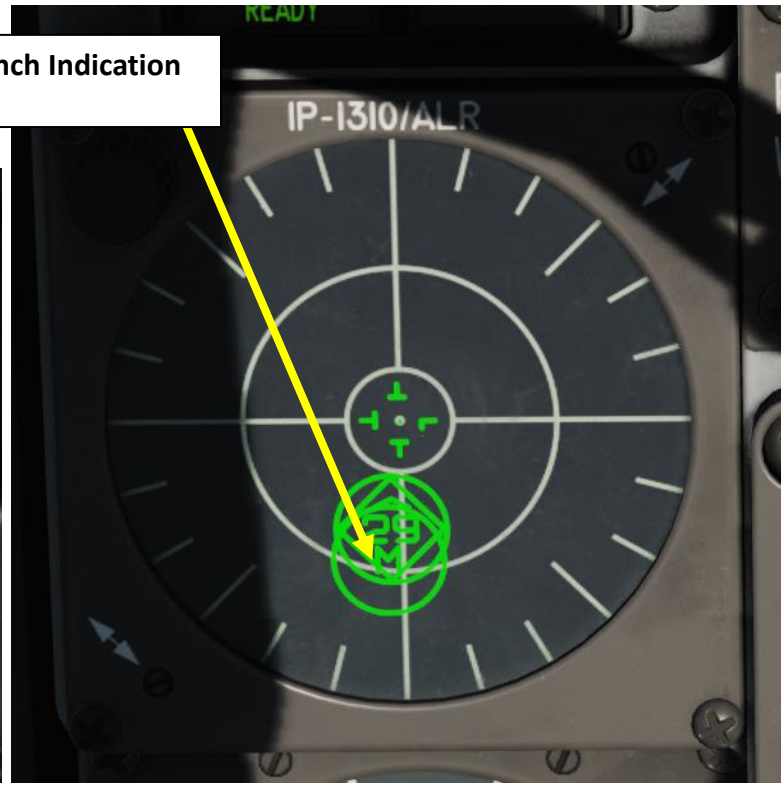
	
Missile Launched	Missile Detected

No Function

Missile Warning System Message
When a missile launch has been detected by the MWS system, this window will indicate LAUNCH. When the MWS has power, it will display ACTIVE and with no power it will display OFF.

Missile Launch Warning Light

Radar Warning Receiver Missile Launch Indication
M: Missile Detected



THE ART OF DEFEATING A MISSILE

Evading missiles is an art: this is what we call “defeating a missile”. There are many videos that explain it well (much better than I could in one page or 2), so here is a list of useful resources you can consult.

DCS A-10 MISSILE AVOIDANCE, by A Kaiser
https://www.youtube.com/watch?v=ak6EgzDwiGs

AIR POWER AUSTRALIA – EVADING THE GUIDED MISSILE, by Carlo Kopp
http://www.ausairpower.net/TE-Evading-Missiles.html

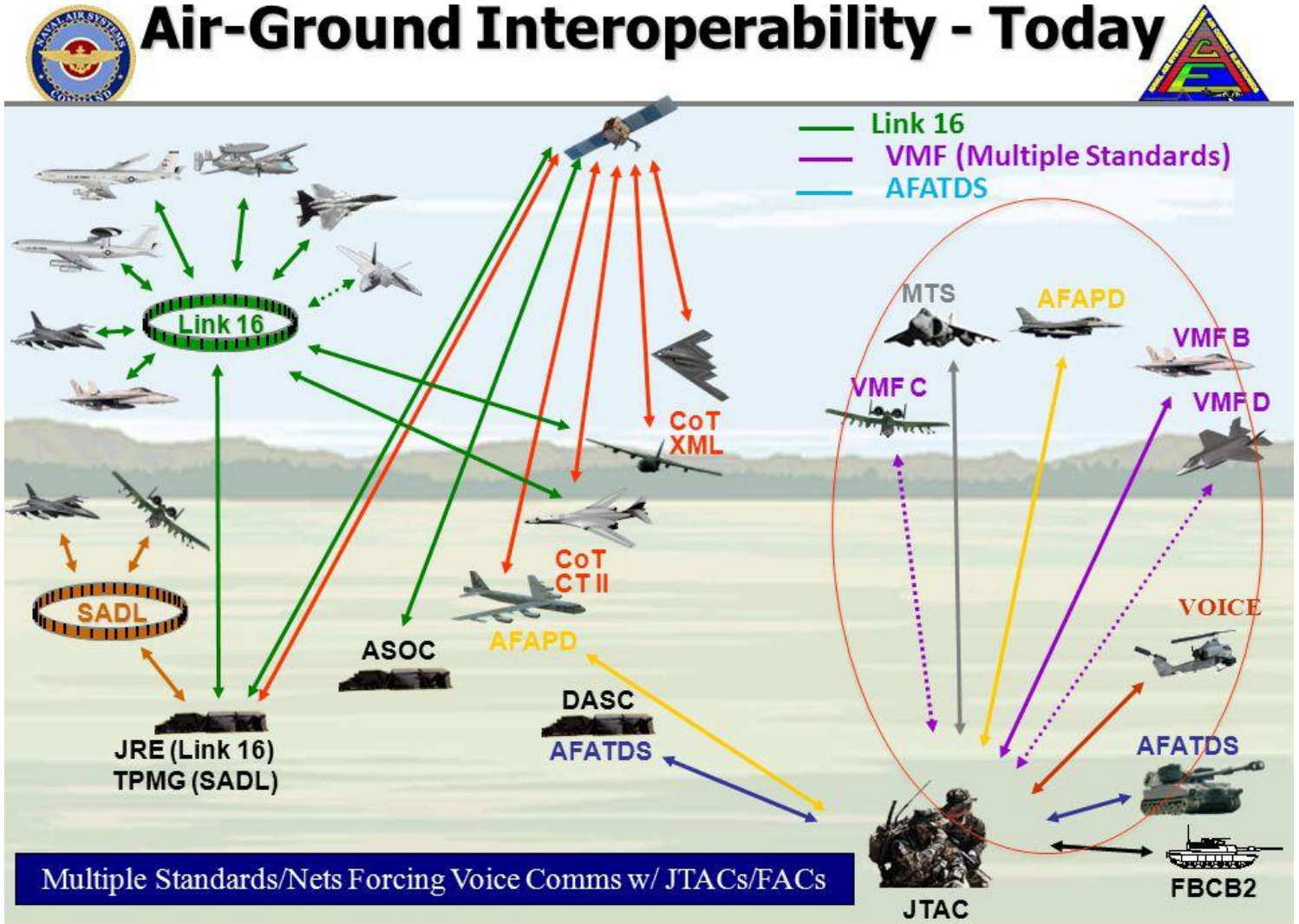
A PRACTICAL GUIDE TO MISSILE EVASION – TRAINING IN FALCON 4.0, by Mark “Boxer” Doran
http://www.simhq.com/_air/air_016a.html

FIGHTER COMBAT – TACTICS AND MANOEUVERING, by Robert L. Shaw
http://www.amazon.ca/Fighter-Combat-Maneuvering-Robert-Shaw/dp/0870210599

SA6 SAM Site

DATALINK INTRODUCTION

One of the biggest challenges of integrated modern warfare is the identification of contacts. As various information donors like friendly fighters, ground radar stations, AWACS (Airborne Warning and Control System, like an E-3 Sentry or an E-2 Hawkeye), and ships interrogate unknown contacts with IFF (Identify-Friend-or-Foe) systems, this information needs to be relayed to everyone within a given Network. This is where Datalink comes in; the Situation Awareness Data Link (SADL) integrates US Air Force close air support aircraft with the digitized battlefield via the US Army's Enhanced Position Location Reporting System (EPLRS). More than just a radio or a data modem, SADL provides fighter-to-fighter, air-to-ground and ground-to-air data communications that are robust, secure, jam-resistant and contention-free. With its inherent position and status reporting for situation awareness, SADL provides an effective solution to the long-standing air-to-ground combat identification problem.



SADL (SITUATIONAL AWARENESS DATALINK)
TAD (TACTICAL AWARENESS DISPLAY) PAGE

The A-10C is equipped with the Situational Awareness Datalink (SADL) such that it can communicate with friendly forces and be more aware of hostile forces in the operating area. When enabled with the JTRS (Joint Tactical Radio System) switch on the AHCP (Armament HUD Control Panel) and the OWN and GROUP network (NET) identification is set up properly, the following symbols can be displayed on the TAD.

JTRS (Joint Tactical Radio System) Power Switch

Attack Tasking Message Received
Upon receiving a JTAC target assignment, the ATTACK message will appear and flash at the top of the screen until you respond with a CNTCO or WILCO response.

Wilco (Will Comply) Response to Tasking
If you decide to accept the Target Assignment, press OSB 19 and the Assigned Target symbol will stop flashing and become solid and the ATTACK message will be removed.

Mini-SPI (Sensor Point of Interest)
When a SADL equipped unit is broadcasting its SPI across the SADL network, it will appear to other SADL equipped units as a Mini-SPI symbol.

SPI (Sensor Point of Interest) Broadcast ON/OFF Indication

CNTCO (Cannot Comply) Response to Tasking
If you cannot comply (CNTCO) with the target assignment, pressing OSB (Option Select Button) next to CNTCO will clear the Assigned Target symbol and ATTACK message from the TAD.

Assigned Target
When you receive a target assignment, this red triangle symbol with a dot in the center will appear at the location of the assigned target on the TAD. As with other symbols, you may hook it for detailed data about the target. The appearance of this symbol will coincide with the ATTACK message at the top of the screen. Once received, you can either reply with a CNTCO or WILCO response. The symbol with flash until you respond.

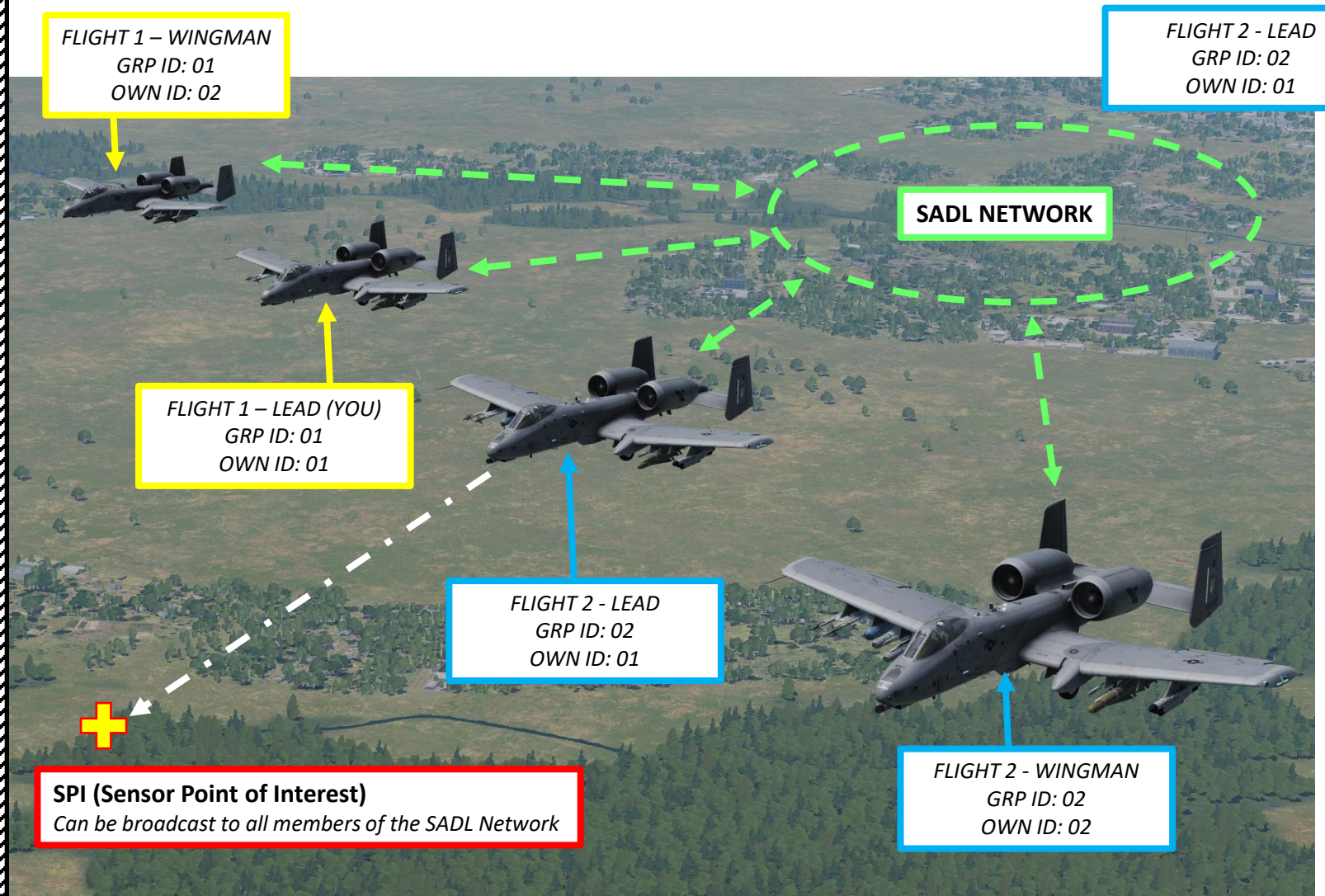
NET Page Selector
SADL Network Configuration page that will allow you to set your OWN and GROUP numbers.

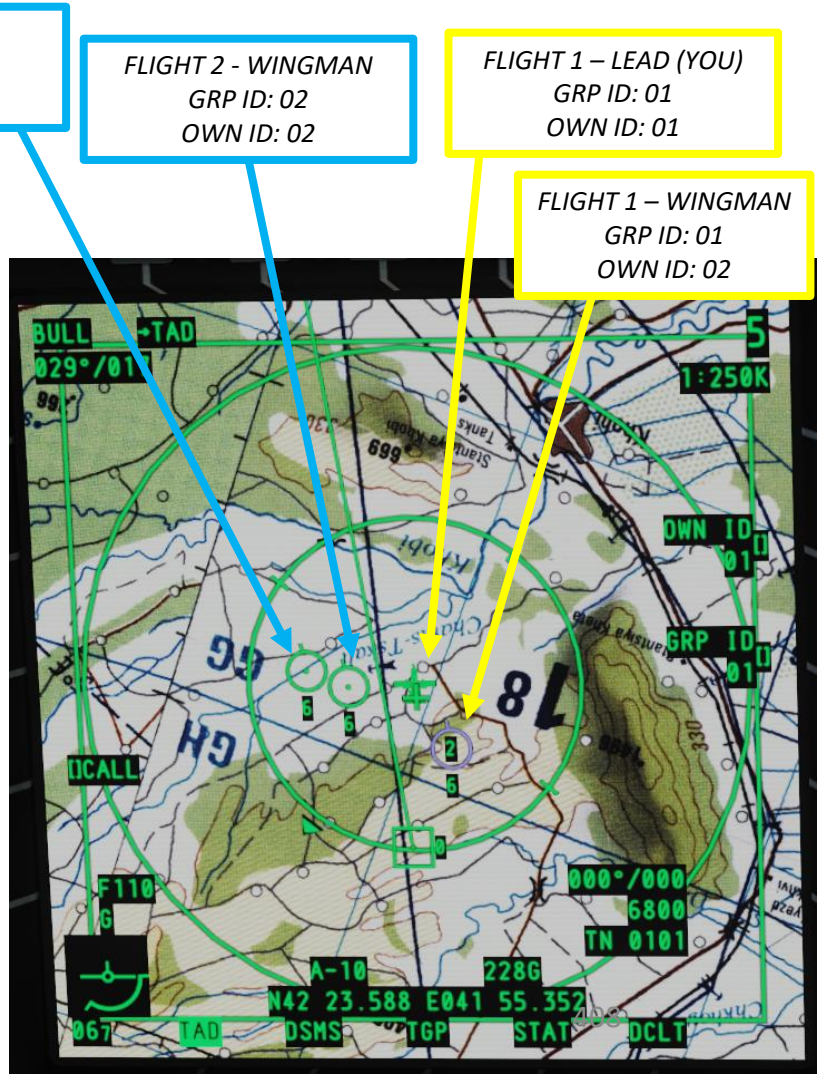
SADL (SITUATIONAL AWARENESS DATALINK) NETWORK CONFIGURATION

A SADL network is divided in groups, which are basically different flights. There are two sets of two-digit numbers associated with the SADL datalink: Group and Ownship.

The first number is the **Group ID** (Identification); it is for you and the other members of your flight. You will all use the same GRP ID number.

The second number is your **Ownship ID**. This will be unique to your group and jet - so you might be Group 01, Own 01, and someone else can be Group 02, Own 01.

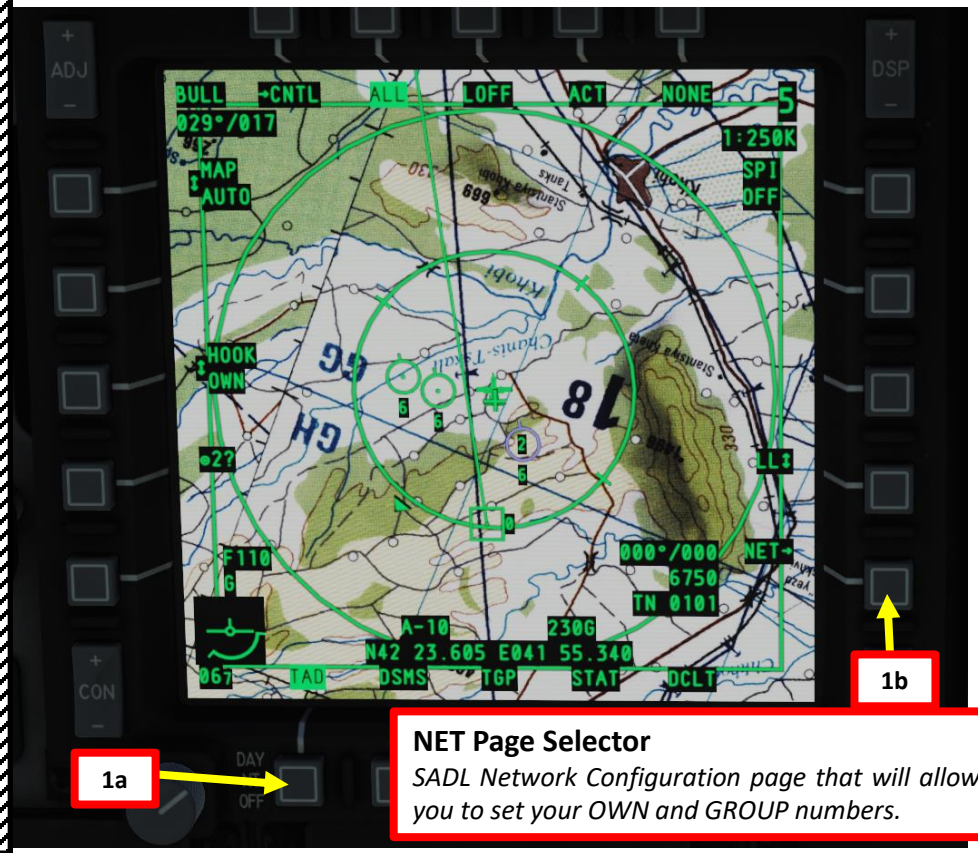


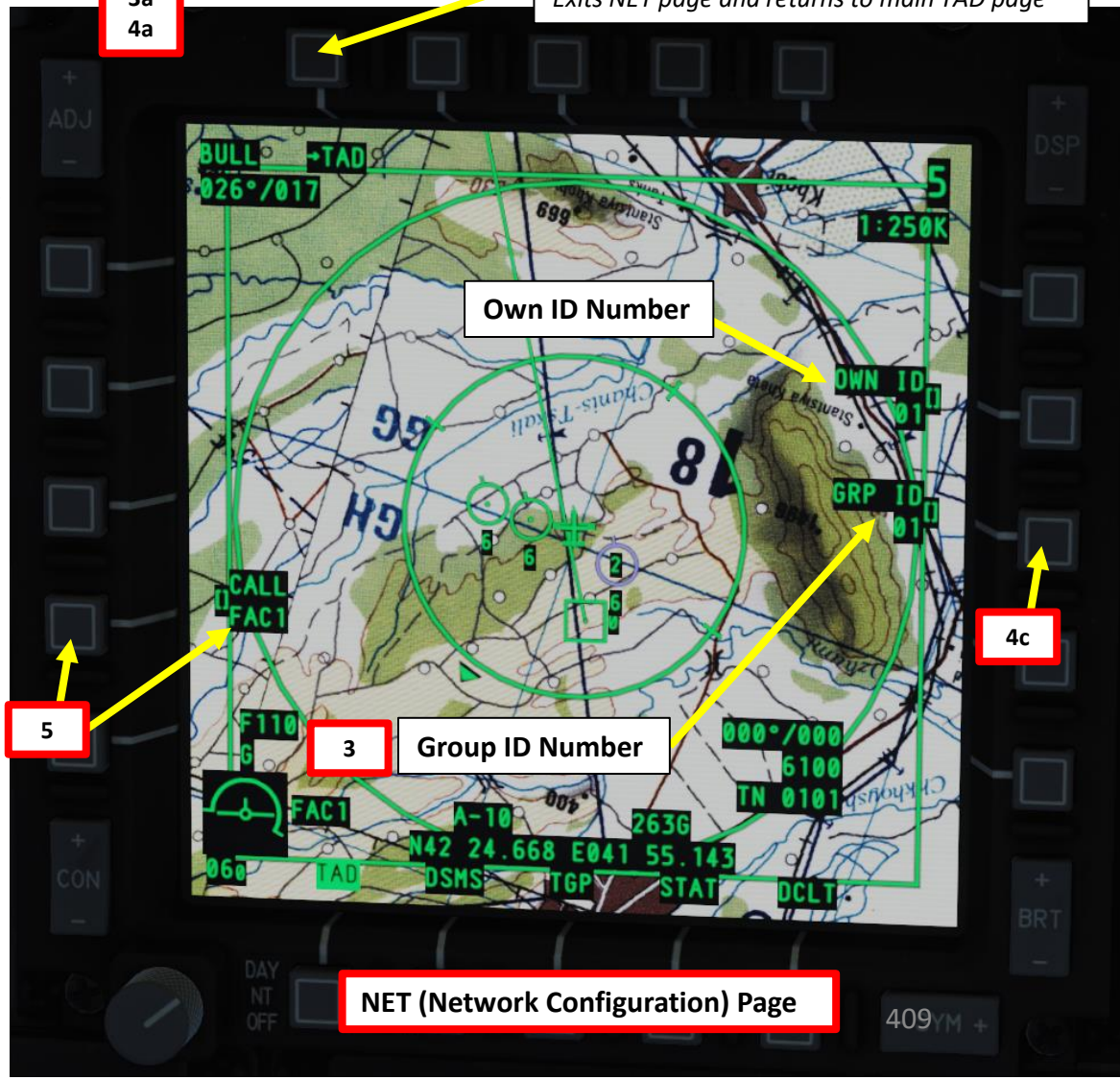


SADL (SITUATIONAL AWARENESS DATALINK) NETWORK CONFIGURATION

In order to use SADL, you need to join a network with a group identification number (GRP ID) and your own identification number (OWN ID). To set your group and own ID:

1. On TAD page, press the OSB (Option Select Button) next to NET.
2. Your current GRP ID and OWN ID are displayed on the right.
3. To select your GROUP ID number, enter the ID number on the UFC (Up-Front Control) scratchpad (i.e. 01) and press on the OSB next to GRP ID.
4. To change your own identification number, enter the ID number on the UFC (Up-Front Control) scratchpad (i.e. 01) and press on the OSB next to OWN ID. If the OWN ID number is already use by someone else, you will get an error message.
5. If desired, you can set your callsign by typing it on the CDU keypad (i.e. FAC1 for Forward Air Controller 1), then pressing on the OSB next to CALL.





SADL (SITUATIONAL AWARENESS DATALINK) SYMBOLOGY

Flight Members
Aircraft on the SADL network and on the same GROUP ID number as you.
- *Center number: OWN ID of the aircraft within the flight*
- *Lower number: altitude of aircraft in thousands of feet*

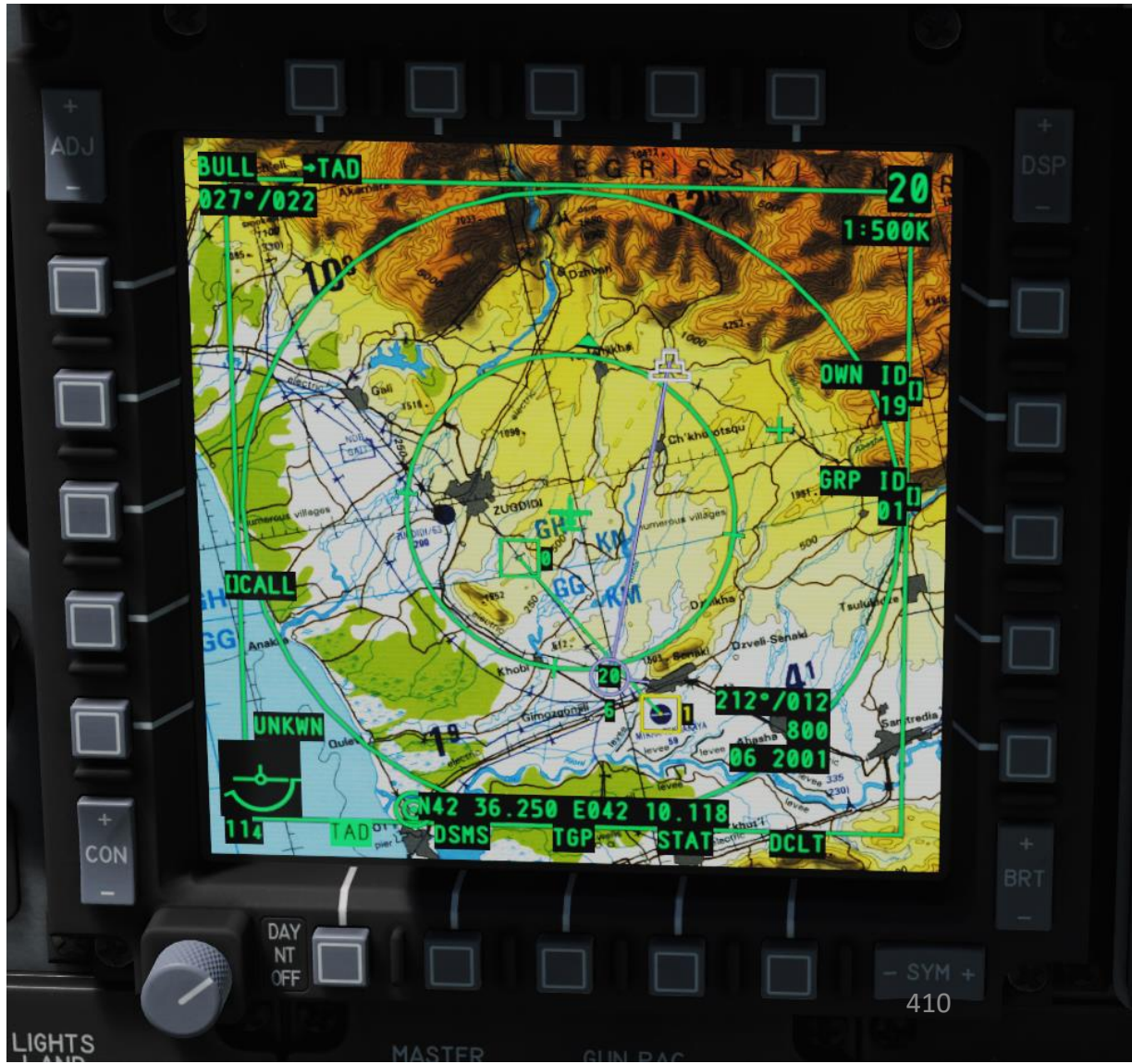
Friendly SADL Networked Members
Aircraft on the SADL network but on a separate GROUP ID number.
- *Lower number: altitude of aircraft in thousands of feet*

Friendly Ground Forces
Friendly ground forces; unit must be assigned an Enhanced Position Location Reporting System (EPLRS) radio to broadcast their location

Mini-SPI (Sensor Point of Interest)
When a SADL equipped unit is broadcasting its SPI across the SADL network, it will appear to other SADL equipped units as a Mini-SPI symbol. This symbol looks like the standard SPI symbol but with one less tier. Connecting this symbol to the broadcast aircraft is a blue line.

SPI (Sensor Point of Interest) Broadcast
When broadcasting your SPI to friendly forces, this field will be lit in reverse video. When broadcasting your SPI, other SADL equipped units will see your SPI on their displays as a Mini-SPI and a blue line connecting your aircraft icon to your Mini-SPI. If you are flying in a multiplayer mission and wish to send your SPI to other friendly aircraft, you must set SPI to ON using the DMS Left Long HOTAS command.

TAD (Tactical Awareness Display) Cursor
Used to hook SADL symbols and SPIs



SADL (SITUATIONAL AWARENESS DATALINK) FUNCTIONS

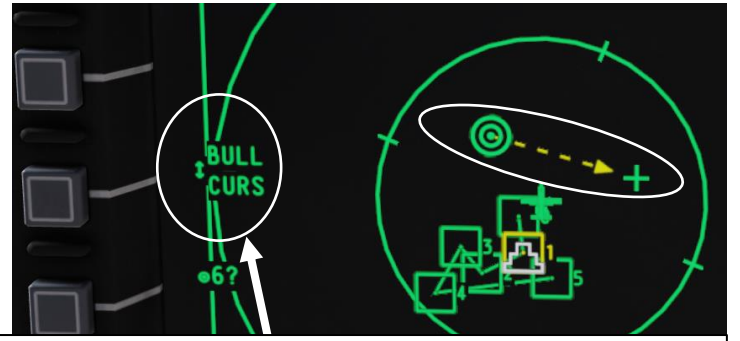
SADL has a number of useful functions we will explore in the following pages:

- **A**: Capability to **hook other wingmen** or SADL symbols and get information from them (type, coordinates, altitude, etc.)
- **B**: Capability to **send messages** to members of the SADL network
- **C**: Capability to **receive messages** from members of the SADL network
- **D**: Capability to **broadcast a SPI** (Sensor Point of Interest) across the whole SADL network or to specific members of the network. This is useful to exchange target locations between members of a same flight.
- **E**: Capability to **use a SPI** (Sensor Point of Interest) broadcasted from a SADL network member
- **F**: Capability to **task targets** to other SADL members
- **G**: Capability to **receive taskings** from members of the SADL network (e.g. a JTAC, Joint Terminal Attack Controller)

A - HOOKING DATALINK SYMBOLS

If you want to have a bearing, distance and elevation information on a specific TAD symbol (i.e. a Bullseye/Anchor Point or Waypoint), you can "hook" a symbol using the TAD when it is the SOI (Sensor of Interest).

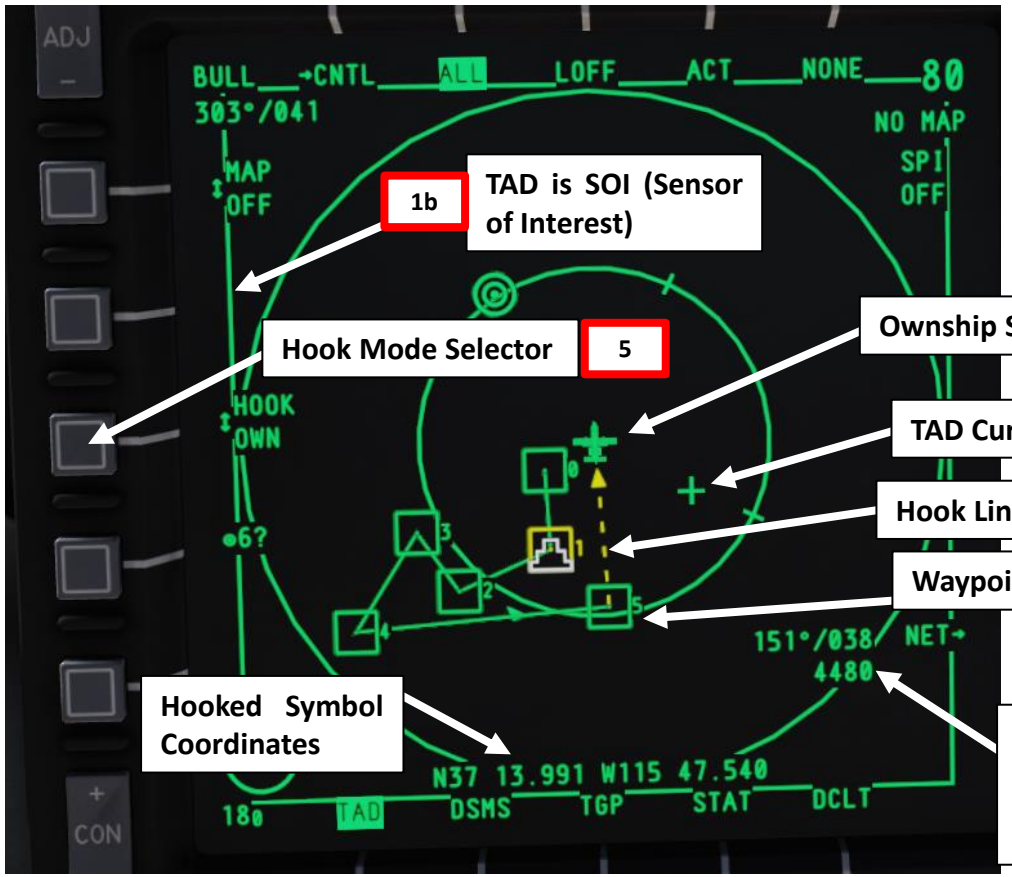
1. Set the TAD as the SOI: press and hold the Coolie Hat Switch in the direction of the MFCD screen displaying the TAD
2. Use the Slew Control Switch to move the TAD Cursor over the desired symbol you want to hook. TAD symbols can include the SPI, TGP diamond, waypoint/steerpoint, or bullseye.
3. Once TAD cursor is over the symbol, press TMS (Target Management System) FWD SHORT to hook the symbol.
4. Hooked Symbol Data will be displayed on the lower right of the TAD.
5. Select desired Hook Mode with the OSB.
6. To Un-Hook a symbol, press the TMS (Target Management System) AFT SHORT.
7. To reset TAD cursor position, press China Hat Switch AFT SHORT.

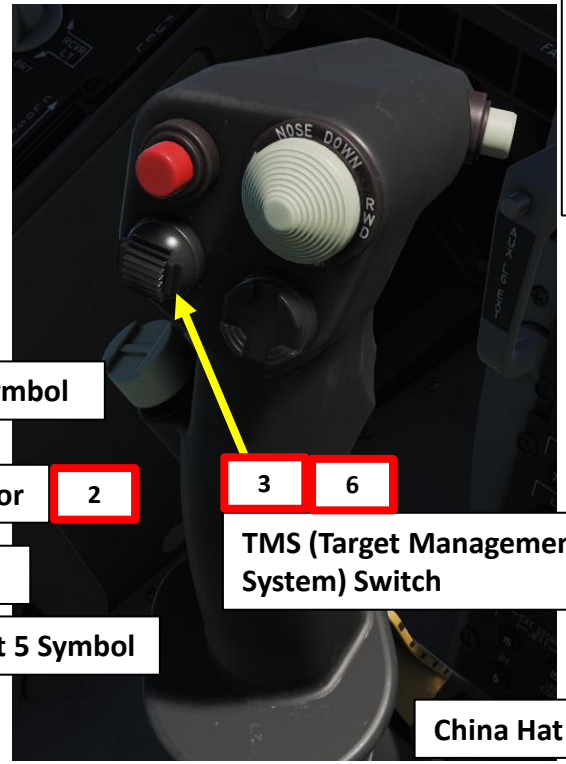


Hook Mode (OWN/BULL/CURS/HOOK)
Upper Row: Symbol from where the hook line begins
Lower Row: Symbol where the hook line ends

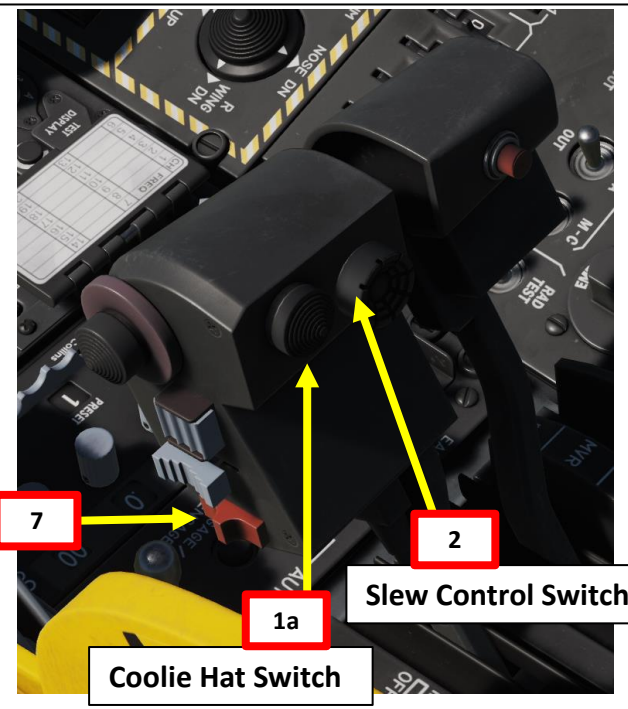
Shown: hook line goes from bullseye (BULL) to TAD Cursor (CURS).

- HOOK is the hooked symbol
- CURS is the TAD cursor
- OWN is your ownship
- BULL is the bullseye





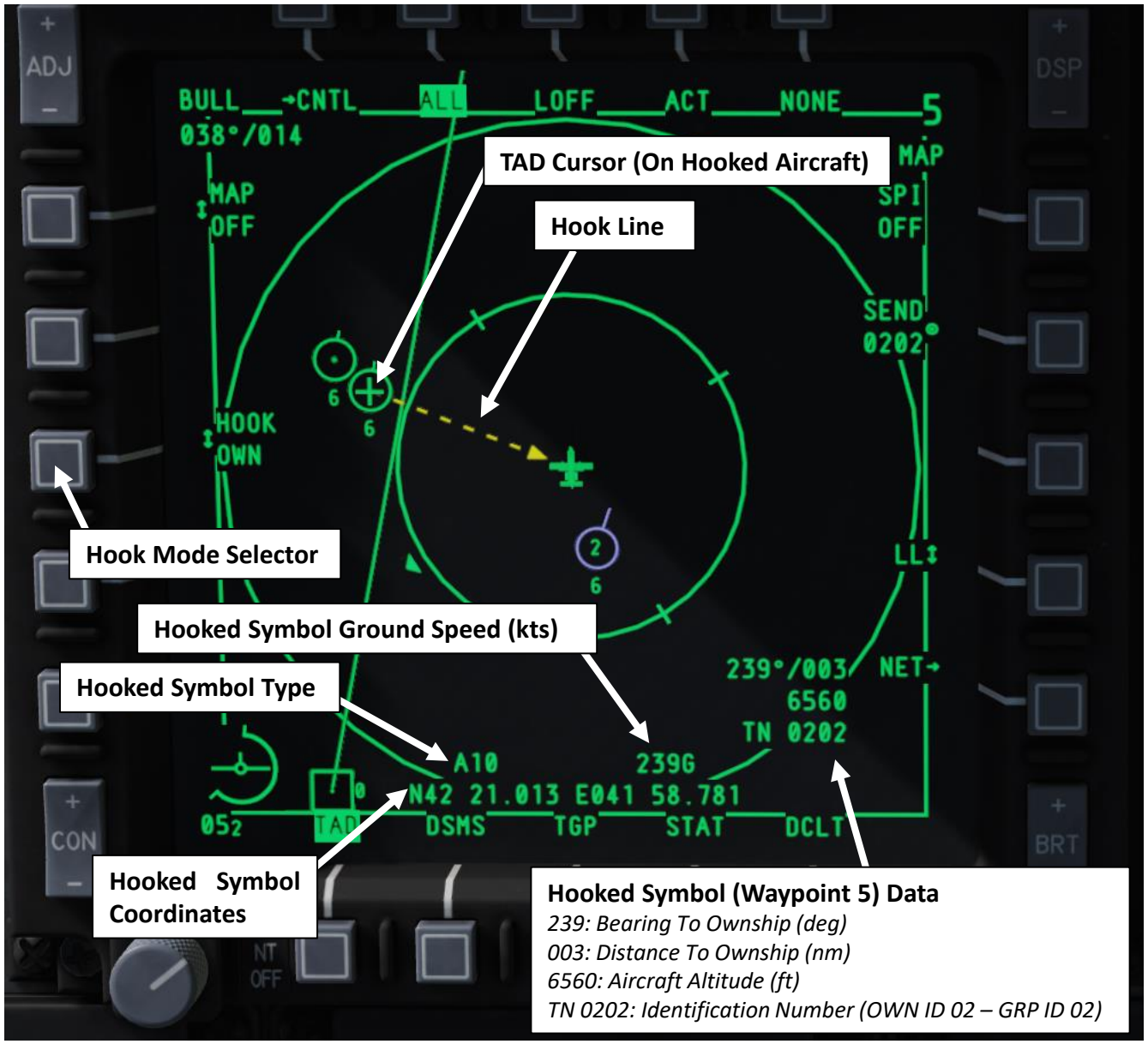
Hooked Symbol (Waypoint 5) Data
151: Bearing To Ownship (deg)
038: Distance To Ownship (nm)
4480: Symbol Elevation (ft)
4



A - HOOKING DATALINK SYMBOLS

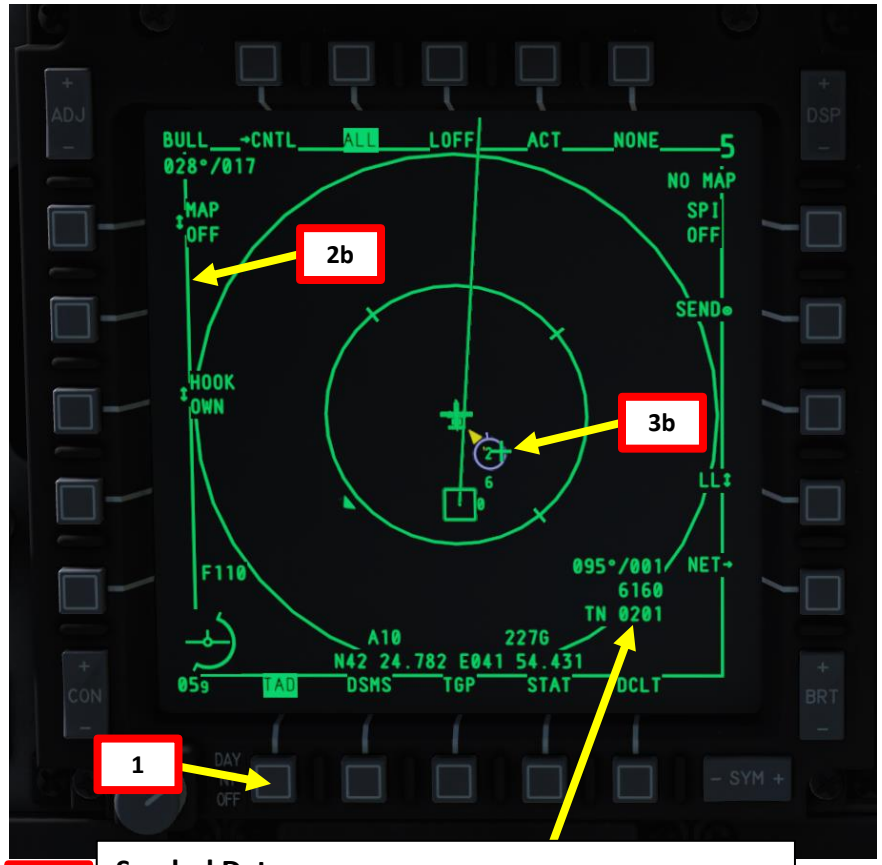
Here is an example that shows a wingman being hooked.

- Note: If TAD is SOI and you have a hooked target… press the TMS (Target Management System) Switch FWD LONG to **set the TAD hooked target as the Sensor Point of Interest (SPI)**. The HUD will then track this hooked contact.

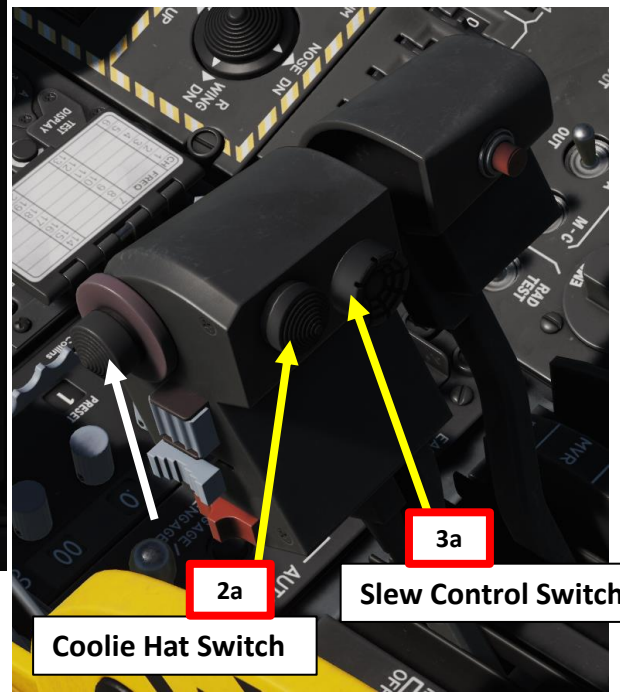


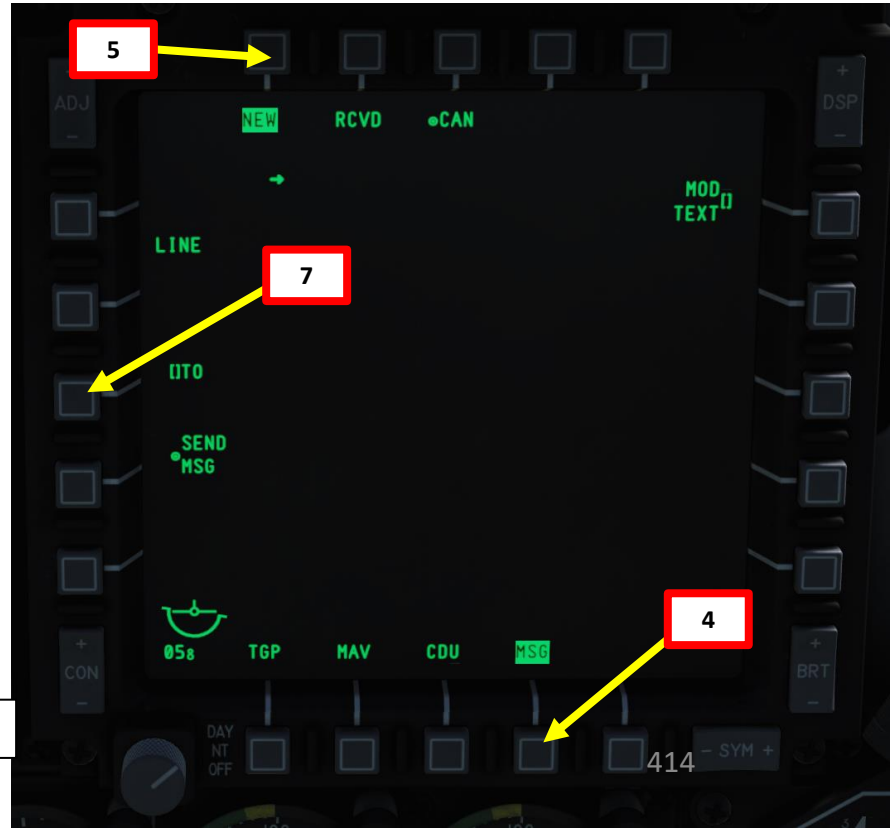
B - HOW TO SEND MESSAGES WITH SADL

1. Select TAD page
2. Make TAD (Tactical Awareness Display) SOI (Sensor of Interest) with the Coolie Hat Switch pressed LONG in the direction of the TAD page
3. Slew TAD Cursor on Wingman. Its “TN” number will appear, which is its OWN ID followed by its GRP ID in the SADL network.
4. Select MSG Page
5. Select NEW
6. On UFC (Up Front Control) Scratchpad, type TN Number of Wingman (0201)
7. Press the OSB next to “TO”. This will set who you send the message to.



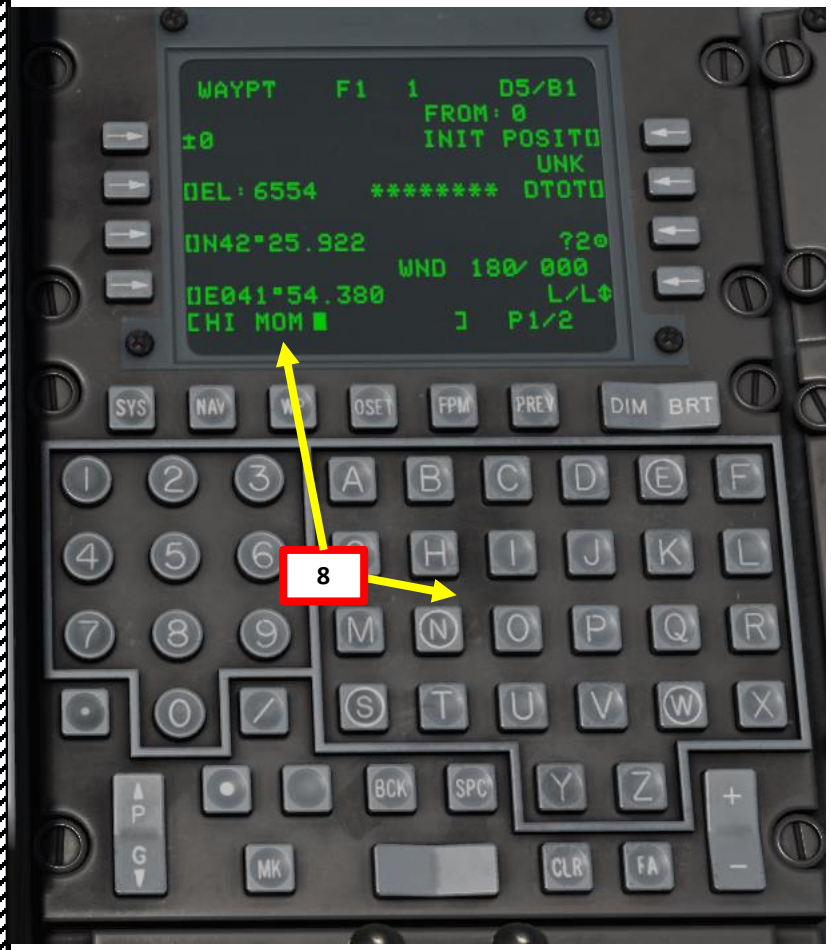
3c **Symbol Data**
TN 0201: Identification Number (OWN ID 02 – GRP ID 01)

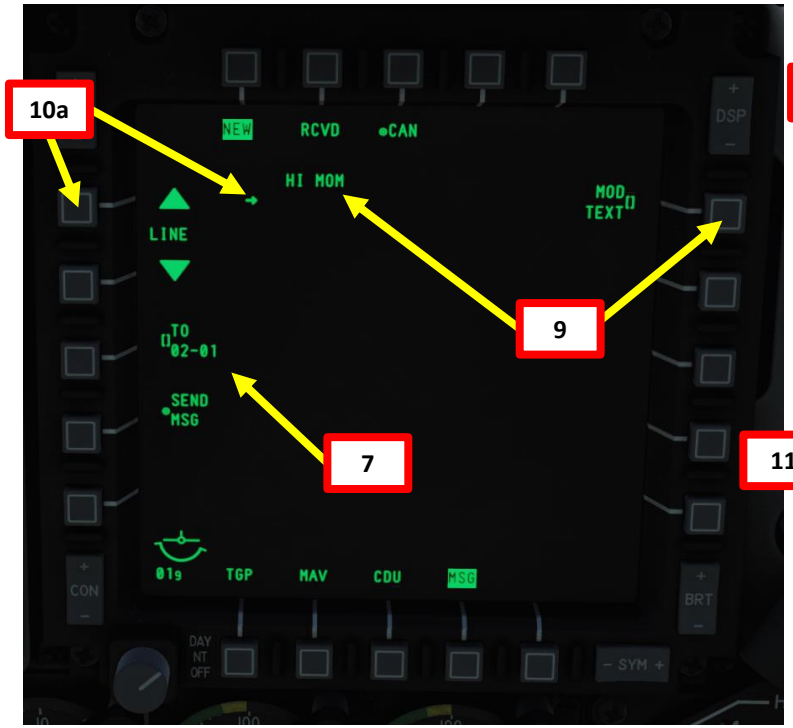


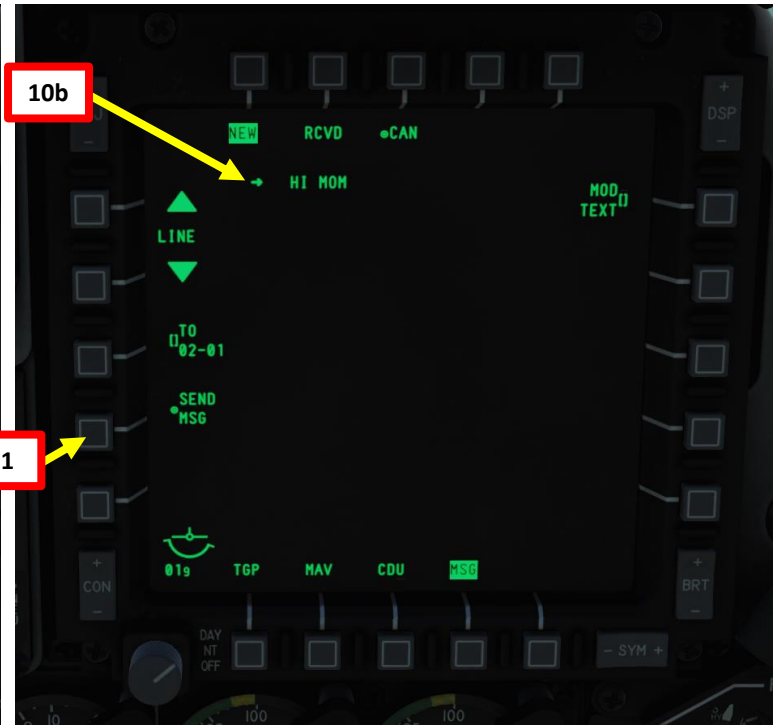


B - HOW TO SEND MESSAGES WITH SADL

8. Type desired message content on CDU (Control Display Unit) Keyboard
9. Select MOD TEXT to enter text
10. With the SET LINE OSBs, set arrow next to text line you want to send
11. Click SEND MSG

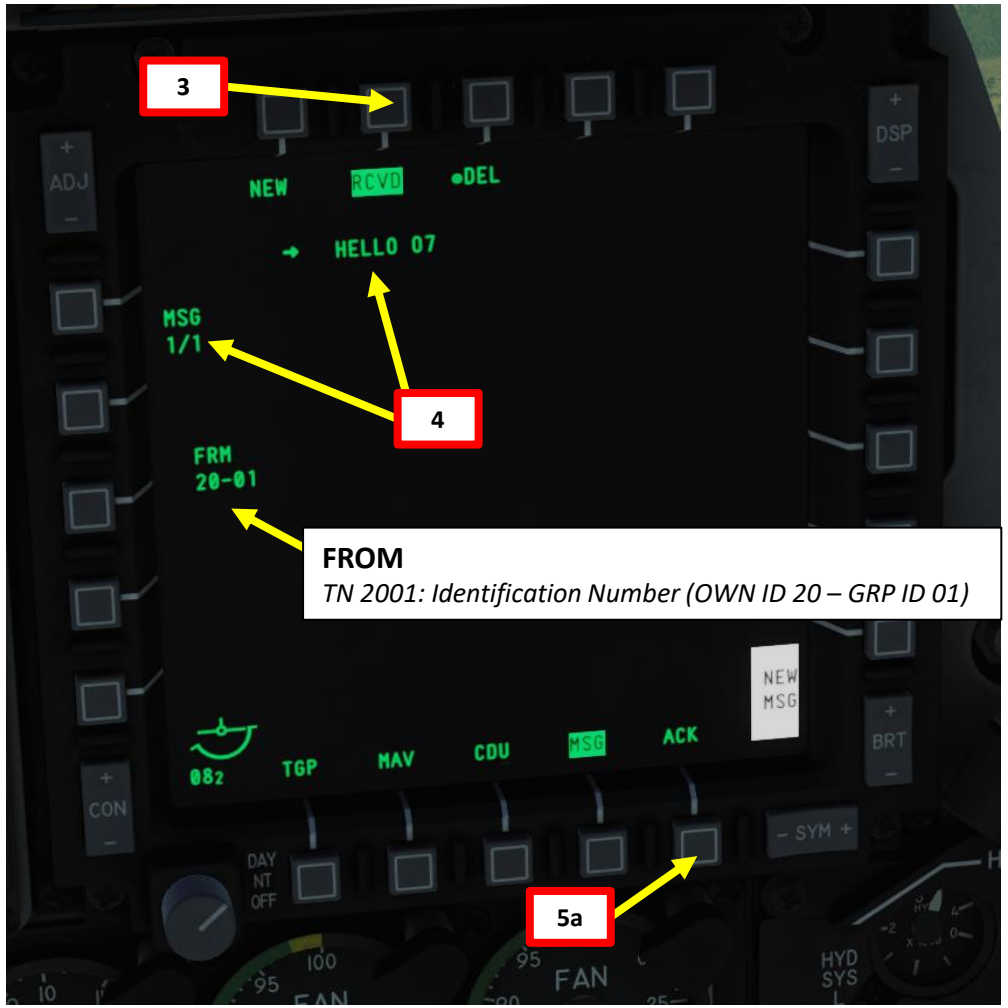


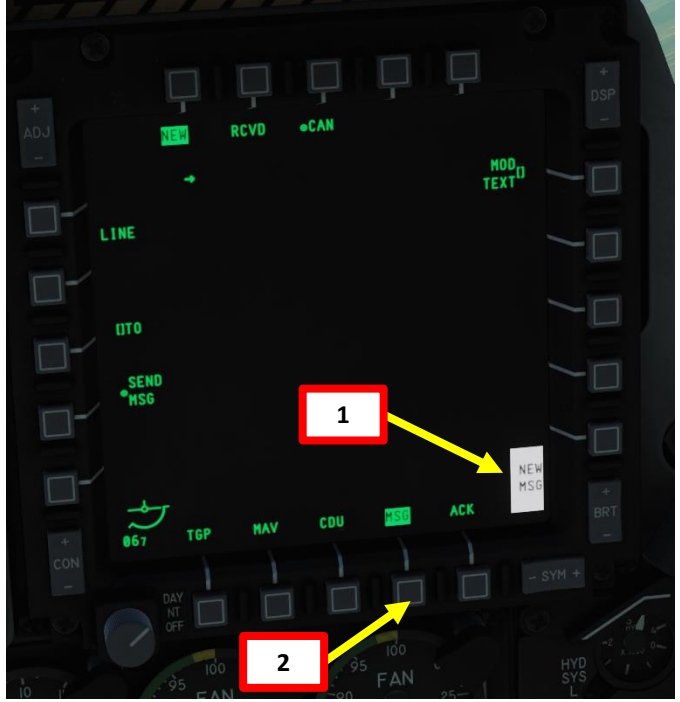




C - HOW TO RECEIVE MESSAGES WITH SADL

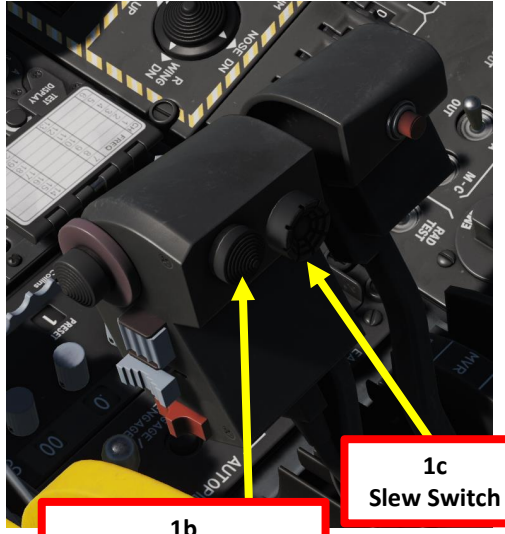
1. NEW MSG means that a new message has been received.
2. Select MSG Page
3. Select RCVD.
4. Message will be displayed.
5. To acknowledge the message, click on ACK.
6. To delete the message, click DEL.

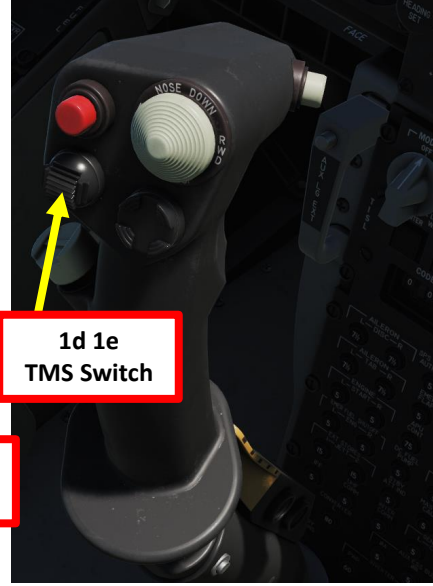


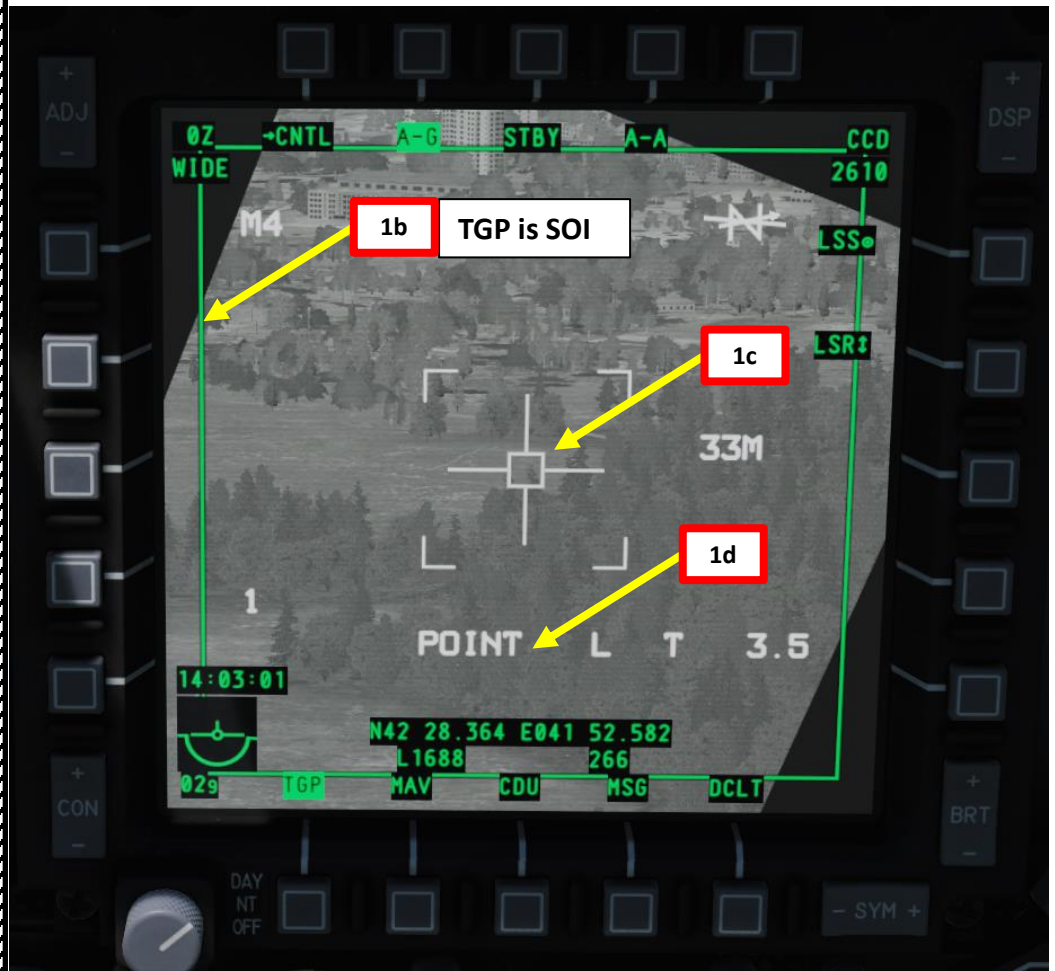


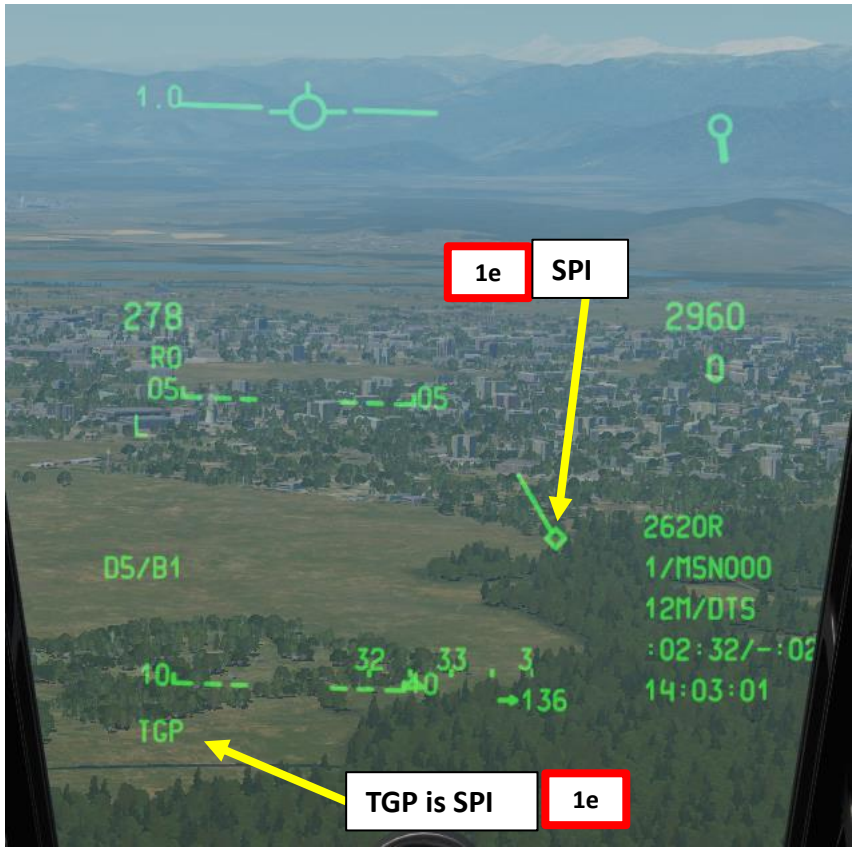
D - HOW TO BROADCAST A SPI WITH SADL

1. First, create a SPI (Sensor Point of Interest) with any sensor. As an example, we will choose the targeting pod.
   a) Power TGP (Targeting Pod), then select TGP page in A-G mode.
   b) Make TGP SOI with the Coolie Hat Switch LONG in the direction of the MFCD that displays your TGP feed
   c) Slew TGP with the Slew Switch
   d) Press the TMS (Target Management System) switch FWD SHORT to track the target
   e) Press the TMS (Target Management System) switch FWD LONG to designate the TGP Sensor Point of Interest (SPI).



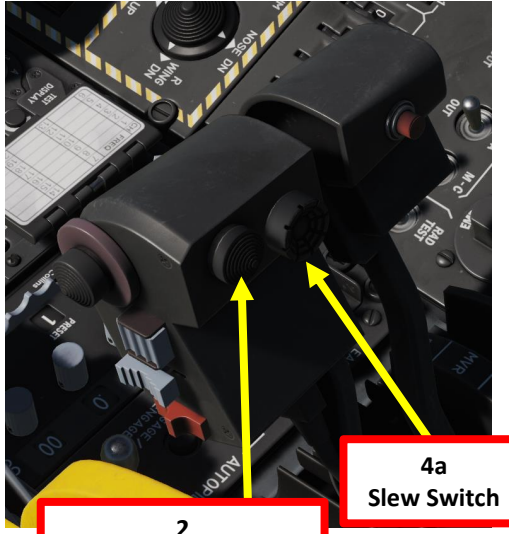


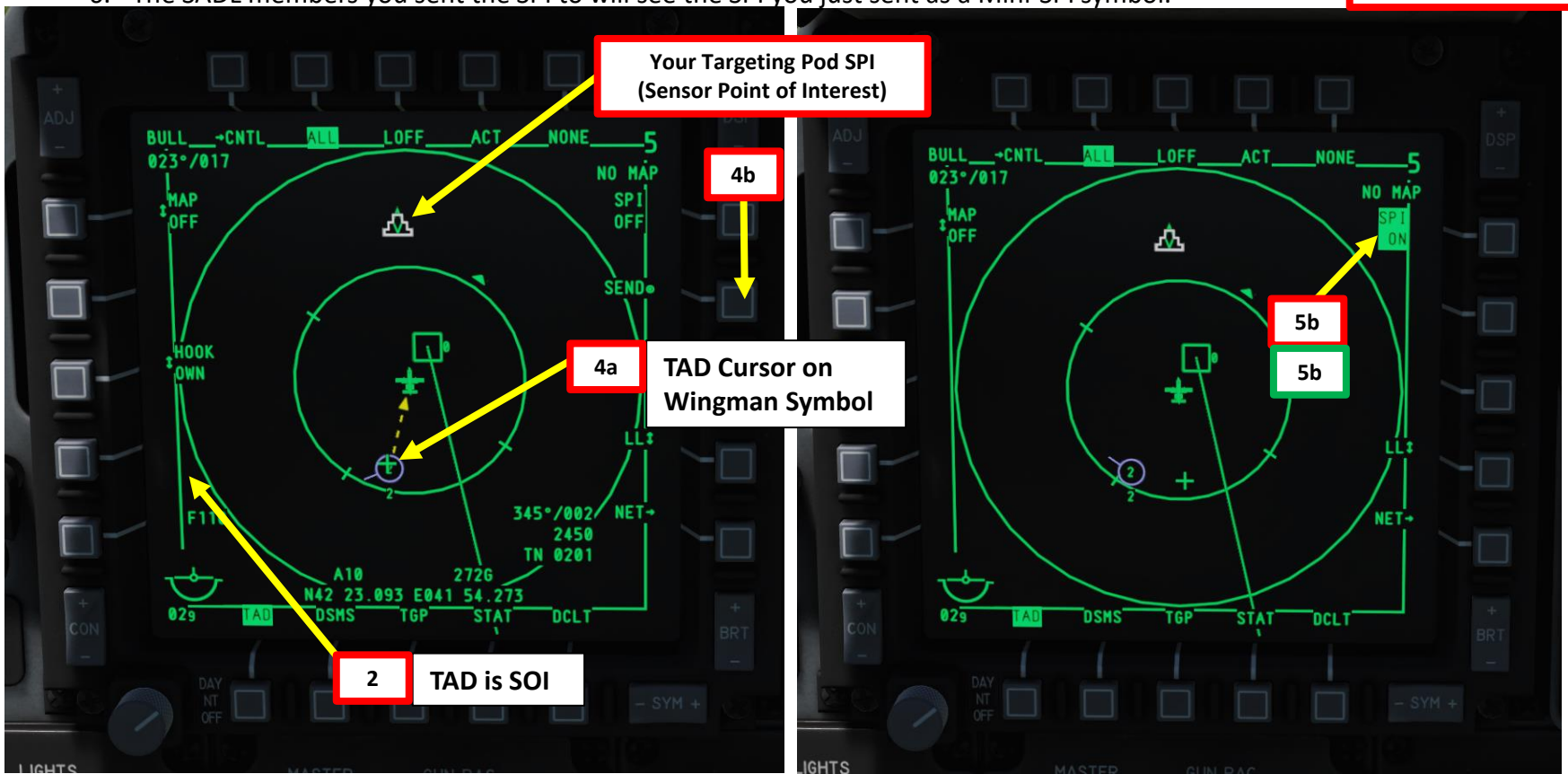


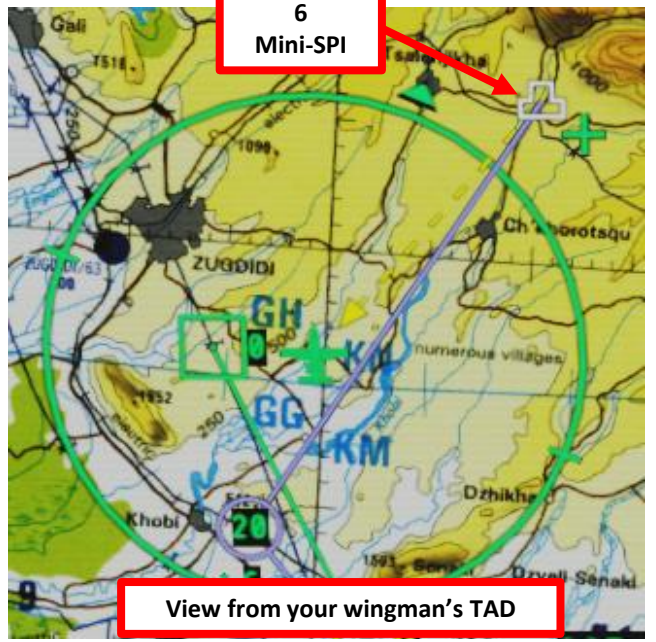


D - HOW TO BROADCAST A SPI WITH SADL

2. Make TAD (Tactical Awareness Display) SOI (Sensor of Interest) with the Coolie Hat Switch LONG in the direction of the MFCD that displays your TAD
3. You can broadcast either on the whole SADL Network or to a specific aircraft
4. To send SPI (Sensor Point of Interest) to a specific aircraft:
    a) Slew TAD Cursor on aircraft you want to send the SPI to
    b) Click SEND button
5. To broadcast on whole NET:
    a) Use HOTAS to broadcast SPI
        - **A-10C LEGACY**: Press DMS (Data Management Switch) LEFT LONG.
        - **A-10C II TANK KILLER EXPANSION**: Press TMS (Target Management System) LEFT LONG
    b) SPI ON indication will appear when SPI data is being broadcast.
    c) Every member of the SADL network will then receive your SPI in its own TAD.
6. The SADL members you sent the SPI to will see the SPI you just sent as a Mini-SPI symbol.





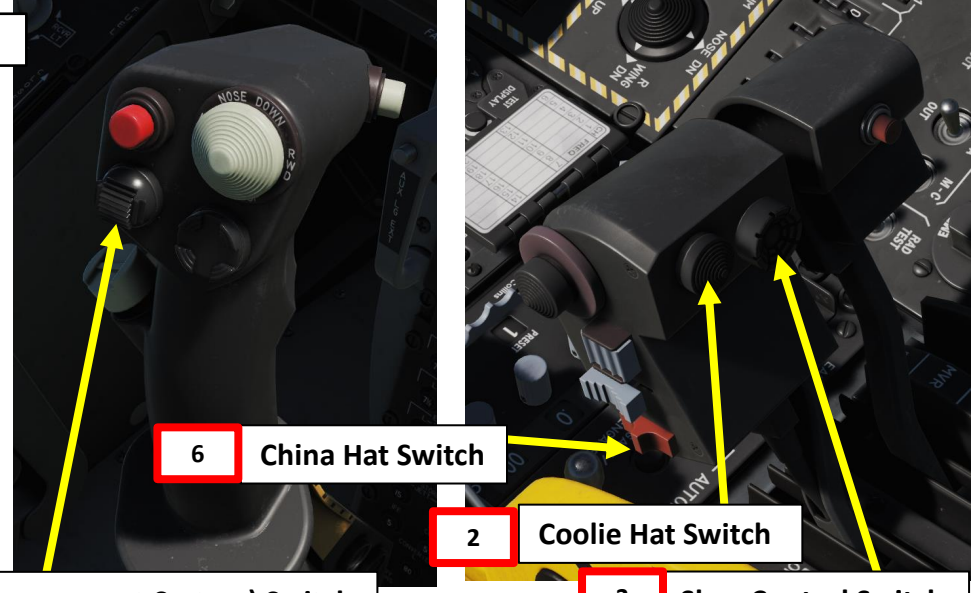


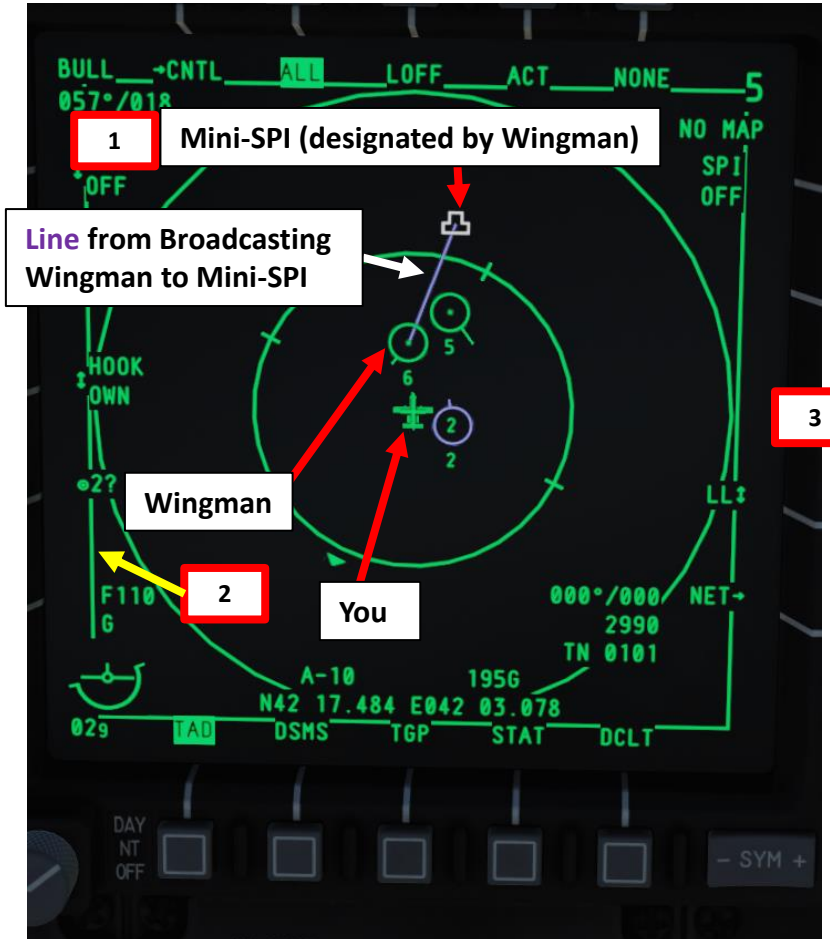
E - HOW TO USE A SPI RECEIVED VIA SADL

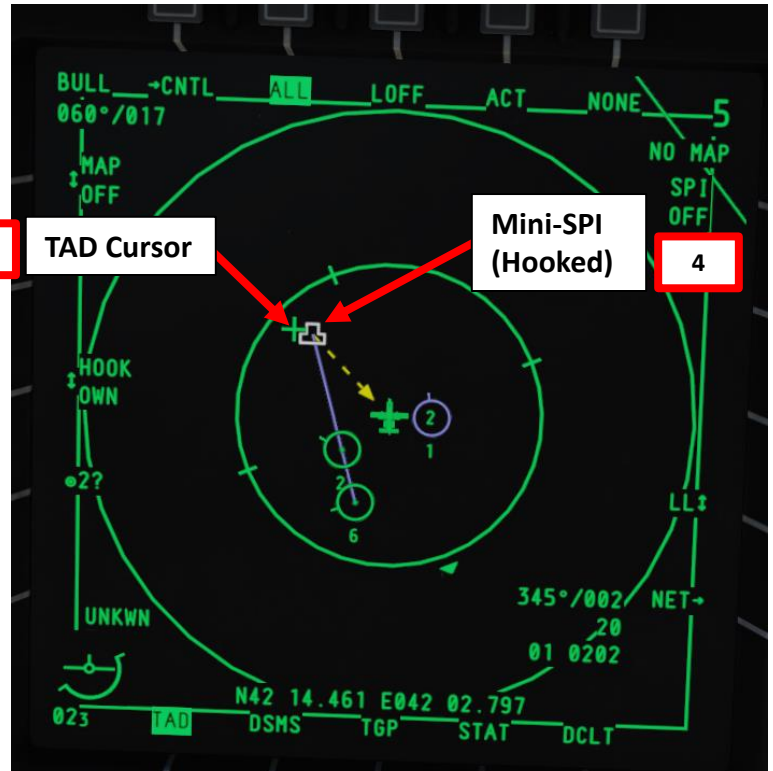
1. A SPI (Sensor Point of Interest) received via SADL from a wingman will be visible as a "Mini-SPI" symbol (a two-tier wedding cake).
2. Make TAD (Tactical Awareness Display) SOI (Sensor of Interest) with the Coolie Hat Switch LONG in the direction of the MFCD that displays your TAD
3. Slew TAD cursor on Mini-SPI symbol
4. Press TMS (Target Management System) FWD SHORT to hook the Mini-SPI
5. Press TMS (Target Management System) FWD LONG to create your own SPI (Sensor Point of Interest) from the Mini-SPI sent by your wingman.
6. Press China Hat FWD LONG to slave all sensors (Targeting Pod, Maverick Missile, etc.) to your own new SPI.

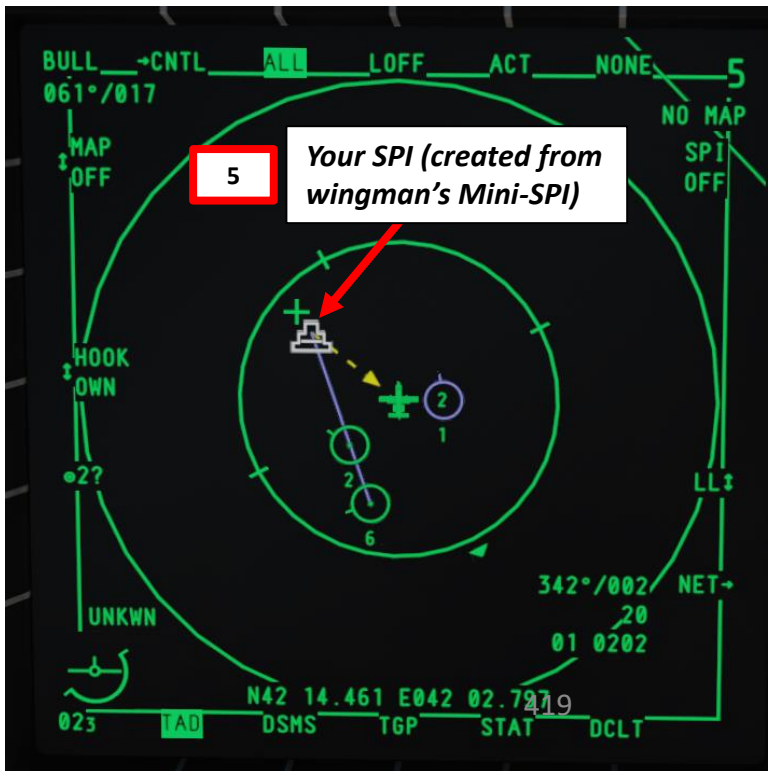
Mini-SPI (from Wingman)

Your SPI







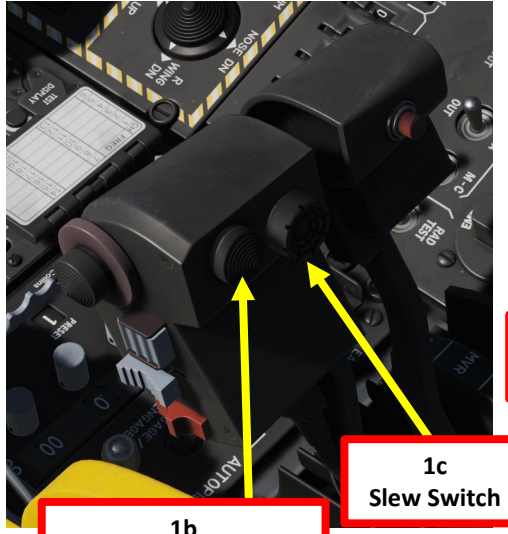


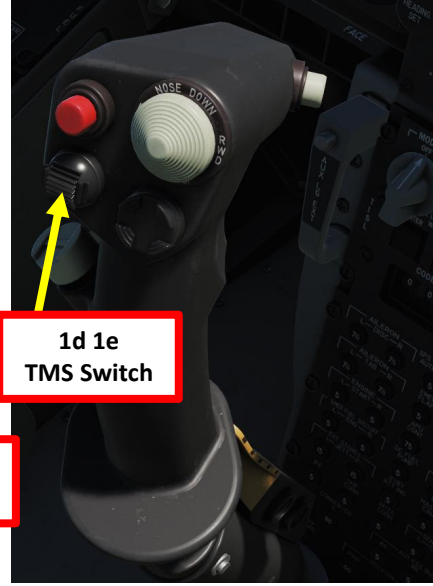
F - TASKING TARGETS TO OTHER SADL AIRCRAFT

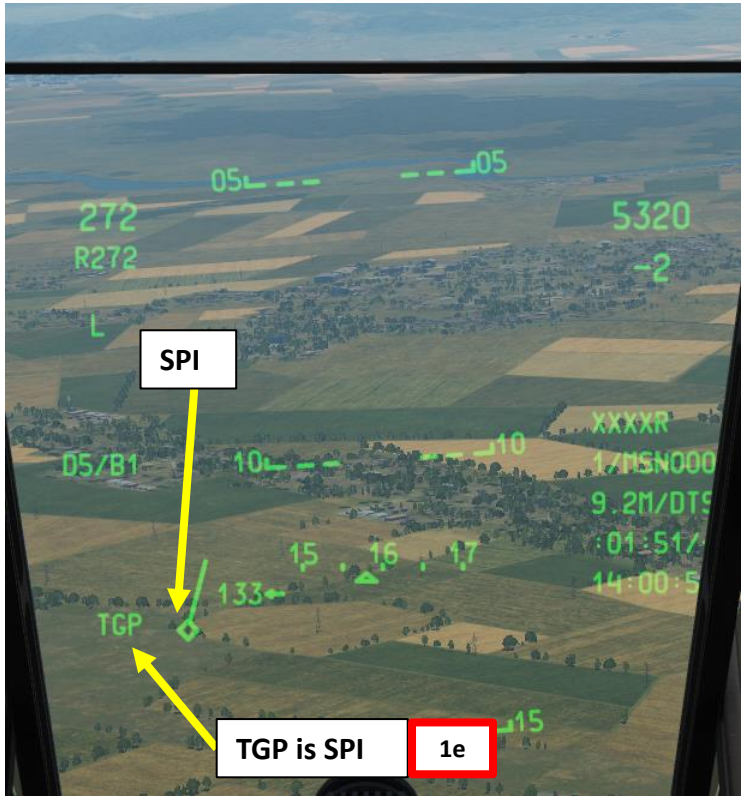
In addition to receiving Target Assignments from JTAC and other SADL-equipped aircraft, you can also assign targets to other SADL-equipped aircraft. This is done through a combination of using the SPI and active hooking.

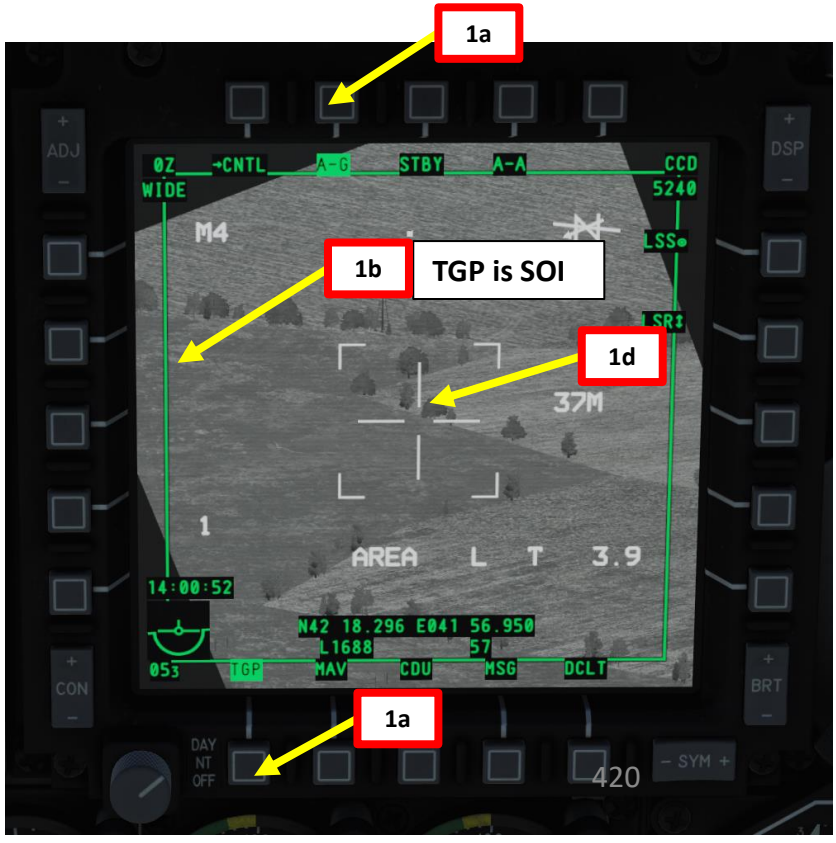
To create a Target Assignment:

1. First, create a SPI (Sensor Point of Interest) with any sensor. As an example, we will choose the targeting pod.
    a) Power TGP (Targeting Pod), then select TGP page in A-G mode.
    b) Make TGP SOI with the Coolie Hat Switch LONG in the direction of the MFCD that displays your TGP feed
    c) Slew TGP with the Slew Switch
    d) Press the TMS (Target Management System) switch FWD SHORT to track the target
    e) Press the TMS (Target Management System) switch FWD LONG to designate the TGP Sensor Point of Interest (SPI).



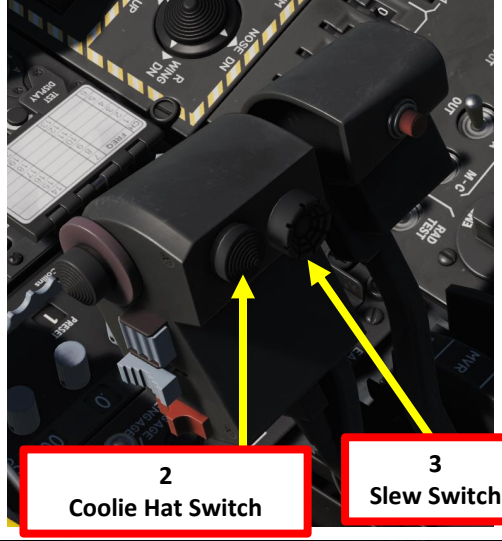


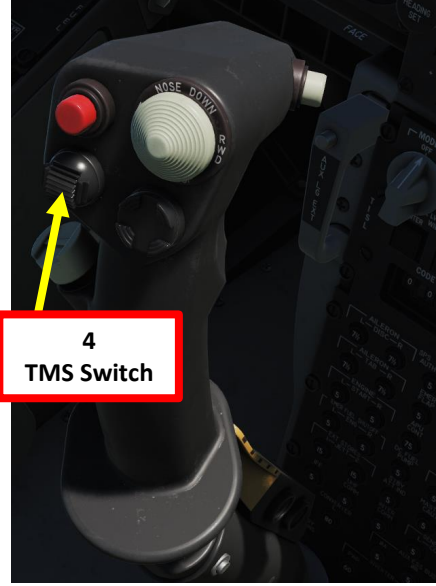


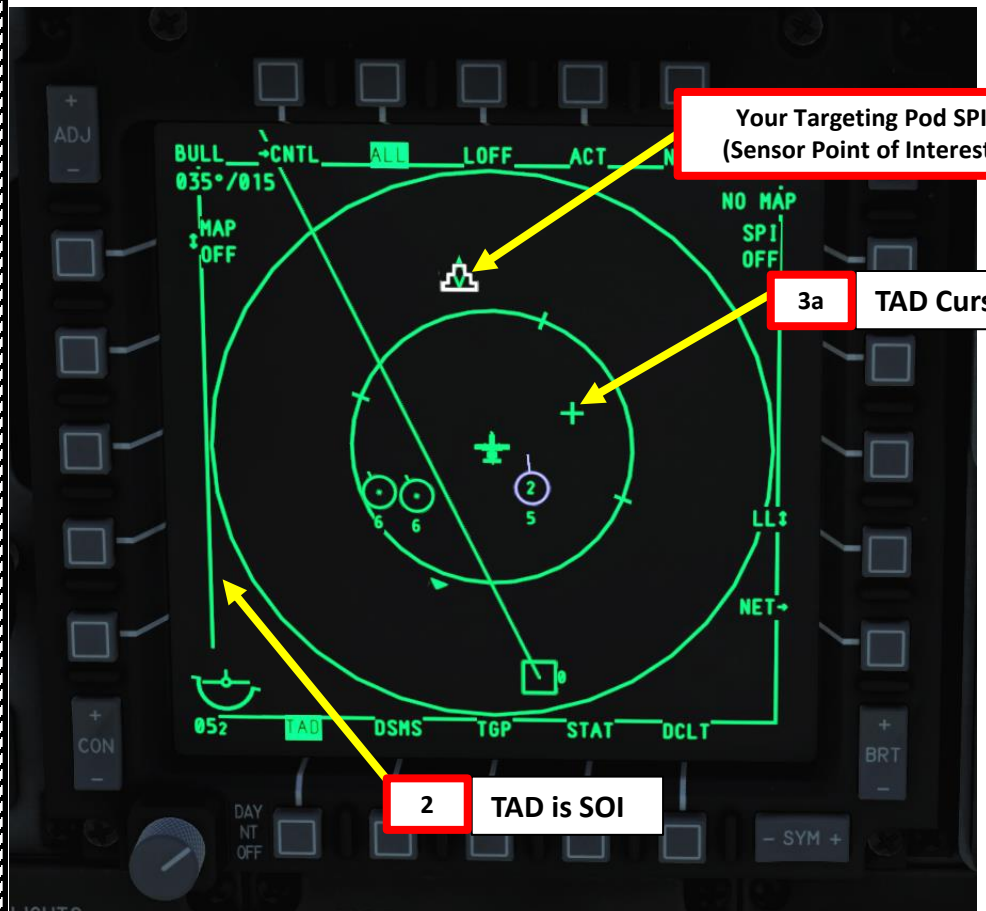


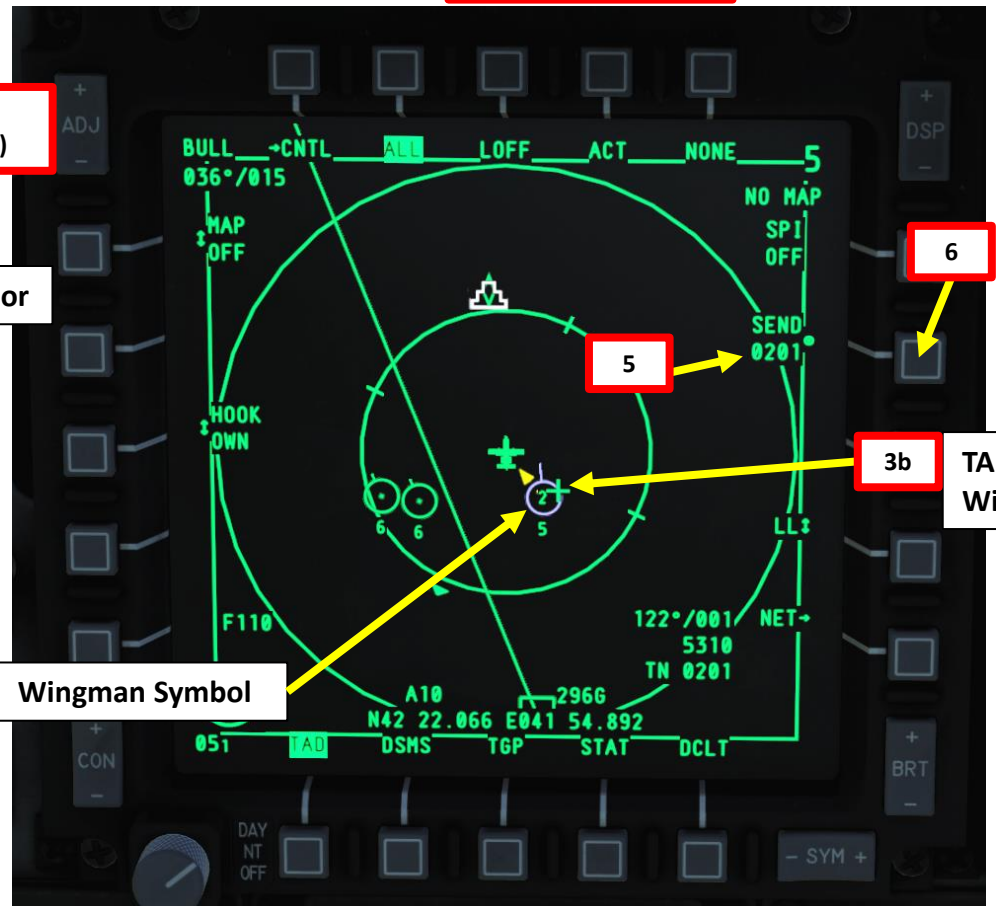
F - TASKING TARGETS TO OTHER SADL AIRCRAFT

2. Make TAD (Tactical Awareness Display) SOI (Sensor of Interest) with the Coolie Hat Switch LONG in the direction of the MFCD that displays your TAD
3. Slew TAD Cursor on aircraft you want to send the Target Assignment to
4. Once TAD cursor is over the symbol, press TMS (Target Management System) FWD SHORT to hook the aircraft.
5. Network Identification (OWN ID – GRP ID) of the hooked aircraft recipient will appear below the SEND label.
6. Press the OSB (Option Select Button) next to SEND to send the Target Assignment.



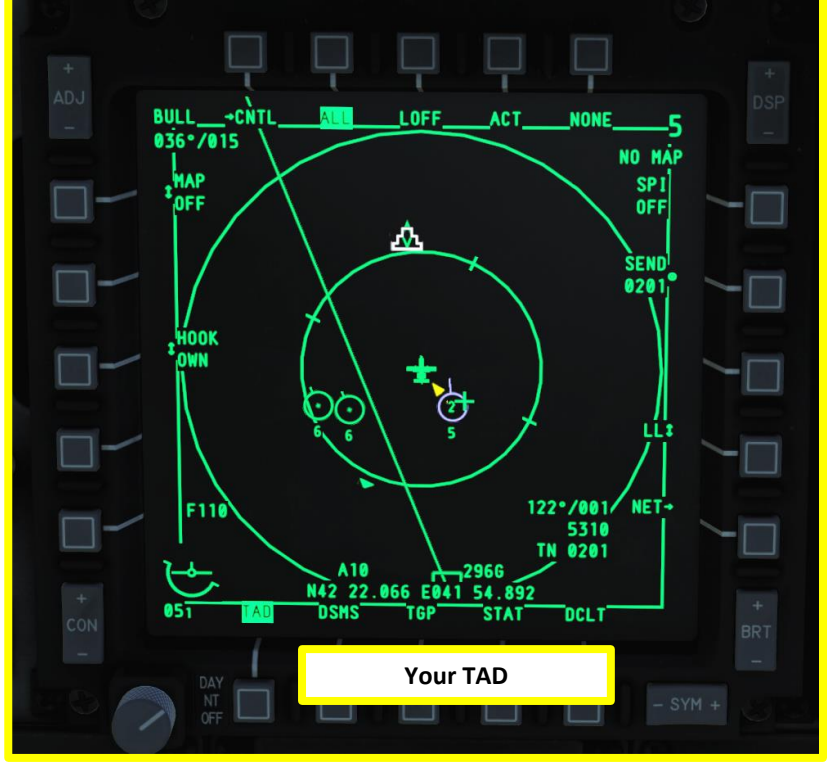


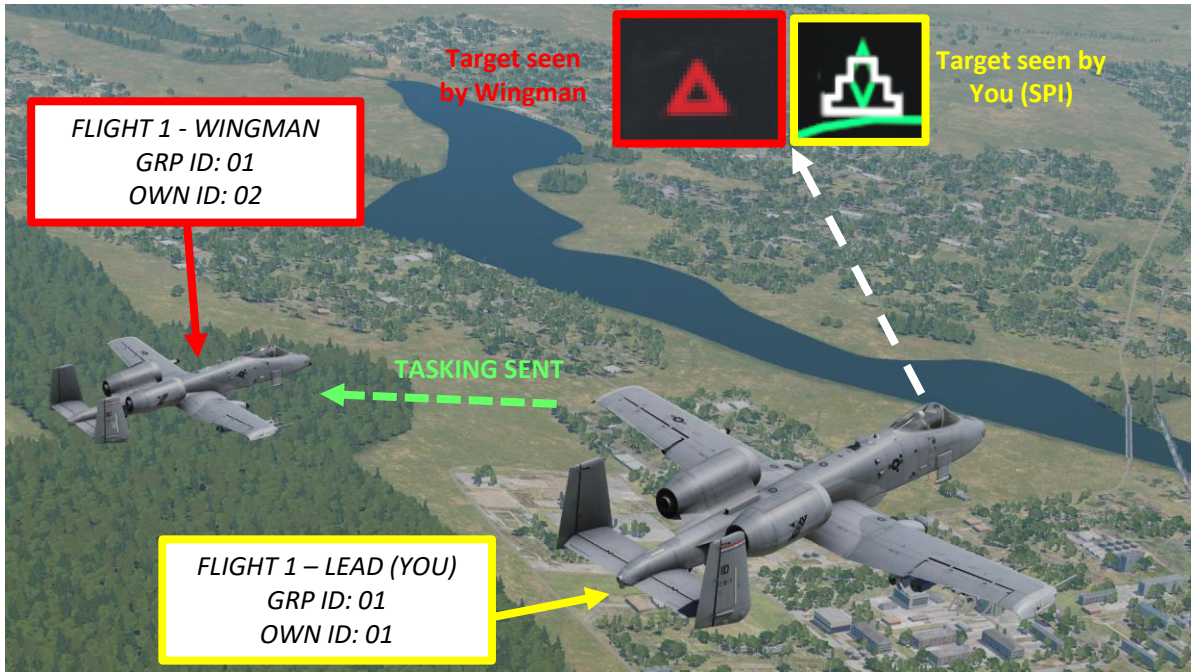




F - TASKING TARGETS TO OTHER SADL AIRCRAFT

7. Your hooked wingman will then receive a new tasking assignment, a NEW TASKING message will appear on both of his MFCDs regardless of the current page.
8. On your hooked wingman's TAD, a red triangle will be on the TAD at the location of the target.

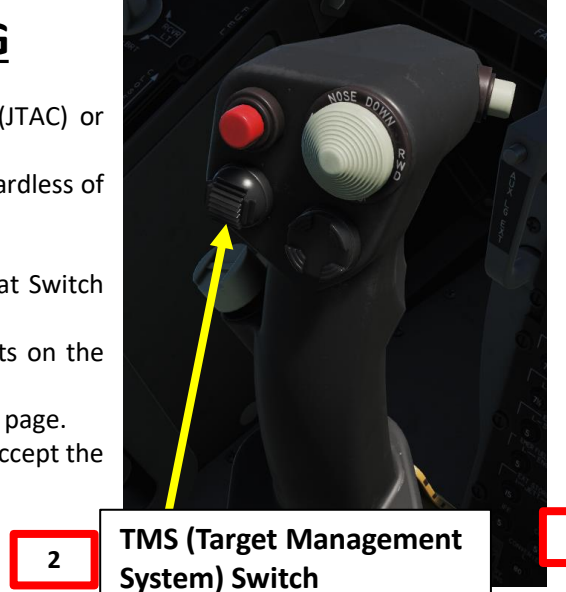


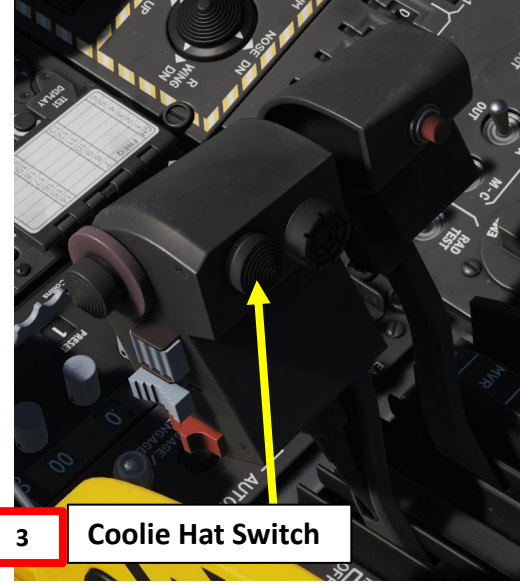


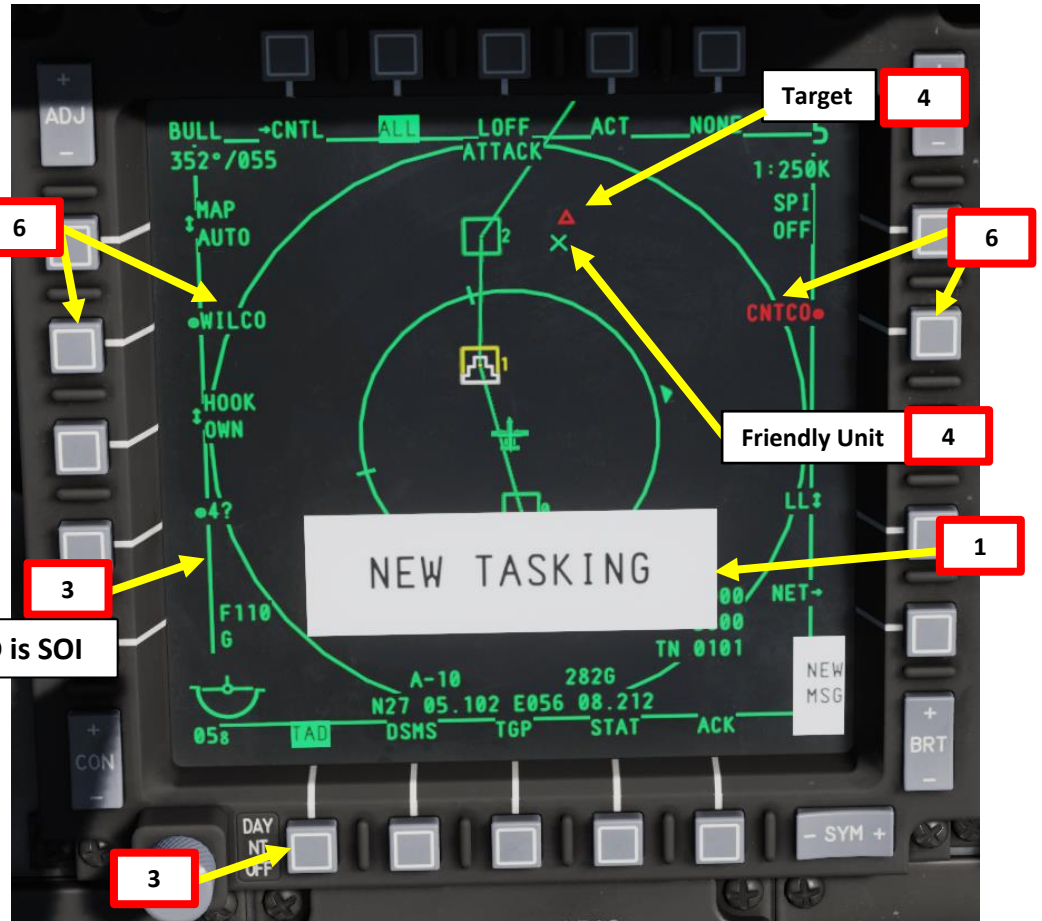
G - RECEIVING JTAC (Joint Terminal Attack Controller) TASKING

During the course of a mission, you may get mission tasking from a Joint Terminal Attack Controller (JTAC) or another SADL-equipped aircraft that will provide you tasking against a ground target.

1. When you receive a new tasking assignment, a NEW TASKING message will appear on both MFCDs regardless of the current page.
2. To remove the message, press TMS (Target Management System) Switch LEFT SHORT.
3. Select TAD (Tactical Awareness Display) Page and make it SOI (Sensor of Interest) with the Coolie Hat Switch LONG in the direction of the MFCD that displays your TAD
4. A red triangle will be on the TAD at the location of the target. A green X will represent friendly units on the ground.
5. A new tasking from the JTAC will be in the form of a digital 9-line briefing. You can consult it in the MSG page.
6. If you accept the tasking, press OSB (Option Select Button) next to WILCO (Will Comply). If you do not accept the tasking, press OSB next to CNTCO (Cannot Comply) to decline.

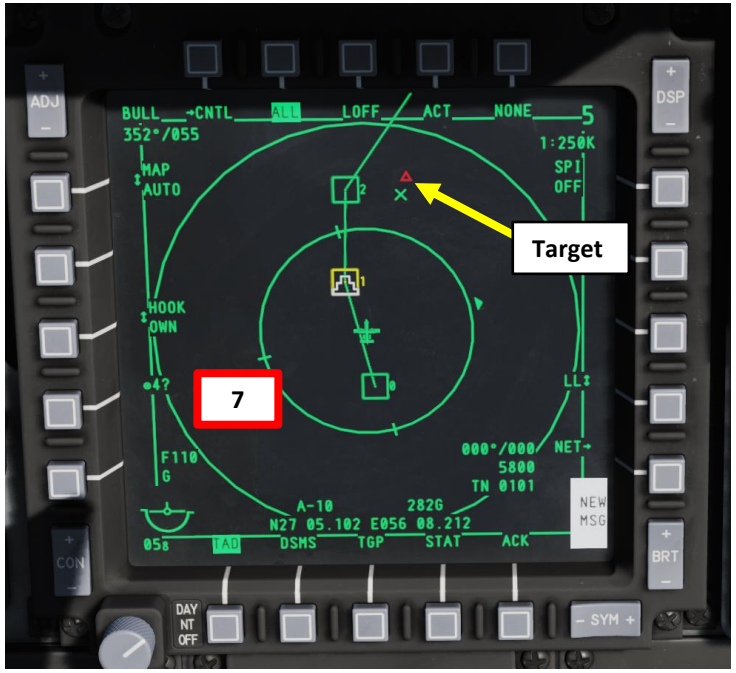


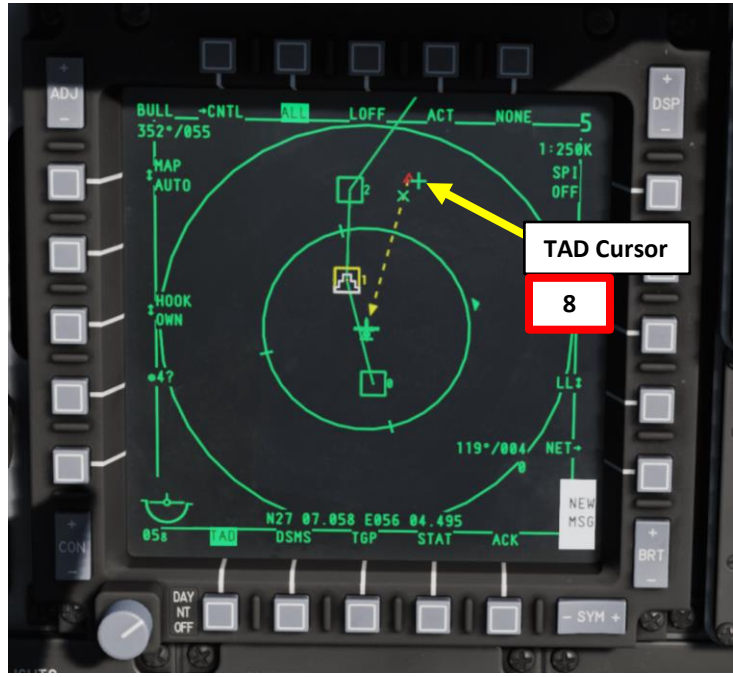




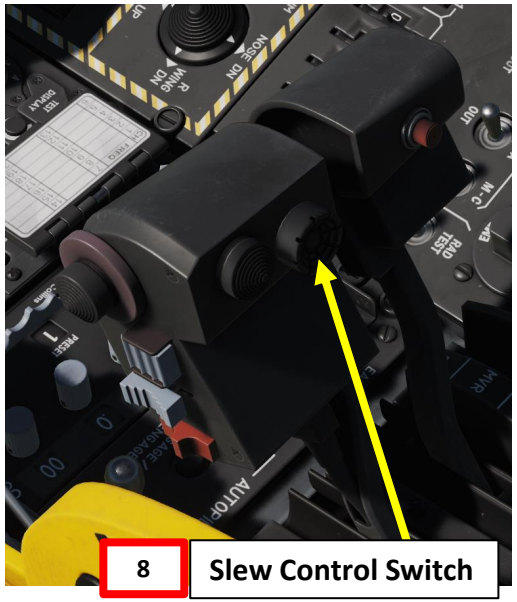
G - RECEIVING JTAC (Joint Terminal Attack Controller) TASKING

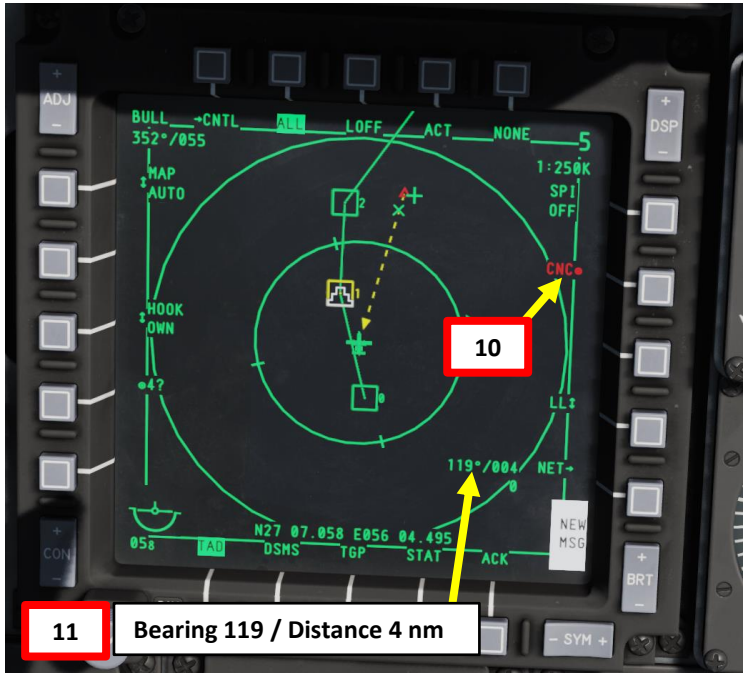
7. Because the target (red triangle) is a TAD object, it can be hooked and be made your SPI (Sensor Point of Interest).
8. Slew the TAD cursor on the target symbol (red triangle) using the Slew Control Switch
9. Hook the target symbol by pressing TMS (Target Management System) Switch FWD SHORT.
10. Once target is hooked, a “CNC” (Cancel) option will be available
11. Bearing and distance (nm) to the SPI are displayed on the TAD.
12. Press the TMS (Target Management System) Switch FWD LONG to set the TAD hooked target as the Sensor Point of Interest (SPI). A SPI symbol will appear.

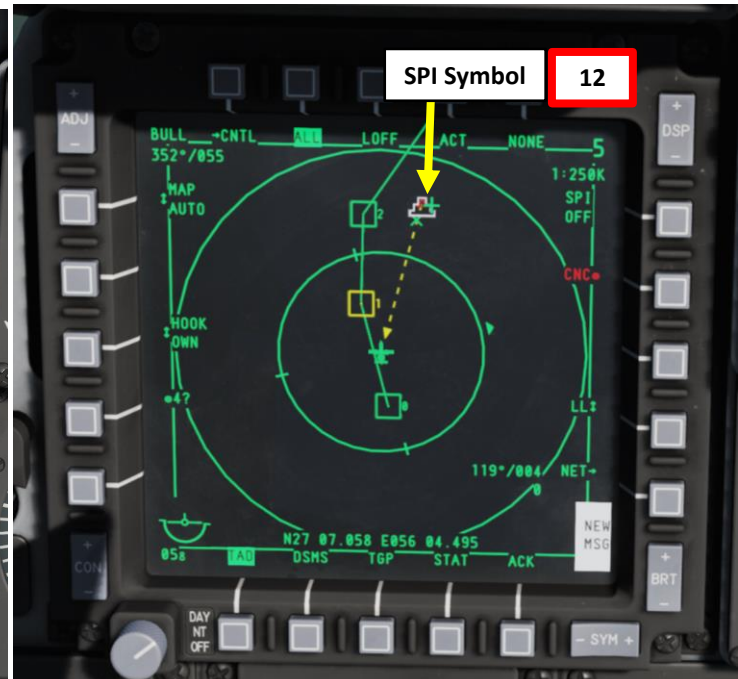




TMS (Target Management System) Switch

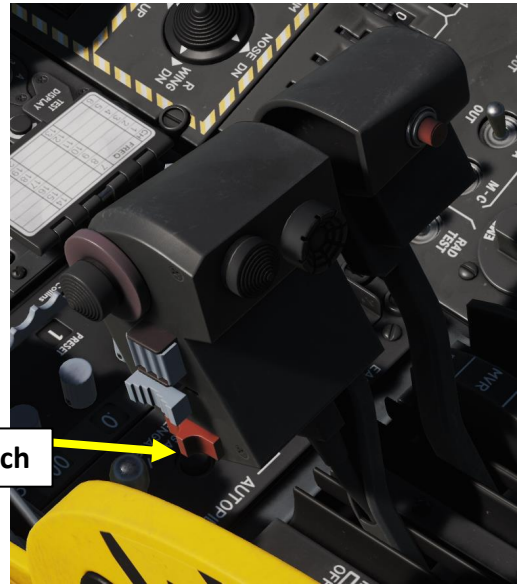


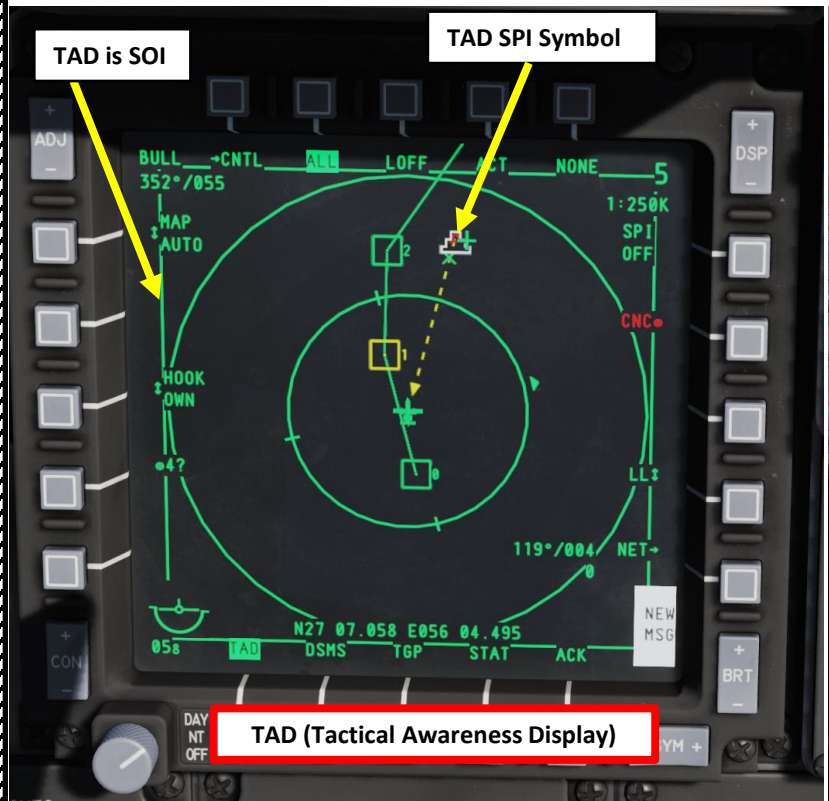


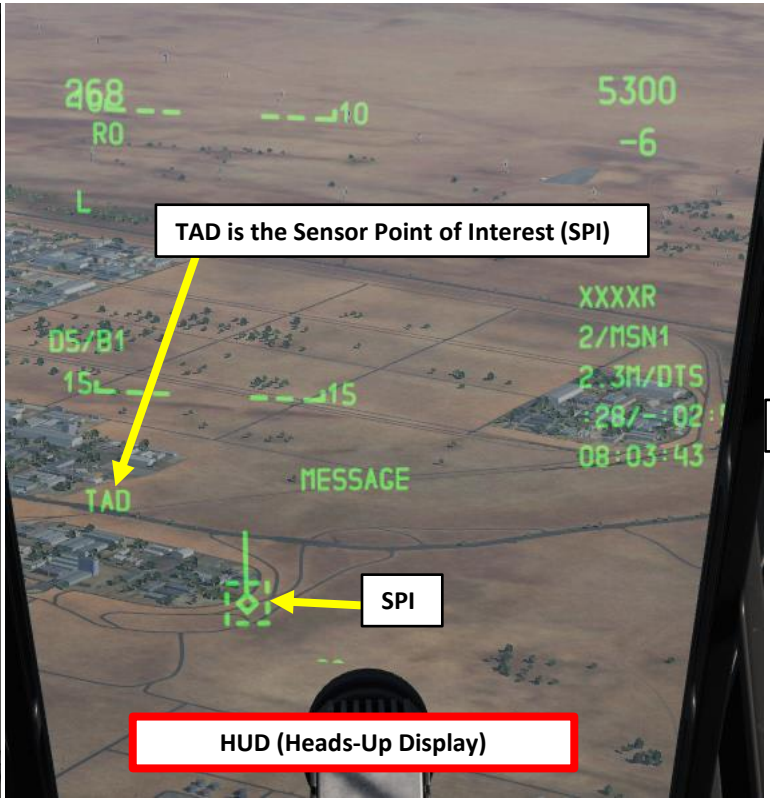


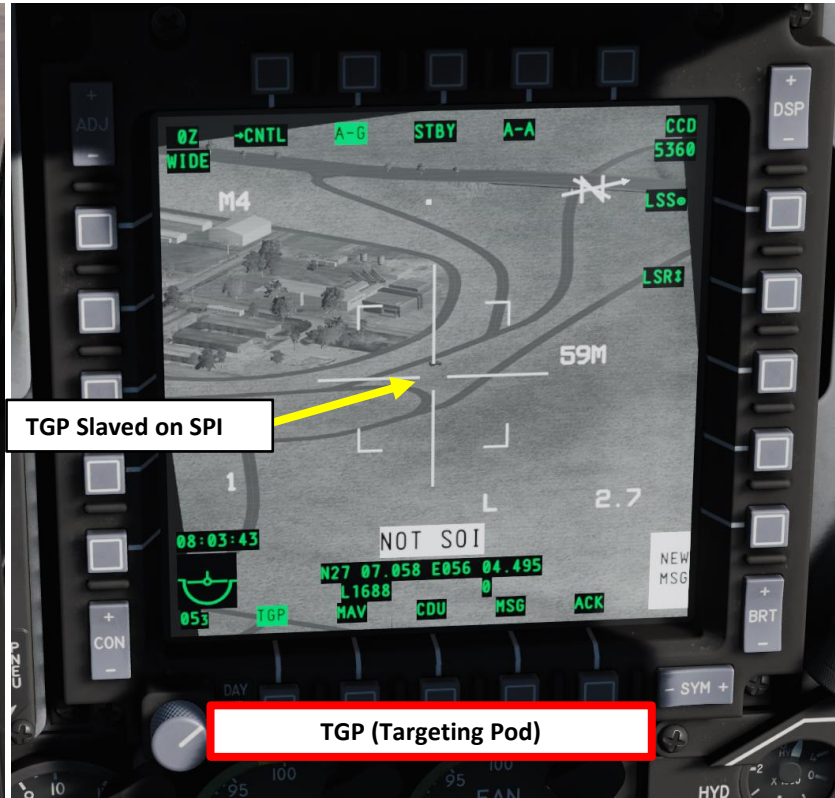
G - RECEIVING JTAC (Joint Terminal Attack Controller) TASKING

13. Once TAD SPI (Tactical Awareness Display Sensor Point of Interest) is designated, press the China Hat Switch FWD LONG to slave all sensors to this new SPI.
14. HUD (Heads-Up Display), TGP (Targeting Pod) and MAV (Maverick Missile) sensors will all lock on the SPI.
15. You can then use weapons as desired.









RADIO SYSTEM OVERVIEW

You have three main radios on your left console.

- The **AN/ARC-186(V) VHF AM # 1** radio set is used for air and ground units
  - frequencies between 116.00 and 151.975 MHz
- The **AN/ARC-186(V) VHF FM #2** radio set is used for communications with JTAC units
  - frequencies between 30.000 and 76.000 MHz
- The **AN/ARC-164 UHF** radio set is used for wingmen, support flights, air traffic controllers
  - frequencies between 225.000 and 399.975 MHz
- The Intercom Panel allows you to choose which radio set you communicate on.

Advanced radio tutorial:
http://en.wiki.eagle.ru/w/images/e/e4/DCS_A-10C_Warthog_Radio_Tutorial.pdf

Intercom Control Panel

- Mic switch forward: VHF AM radio
- Mic switch aft: VHF FM radio
- Mic switch up: No function
- Mic switch down: UHF radio

Figure 120. Intercom Control Panel

AN/ARC-164 UHF Radio Control Panel

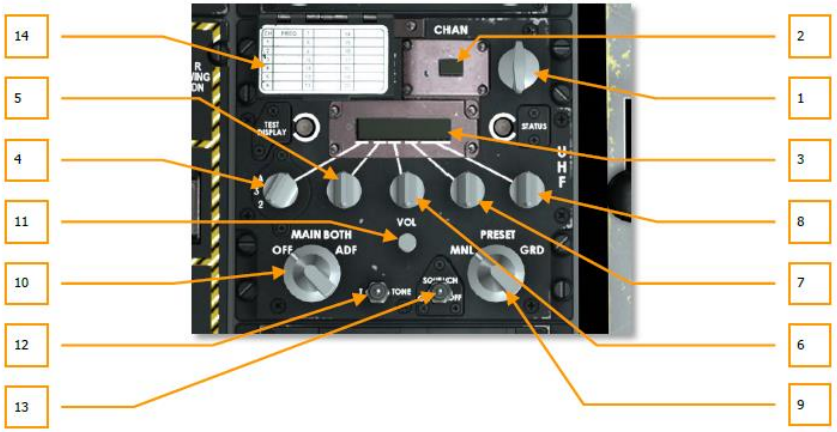


Figure 111. ARC-164 Radio Head

AN/ARC-186(V) VHF AM Radio 1 Control Panel

Figure 110. ARC-186 Radio Head

AN/ARC-186(V) VHF FM Radio 2 Control Panel

Figure 113. ARC-186 Radio Head

RADIO SYSTEM OVERVIEW

A-10C II Tank Killer Expansion Only

ARC-210 V/UHF Radio Panel – Not Yet Available

INTERCOM CONTROL PANEL

The Intercom system panel is a single interface between you and the various navigation and radio systems in regards to their audio input/output. While each of these navigation and radio systems has their own audio (volume) controls, the Intercom panel overrides their settings. Additionally, the Intercom panel can control the volume level of tones associated with LASTE such as pull up, altitude, etc.

It also allows communication with ground crew (needed for arming and refueling your aircraft).

Audio Control Switches

- ***INT****: Intercom Audio Power (communication with ground crew)*
- ***FM****: VHF/FM Receiver Audio Power*
- ***UHF****: UHF Receiver Audio Power*
- ***VHF****: VHF/AM Receiver Audio Power*
- ***AIM****: AIM-9 Sidewinder Seeker Tone Audio Power*
- ***IFF****: Interrogation Tone Audio Power*
- ***ILS****: Instrument Landing System Localizer/Marker Beacon Tone Audio Power*
- ***TCN****: TACAN Tone Audio Power*

HM (Hot Microphone) Switch

Intercom Volume Control

INTERCOM Selector Switch
Selects which radio your microphone is speaking to

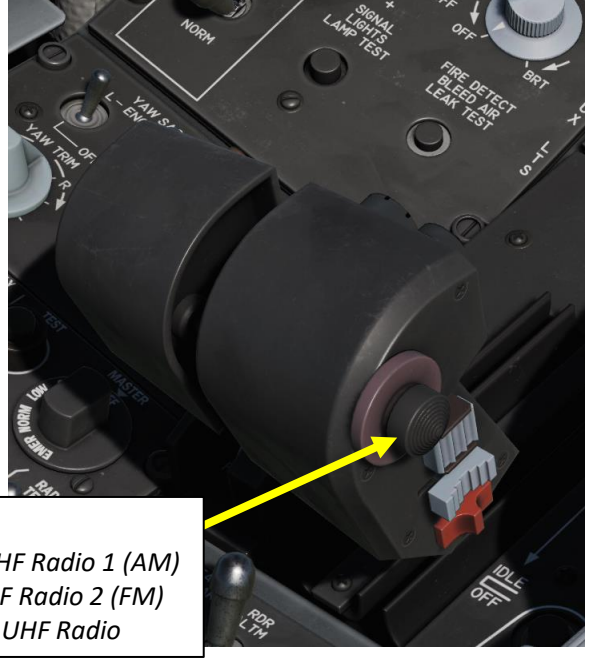
INTERCOM Call Button

AN/ARC-186(V) VHF AM TUTORIAL

The VHF/AM (Radio 1) transmits and receives between 116.00 and 151.975 MHz. There are also 20 preset channels available.

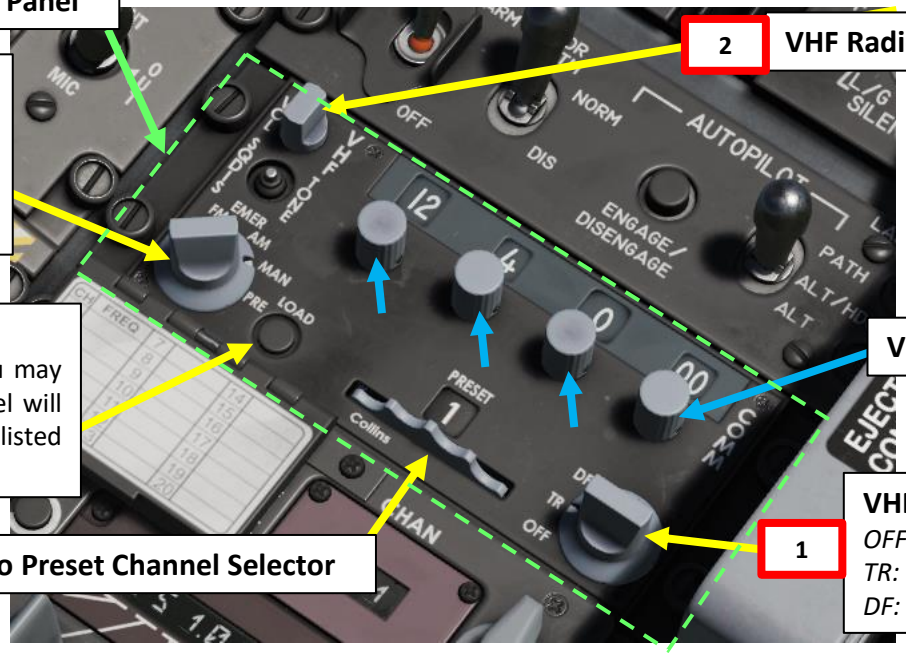
To use the VHF AM Radio:

1. Set Radio Frequency Mode to TR (Transmit-Receive)
2. Adjust Radio Volume as required.
3. Set Radio Function Selector to either MAN (Manual Frequency) or PRE (Preset Channel), as desired. We will choose a manual frequency.
4. Set Manual frequency using the Frequency Dials, or the Preset Channel using the Preset Channel Selector.
5. Transmit using the Microphone Switch FWD .



Microphone Switch — 5
- *FWD: Transmits on VHF Radio 1 (AM)*
- *AFT: Transmits on VHF Radio 2 (FM)*
- *DOWN: Transmits on UHF Radio*

AN/ARC-186(V) VHF AM Radio #1 Control Panel



VHF AM Radio Function Selector — 3
EMER FM: Emergency FM Guard Frequency
EMER AM: Emergency AM Guard Frequency
MAN: Manual Frequency
PRE: Preset Channel

VHF Radio Volume Control Knob — 2

LOAD Button
After a frequency has been manually entered, you may press the LOAD button and that frequency channel will be saved to the currently displayed preset channel listed in the Preset Indicator Window.

VHF Radio Frequency Dials — 4

VHF Radio Preset Channel Selector

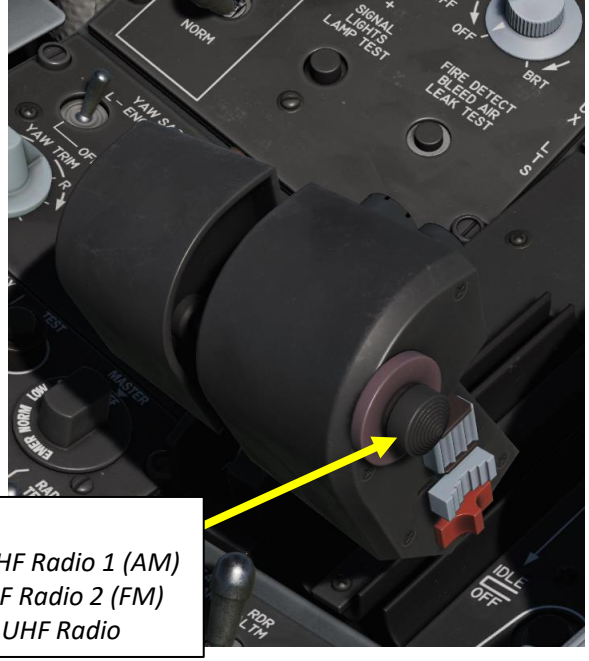
VHF Radio Frequency Mode Selector — 1
OFF
TR: Transmit-Receive
DF: VHF Direction Finder

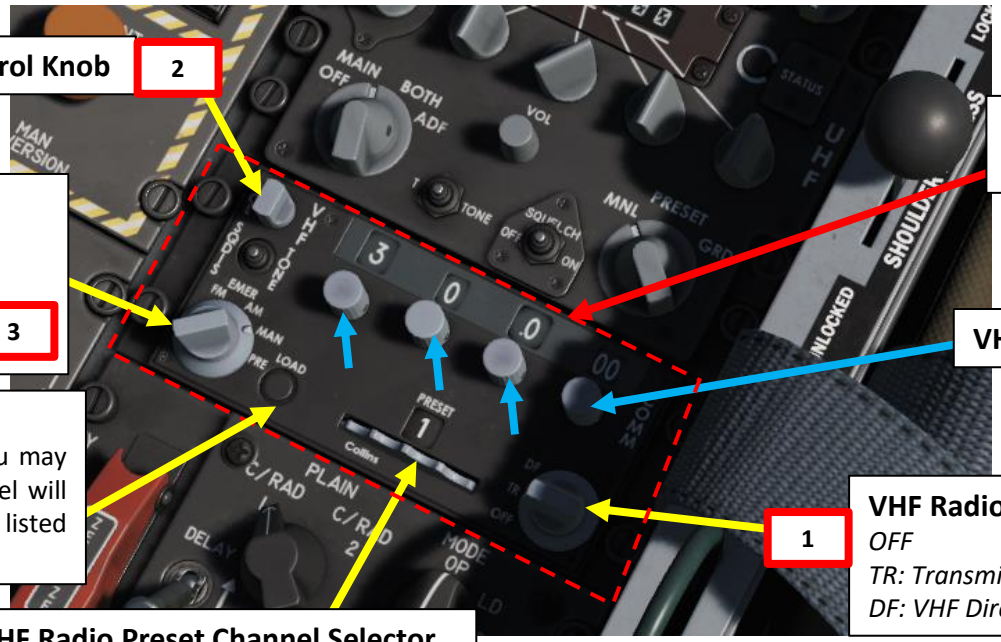
AN/ARC-186(V) VHF FM TUTORIAL

The VHF/FM operates between 30.000 and 76.000 MHz. In most missions, Radio 2 will be used to communicate with JTAC units. There are also 20 preset channels available.

To use the VHF FM Radio:

1. Set Radio Frequency Mode to TR (Transmit-Receive)
2. Adjust Radio Volume as required.
3. Set Radio Function Selector to either MAN (Manual Frequency) or PRE (Preset Channel), as desired. We will choose a manual frequency.
4. Set Manual frequency using the Frequency Dials, or the Preset Channel using the Preset Channel Selector.
5. Transmit using the Microphone Switch AFT .



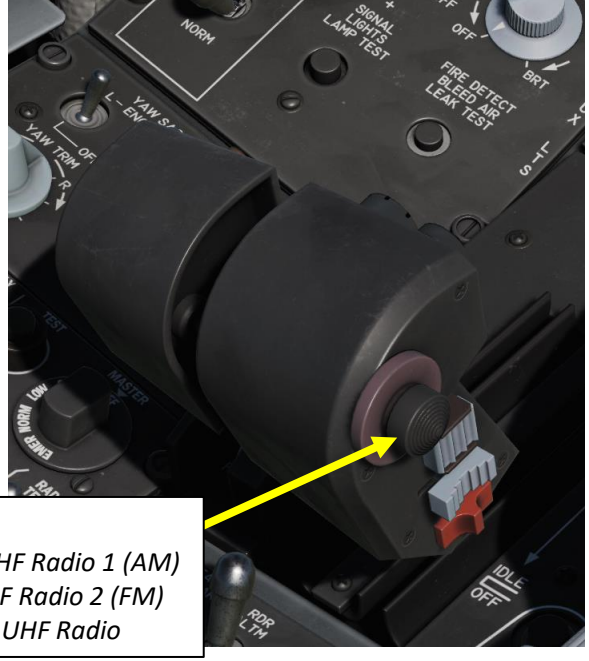


AN/ARC-164 UHF TUTORIAL

The UHF radio has 20 preset channels (PRESET) and the ability to manually enter a channel frequency (MNL). The frequency range runs from 225.000 to 399.975 MHz. During most missions, you will communicate with your flight using this radio.

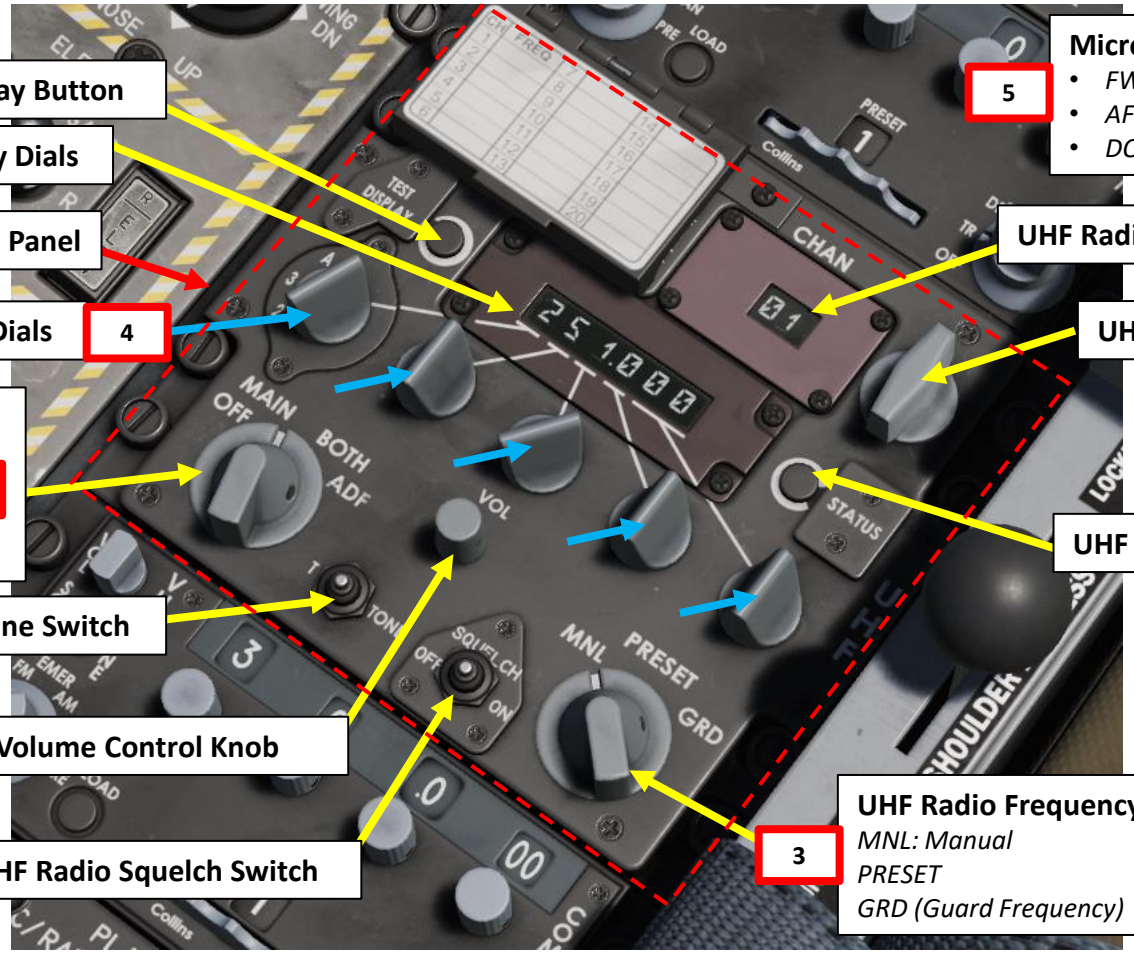
To use the UHF Radio:

1. Set Radio Function Selector to MAIN or BOTH.
2. Adjust Radio Volume as required.
3. Set Radio Frequency Mode Selector to either MNL (Manual Frequency) or PRESET (Preset Channel), as desired. We will choose a manual frequency.
4. Set Manual frequency using the Frequency Dials, or the Preset Channel using the Preset Channel Selector.
5. Transmit using the Microphone Switch DOWN .



Microphone Switch
- *FWD: Transmits on VHF Radio 1 (AM)*
- *AFT: Transmits on VHF Radio 2 (FM)*
- *DOWN: Transmits on UHF Radio*

5



UHF Radio Test Display Button

UHF Radio Manual Frequency Dials

AN/ARC-164 UHF Radio Control Panel

UHF Radio Manual Frequency Dials **4**

UHF Radio Function Selector
OFF
MAIN
BOTH
ADF: Automatic Direction Finder

1

UHF Radio Tone Switch

2 **UHF Radio Volume Control Knob**

UHF Radio Squelch Switch

UHF Radio Preset Channel Indicator

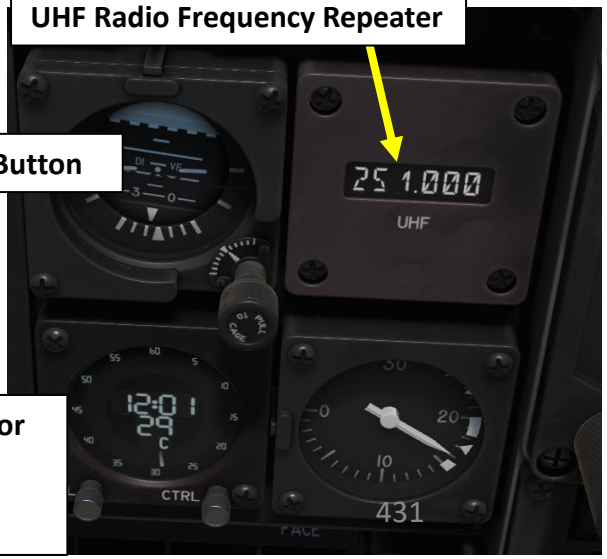
UHF Radio Preset Channel Selector

UHF Radio Frequency Repeater

UHF Radio Status Button

UHF Radio Frequency Mode Selector
MNL: Manual
PRESET
GRD (Guard Frequency)

3



AN/ARC-164 UHF TUTORIAL

LOAD PRESET Cover

Lifting this cover reveals an orange button labeled LOAD. To load a frequency to a preset channel, you simply:

1. *Dial in the frequency manually*
2. *Select the preset channel you wish to assign the frequency to*
3. *Press the LOAD button.*

AN/ARC-210 V/UHF TUTORIAL

A-10C II Tank Killer Expansion Only

ARC-210 V/UHF Radio Panel – Not Yet Available

AN/ARC-210 V/UHF TUTORIAL

A-10C II Tank Killer Expansion Only

ARC-210 V/UHF Radio Panel – Not Yet Available

AN/ARC-210 V/UHF TUTORIAL

A-10C II Tank Killer Expansion Only

ARC-210 V/UHF Radio Panel – Not Yet Available

RADIO FREQUENCIES – AIRFIELDS

LOCATION	FREQUENCY
Anapa	121.0
Batumi	131.0
Beslan	141.0
Gelendzhik	126.0
Gudauta	130.0
Kobuleti	133.0
Kutaisi	134.0
Krasnodar Center	122.0
Krasnodar Pashkovsky	128.0
Krymsk	124.0
Maykop	125.0
Mineral'nye Vody	135.0
Mozdok	137.0
Nalchik	136.0
Novorossiysk	123.0
Senaki	132.0
Sochi	127.0
Soganlug	139.0
Sukhumi	129.0
Tblisi	138.0
Vaziani	140.0

FLIGHT CONTROLS

Flight control in the A-10C is provided by a series of redundant pushrods and hydraulic systems that actuate the ailerons (roll), elevators (pitch) and rudders (yaw). Loss of a single hydraulic system will not disable control but the level of response will decrease depending on the control surface.

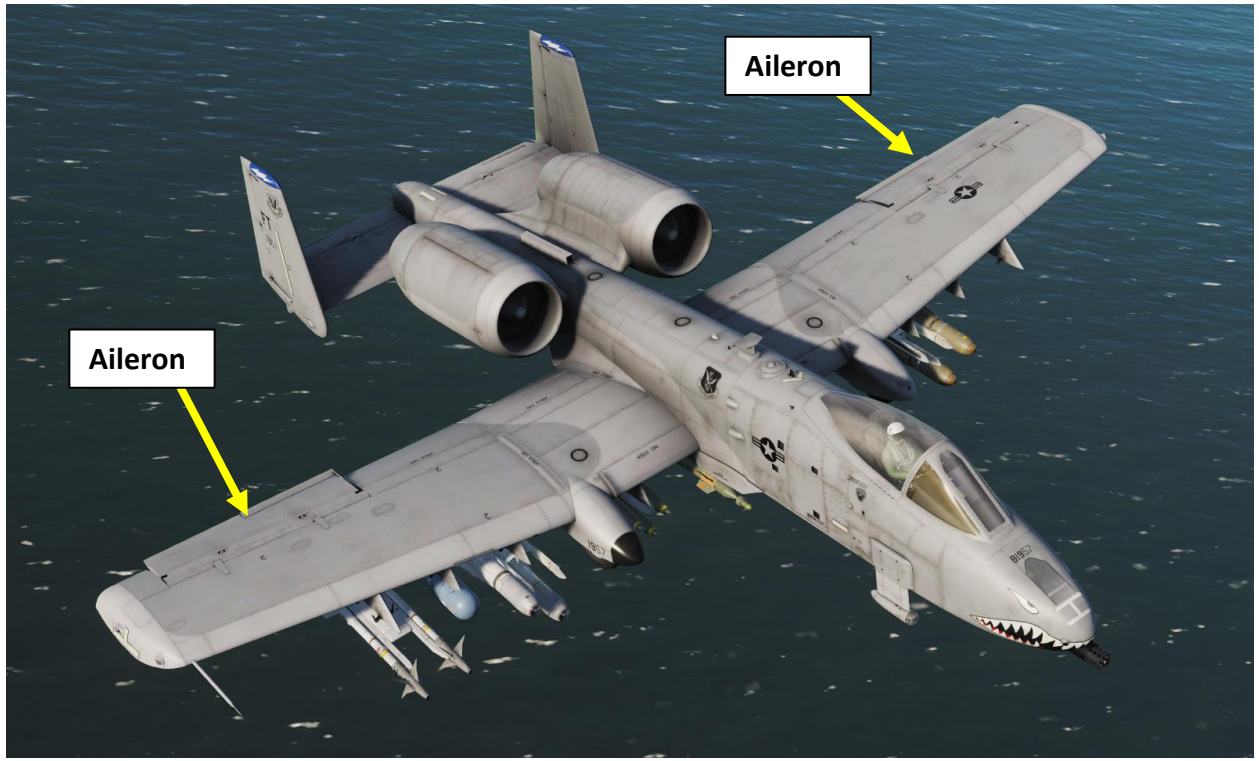
The primary elements of the **Flight Control Systems (FCS)** of the A-10 include the **Stability Augmentation System (SAS)**, the **Manual Reversion Flight Control System (MRFCS)**, and the **Enhanced Attitude Control System (EAC)**. In combination and according to the situation, the FCS determines how the pilot's control inputs are transferred to the aircraft.

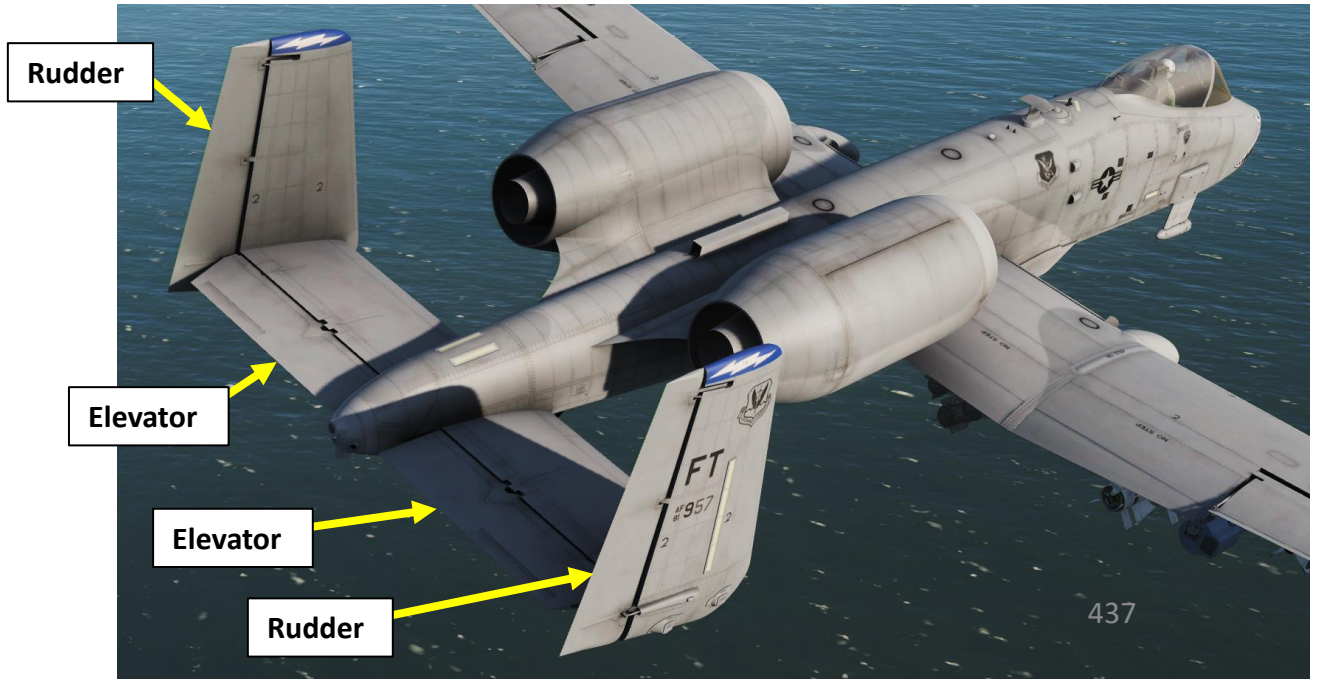
Pitch control is provided by two elevators at the tail of the plane. In addition to a direct link pushrod from the cockpit, the two connected elevators are both powered by hydraulic system actuators. As such, if you lose one of the hydraulic systems, the other system will handle the load of the other via a shareable, linking shaft. If one of the two elevators actuators becomes jammed, that linkage can be disabled and you can fly with the still operational elevator. Pitch trim is provided by electrically driven trim tabs on the ends of the elevators.

Roll control is provided by an aileron on each wing. As with the elevators, the ailerons are powered by both hydraulic systems to provide control redundancy. As a failure backup, the trim tabs can also be used to fly the aircraft in the Manual Reversion Flight Control System (MRFCS). Roll trim is provided by trim tabs on the trailing end of the ailerons.

Yaw control is provided by two rudders, both powered by the two hydraulic systems. The rudders are controlled in unison by a single cable to the actuators.

Take note that the A-10's FCS (Flight Control System) is not a fly-by-wire system and the pilot is much more in charge of what the aircraft is doing rather than being a voting member. As such, the A-10 is very much a seat-of-your-pants aircraft to fly and can be extremely responsive in the right hands.





SAS (STABILITY AUGMENTATION SYSTEM)

To help dampen and improve flying characteristics in pitch and yaw, the A-10C is equipped with the **Stability Augmentation System (SAS)**. SAS also provides you automatic turn coordination (adding the proper amount of rudder input when banking the aircraft). The SAS assists in making the A-10C a very stable gun platform.

Note: SAS relies upon hydraulic power, and the loss of hydraulics will result in the automatic disengagement of the SAS channels.

Pitch SAS

The SAS pitch channels allows the Integrated Flight and Fire Control Computer (IFFCC) to provide pitch control functions up to +5/-2 elevator trailing edge. The most noticeable effect of this is pipper tracking on a target through the HUD in the pitch axis.

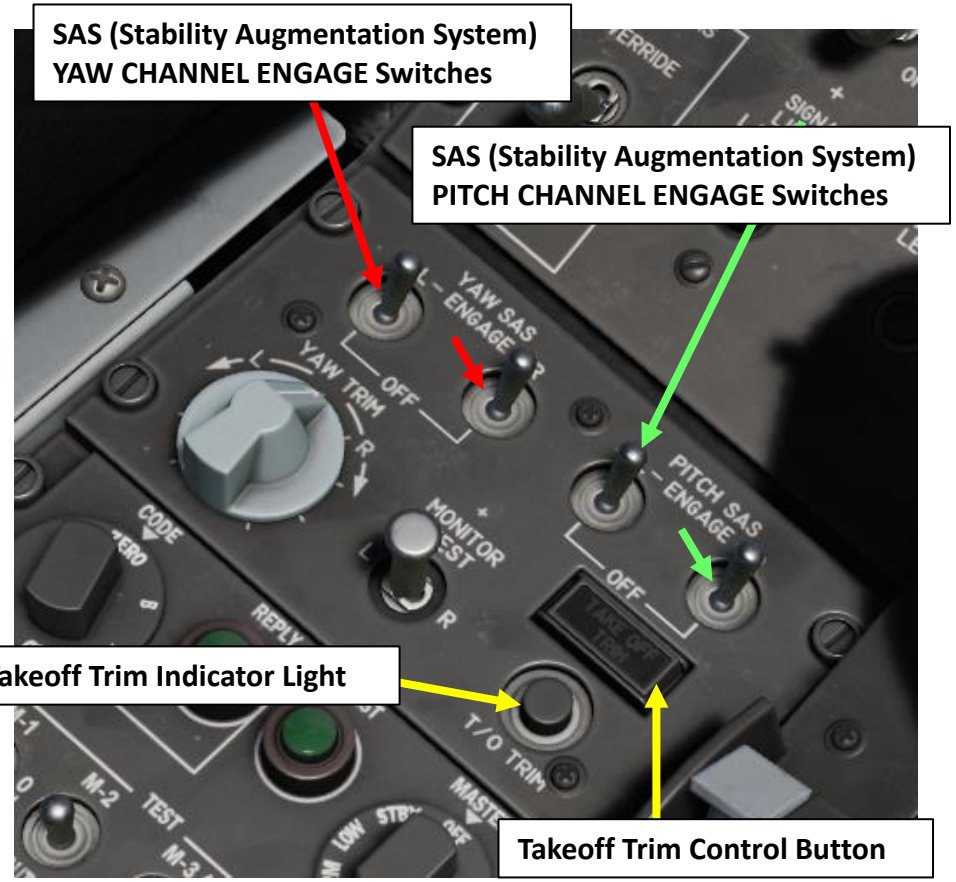
Yaw SAS

The SAS yaw channels have three main functions:

- ± 7-degrees of yaw rate dampening
- ± 7-degrees of rudder authority for turn coordination
- ± 10-degrees of rudder authority for yaw trim

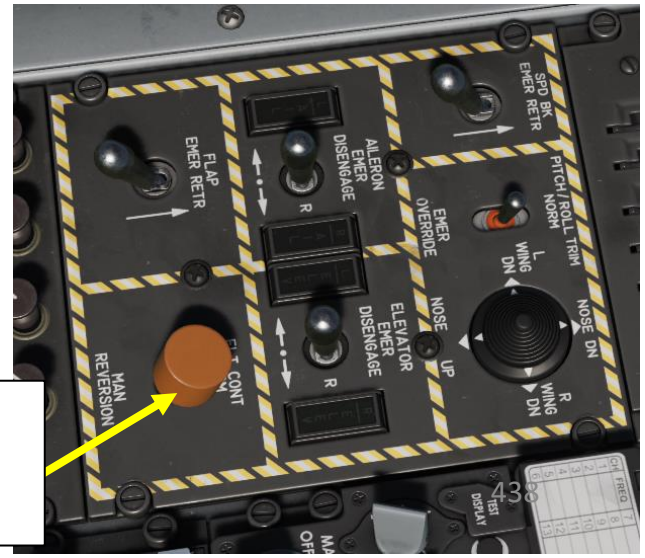
The SAS continuously compares the output of the two channels, and if there is an excessive difference, the system will automatically deactivate both channels of the axis. SAS can also be disconnected with the SAS disconnect button.

Note: For SAS operation, hydraulic power must be provided.



MRFCS (MANUAL REVERSION FLIGHT CONTROL SYSTEM)

The MRFCS is used for emergency situations when both hydraulics systems have failed or a complete failure is impending. Flight control is radically reduced and primarily relies on use of trim tabs to fly the aircraft. While sufficient for light maneuvering, it is not feasible to land with.



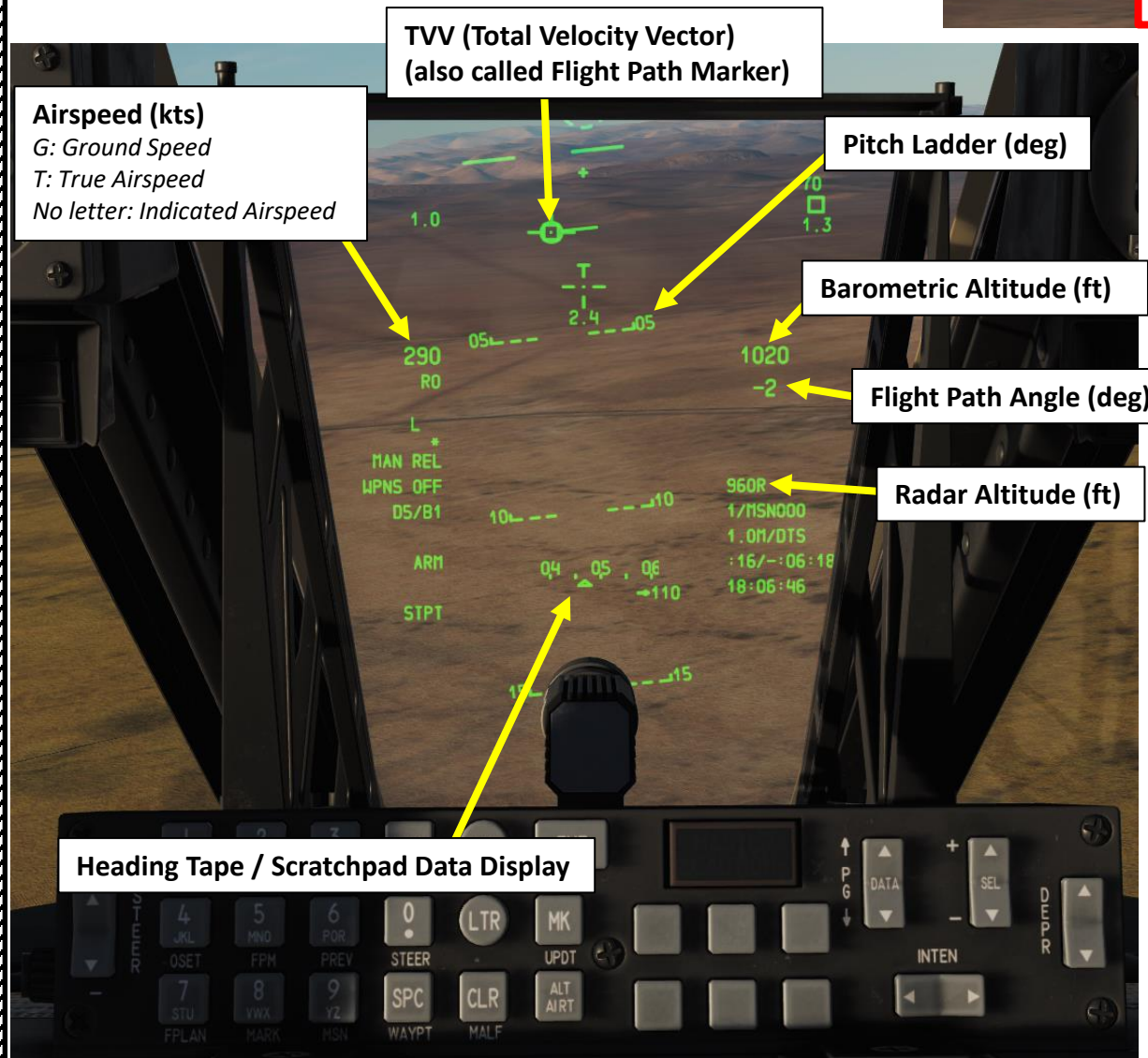
AIRCRAFT AERODYNAMIC & STRUCTURAL LIMITS

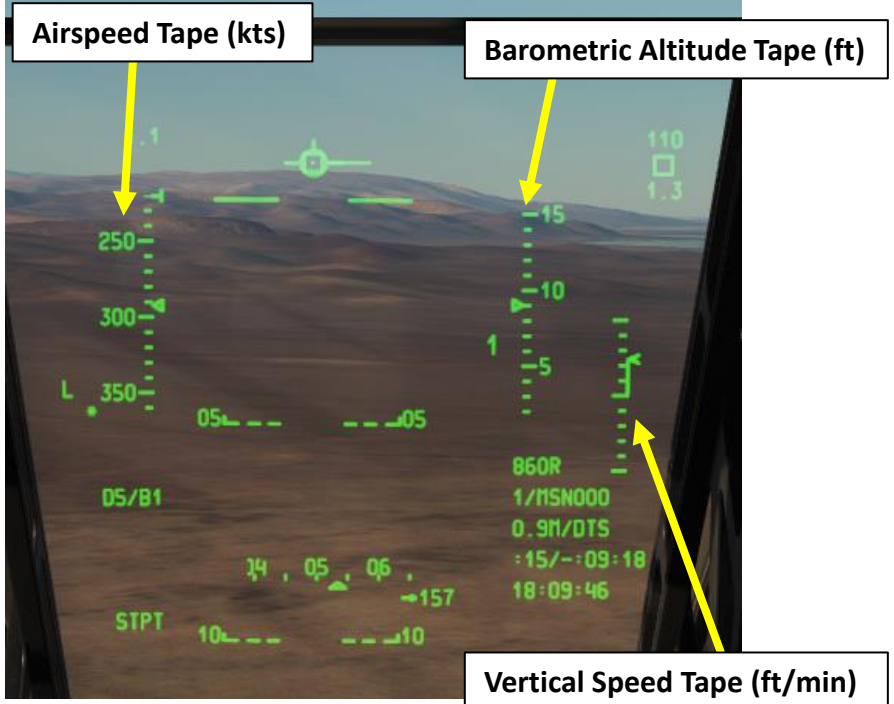
The A-10C has very gentle flight characteristics and is overall very easy to fly.

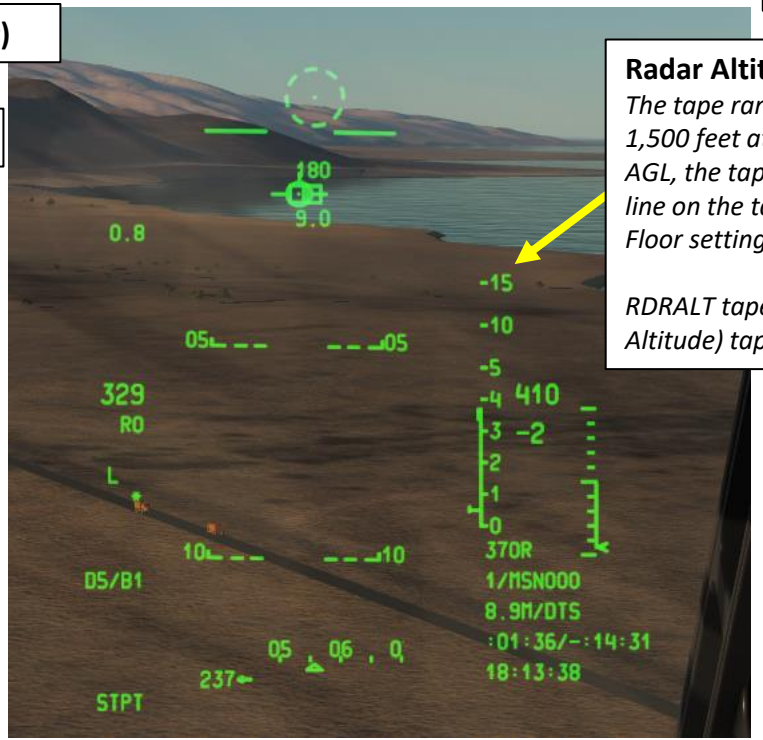
Aircraft Limits	
Stall Speed	120 kts
Maximum Not To Exceed (V_{NE}) Speed at Sea Level	450 kts
Cruise Speed	300 kts
Service Ceiling	45000 ft
Rate of Climb	6000 ft/min
Structural G Limit (300-450 kts) at Sea Level	+7.3 G -3.0 G
Combat Range	252 nm
Ferry Range	2240 nm
Negative G Limit:	If you fly at negative G for more than 10 seconds, you risk the engines shutting down due to lack of fuel supply.

HUD DISPLAY MODES

You can customize a number of parameters displayed on your Heads-Up Display. For instance, you can set airspeed tapes, metric/imperial units, a radar altitude tape, airspeed type like Indicated Airspeed (IAS), True Airspeed (TAS), Ground Speed (GS) or Indicated Airspeed/Mach (IAS/MACH).







Radar Altitude (RDRALT) Tape (ft)

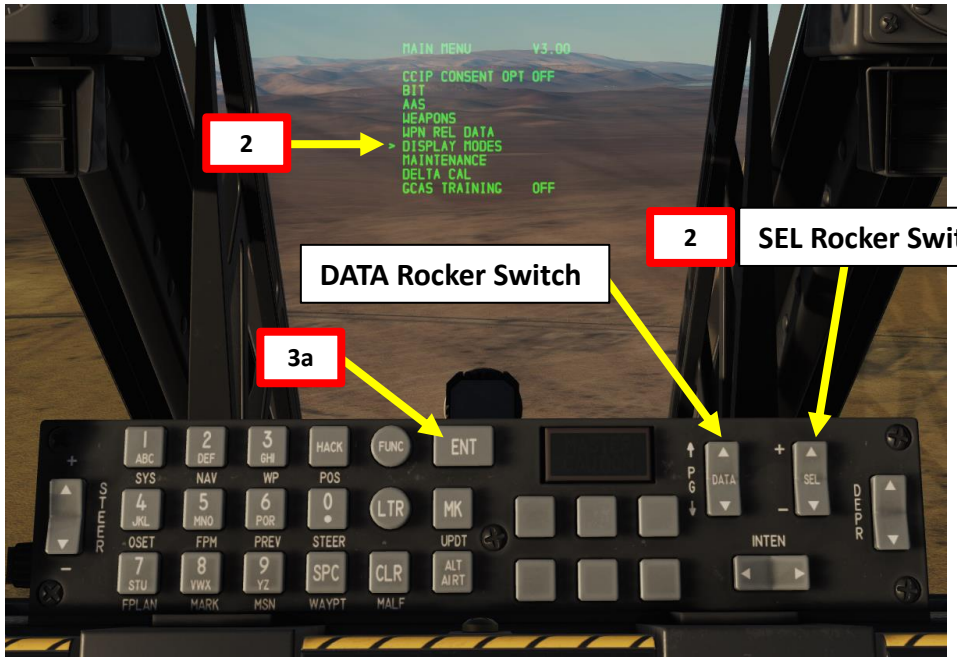
The tape ranges from 0 feet at the bottom to 1,500 feet at the top. When above 1,500 feet AGL, the tape is removed. The small horizontal line on the tape indicates the set Altitude Alert Floor setting.

RDRALT tape is only visible if TAPES (Airspeed & Altitude) tapes are not enabled.

HUD DISPLAY MODES

HUD Display Option Example:

1. Set IFFCC (Integrated Flight & Fire Control Computer) – TEST (middle position) by left clicking
2. Press SEL rocker switch to select DISPLAY MODES.
3. Press ENT button to enter menu.
4. Select the TAPES menu with the SEL rocker switch. Use DATA rocker switch to toggle Y (Yes) or N (No) to set Airspeed and Altitude tapes as desired.
5. Select the RDRALT TAPE menu with the SEL rocker switch. Use DATA rocker switch to toggle Y (Yes) or N (No) to set Radar Altitude tape as desired.
6. Select the AIRSPEED menu with the SEL rocker switch. Use DATA rocker switch to toggle between airspeed types (Indicated Airspeed (IAS), True Airspeed (TAS), Ground Speed (GS) or Indicated Airspeed/Mach (IAS/MACH)).
7. Select the VERT VEL menu with the SEL rocker switch. Use DATA rocker switch to toggle Y (Yes) or N (No) to set Vertical Velocity tape as desired.
8. Set IFFCC (Integrated Flight & Fire Control Computer) – ON (UP position) by right clicking



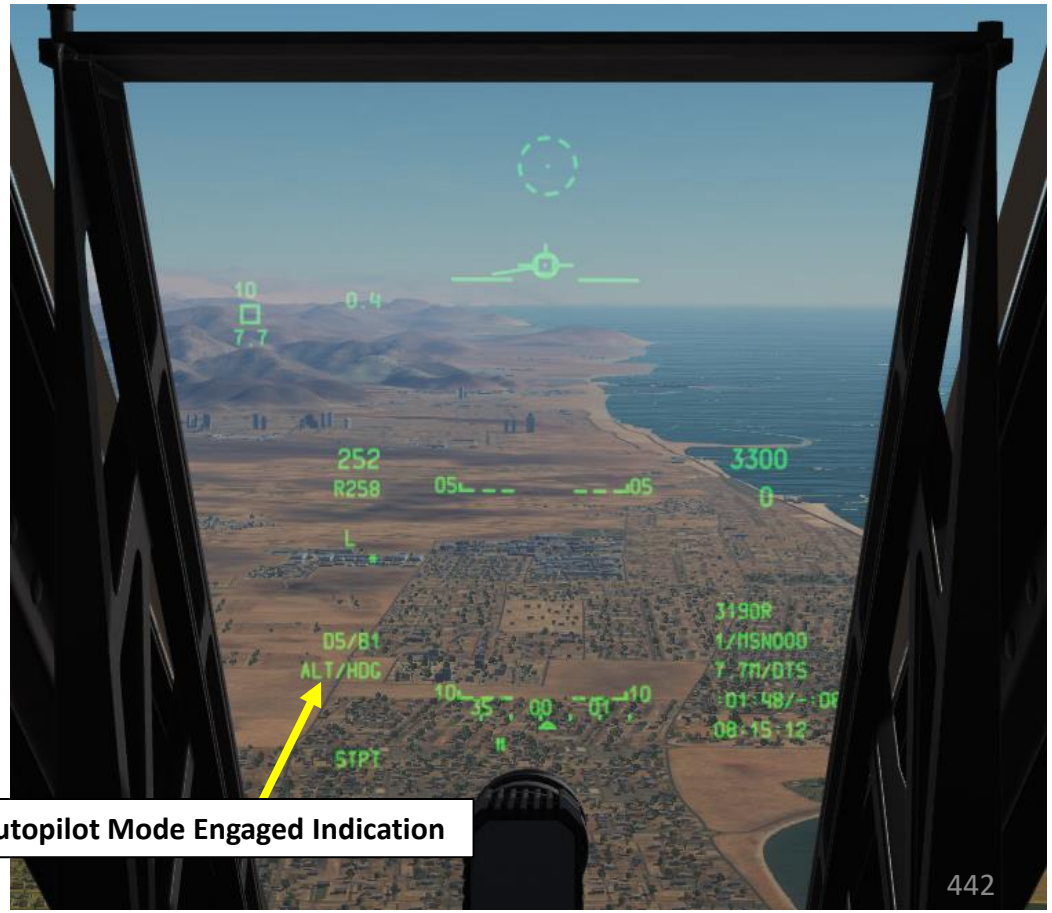
AUTOPILOT

The LAAP (Low Altitude Autopilot) has three main modes:

- **PATH** (top LAAP switch position):
  - This mode will attempt to keep the aircraft on its current flight path, represented by the total velocity vector symbol on the HUD. This mode will not engage with a bank angle greater than 10-degrees.
- **ALT/HDG** (middle LAAP switch position):
  - This mode will attempt to maintain the barometric altitude and heading of the aircraft when the mode was activated. This mode will not engage with a bank angle greater than 10-degrees.
- **ALT** (down LAAP switch position):
  - When this mode is engaged, the autopilot will attempt to maintain current bank angle and barometric altitude.

Low Altitude Autopilot (LAAP) Mode Selector Switch

- *PATH: Keep current flight path*
- *ALT/HDG: Keep current altitude + heading*
- *ALT: Keep current bank angle and altitude*



Autopilot Mode Engaged Indication

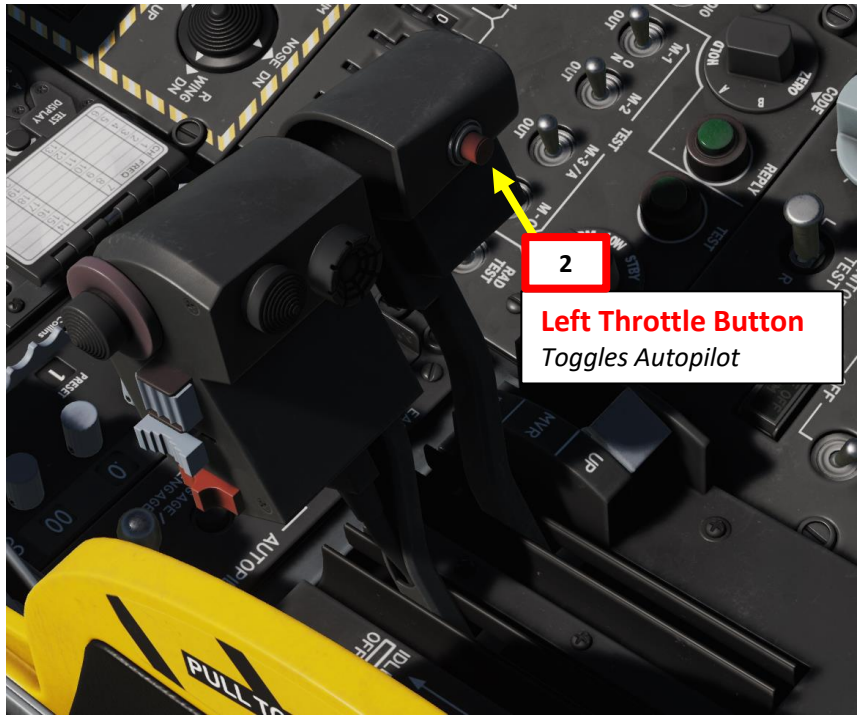
AUTOPILOT

To use the LAAP (Low Altitude Autopilot):

1. Select one of the three auto-pilot modes using the LAAP Mode Switch (PATH, ALT/HDG or ALT)
2. Engage autopilot by using either the Left Throttle Button or the Autopilot Engage/Disengage Button.
3. When engaged, Autopilot Mode is displayed on the HUD (Heads-Up Display).
4. If a control input is commanded while in autopilot, the active autopilot mode will automatically disengage and a “WARNING, AUTOPILOT” message will be heard. You can also disengage autopilot by pressing the Autopilot Engage/Disengage Button or Left Throttle Button.

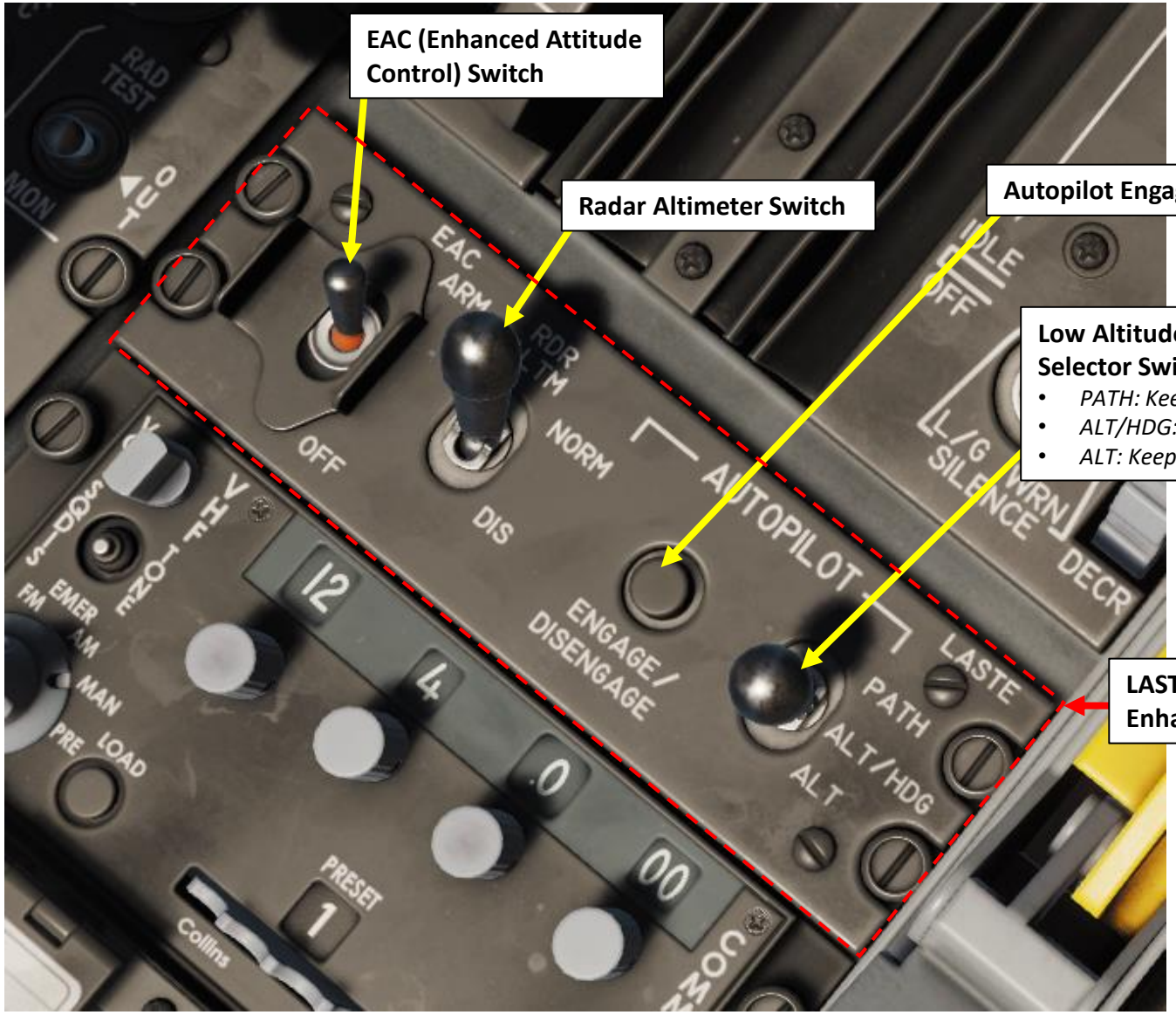
Be advised: autopilot will only engage if you are flying level (+/- 5 degrees).

The A-10C does not include a route autopilot system that automatically flies the aircraft to a steerpoint or along a loaded flight plan.



LASTE (LOW ALTITUDE SAFETY & TARGET ENHANCEMENT)

Introduced into later versions of the A-10A, the Low Altitude Safety and Targeting Enhancement (LASTE) system provides several advancements to the A-10A and later A-10C. Chief among them is the autopilot system, CCIP and CCRP bombing modes, air-to-air HUD mode, and the EAC (Enhanced Attitude Control).

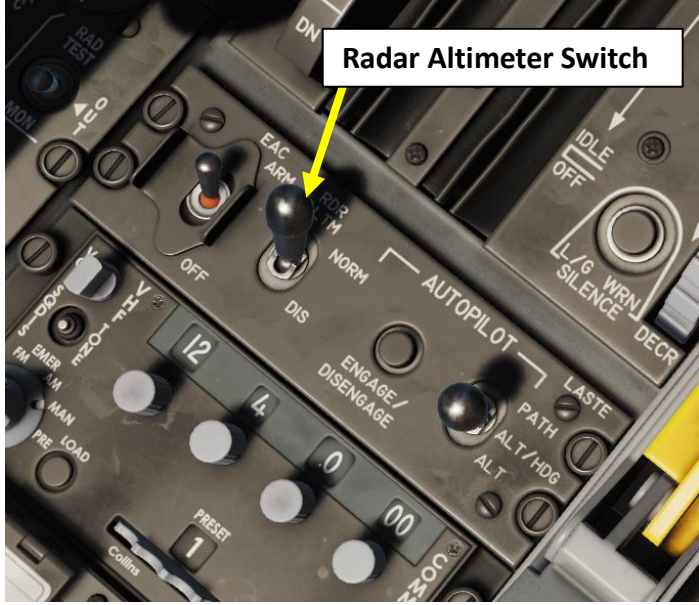


GCAS (GROUND COLLISION AVOIDANCE SYSTEM)

The GCAS (Ground Collision Avoidance System) provides you warning of a potential ground impact; however, it will not prevent the impact. GCAS uses a combination of inputs from the radar altimeter, INS and LASTE computer to judge such an event. A GCAS warning is indicated by a large, flashing break-X on the HUD and a “PULL UP, PULL UP” audio message.

GCAS can provide you with an “ALTITUDE, ALTITUDE” audio alert messages when the aircraft is below a preset mean sea level (MSL) altitude and above ground level (AGL) altitude. These altitudes are set on the Up Front Controller (UFC).

Note: If the RDR ALTM (Radar Altimeter) switch is in the NRM (normal) position, the radar altimeter is functioning and will provide data for GCAS functions. If the RDR ALTM switch is in the DIS (disable) position, the radar altimeter is disabled as well as GCAS functions.

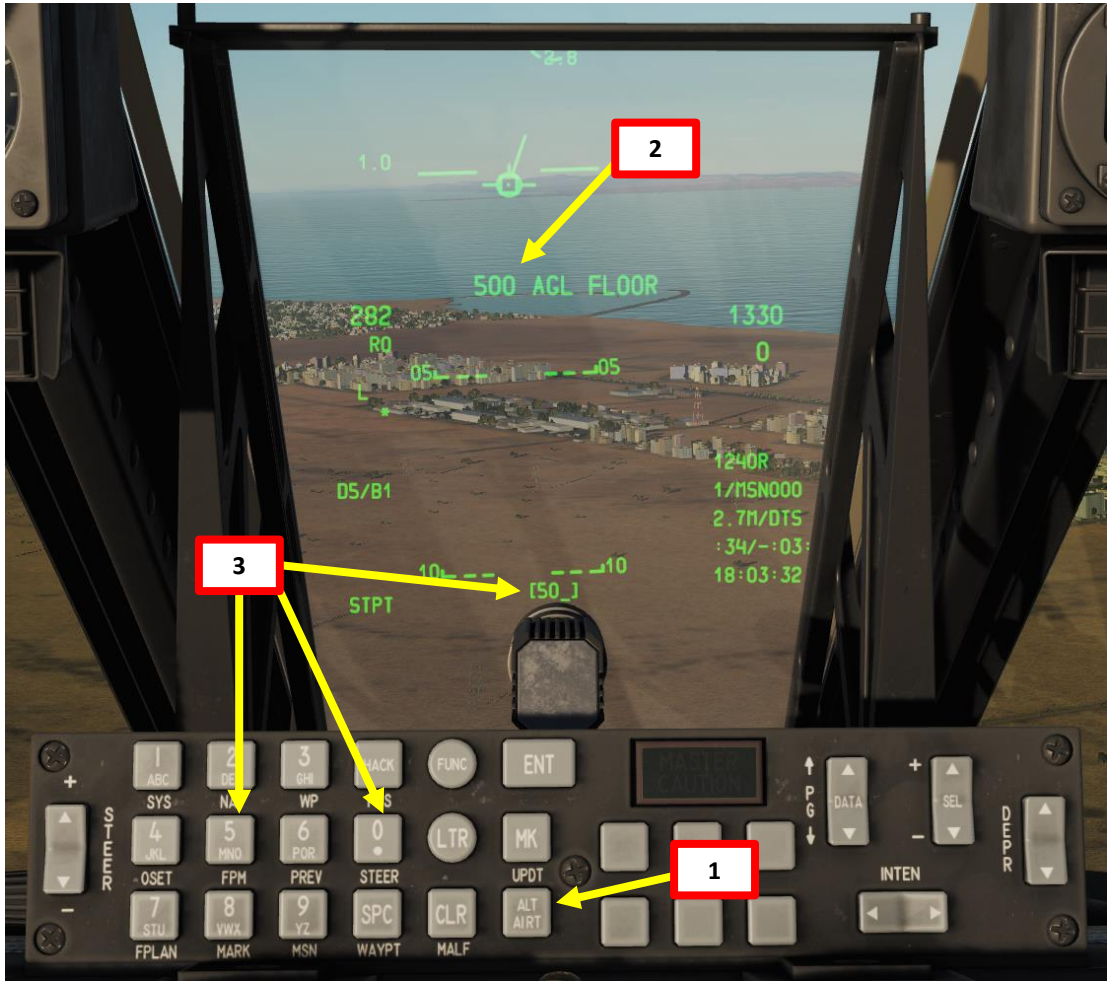


GCAS (GROUND COLLISION AVOIDANCE SYSTEM)

There are situations where you could want to fly low in order to avoid SAM sites or enemy air defenses. In this case, the GCAS could be very irritating. Luckily for us, it is possible to manually set the altitude at which the LOW ALTITUDE WARNING of the GCAS is triggered.

How to set Low Altitude Warning

1. Press on the ALT ALRT (Altitude Alert) button on the UFC (Up Front Control) Scratchpad.
2. The current Altitude Alert (i.e. 500 ft AGL, Above Ground Level) will be displayed.
3. On the UFC Scratchpad, enter the desired Low Altitude Warning threshold you want to use. We will use 50.
4. Press ENT to set new Altitude Alert setting.



EAC (ENHANCED ATTITUDE CONTROL) SYSTEM

The EAC (Enhanced Attitude Control) system was one part of the LASTE update to the A-10A that provides an autopilot capability. EAC uses sensor data from the Embedded GPS INS (EGI) navigation system, the Central Air Data Computer (CADC) and the SAS, and then provides input into elevator and yaw as part of the SAS.

The EAC system provides two major FCS functions:

- **Precision Attitude Control (PAC)**: In PAC 1, pressing the trigger (first gun trigger detent) in Gun master mode will trim the aircraft through SAS to keep the gun pipper on the target point. PAC 2 is activated when firing the gun (second gun trigger detent).
- **Low Altitude Autopilot (LAAP):** includes the autopilot modes of Altitude/Bank Hold, Altitude/Heading Hold, and Path Hold modes.

Combined, the FCS of the A-10C provides a good, stable weapons platform to accurately employ weapons from.

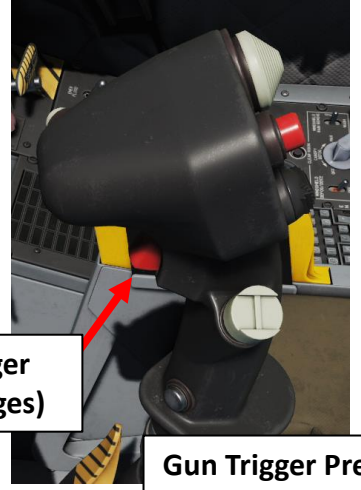
The **EAC switch** has two positions: OFF (down) and ARM (up).

- When in the ARM position, EAC is provided to LASTE.
- If in the OFF position, the EAC functions are disabled and the EAC caution light appears.

EAC (Enhanced Attitude Control) Switch

Low Altitude Autopilot (LAAP) Mode Selector Switch

- *PATH: Keep current flight path*
- *ALT/HDG: Keep current altitude + heading*
- *ALT: Keep current bank angle and altitude*

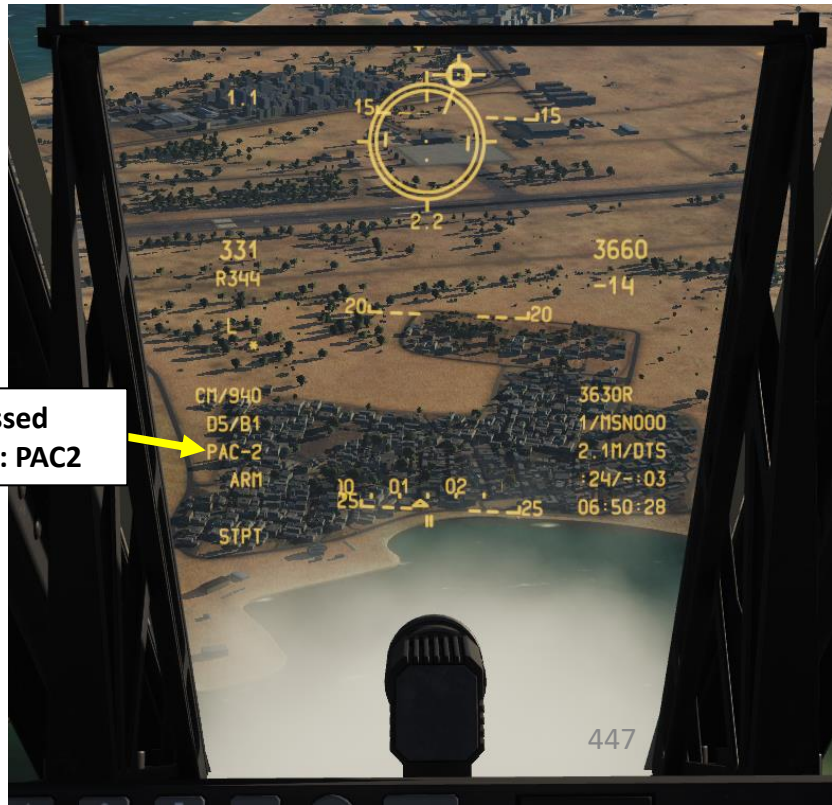


Gun Trigger (Two Stages)

Gun Trigger Pressed (First Detent): PAC1

GUN/PAC (Precision Attitude Correction) Arming Switch

- *ARM: Gun Armed, PAC enabled*
- *SAFE: Gun Not Armed, PAC disabled*
- *GUNARM, Gun Armed, PAC disabled*



Gun Trigger Pressed (Second Detent): PAC2

LASTE (LOW ALTITUDE SAFETY & TARGET ENHANCEMENT)
WIND PROFILE CORRECTION

Winds have an effect on bombs, which can be managed with the help of Wind Correction functionalities of the LASTE. This is a complicated subject and forum user Boris was kind enough to provide an in-depth explanation on how to use it.

Bunyap's Tutorial:
https://youtu.be/r5hCfUZZJhc

Boris' forum thread:
https://forums.eagle.ru/showthread.php?t=124711

LASTE Wind/Temp Profile Spreadsheet
https://docs.google.com/spreadsheets/d/1rTUQqJYqq3yHsXjxUMA6MVvxgfI8nudMf8Nw95V2Mqk/edit#gid=0

Thread Tools | Search this Thread | Rating: | Display Modes

05-19-2014, 01:34 PM #1

Boris
Senior Member

Join Date: Apr 2013
Location: Hamburg, Germany
Posts: 1,372

CDU Wind correction done right

Since there is no comprehensive, fault free guide on proper wind correction for dumb bombs, I have decided to write one up.

Previous guides and videos have shown incorrect wind directions and or speeds. Following these steps should lead to accurate CCIP bombing in complex winds. Where the pipper is pointing on release, that is where the bomb will go.
Hopefully this will also dispel the myth that wind correction is not functional.

First of all, it is important to understand how the mission editor and the engine handle wind.
Here are the wind settings I'm using for this particular guide:

As you can see, we have a 20°, 4m/s wind at 10m, a 310°, 6m/s wind at 2000m and a 270°, 8m/s wind at 8000m.
However, this is not all. As the game engine calculates for a natural drop in wind speed at very low altitude, it needs to upscale the wind speed above. We have already entered the wind speed for 10 meters, but the wind speed for most of the bottom layer of wind will be TWICE (2x) that entered in the ME.
So in fact, we will have a maximum wind speed of 8m/s from about 350 to 650m.

So layer by layer we actually have:

10m 020° 4m/s
500m 020° 8m/s
2000m 310° 6m/s
8000m 270° 8m/s

We now have our layers.

Next we have to convert these values into something the CDU can use. DO NOT plug these values straight into the CDU, as you will make any wind error even worse.
The mission editor displays in which direction the wind is blowing to. The CDU shows the direction from which the wind is coming, and it shows the magnetic, not the true bearing. So to convert these bearings we need to add 180 to any values below 180, and subtract 180 from any values above 180, to get the bearing on the opposite side of the compass rose. Then we need to subtract 7° to get the magnetic bearing.

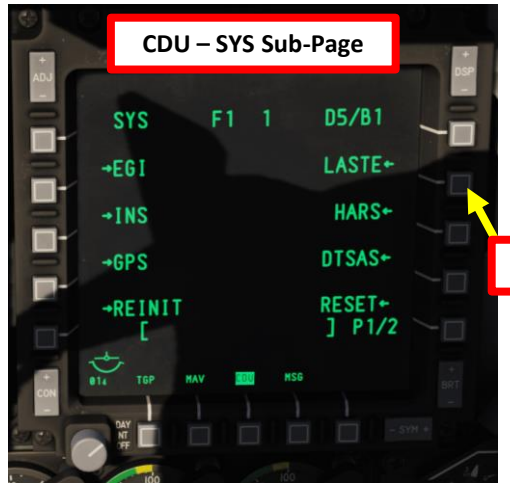
Eg. 020° + 180° = 200°
200° - 7° = 193°

We also need to convert all wind speeds from m/s to knots. This is easy, just multiply each value by 2.
So what we end up with for the CDU is:

10m 193° 08 knots
500m 193° 16 knots
2000m 123° 12 knots
8000m 083° 16 knots

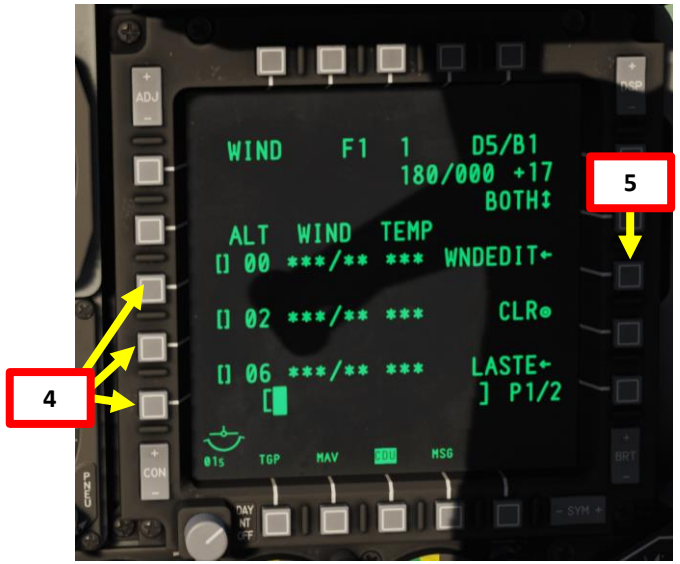
Now we need to enter this data into the CDU during flight.

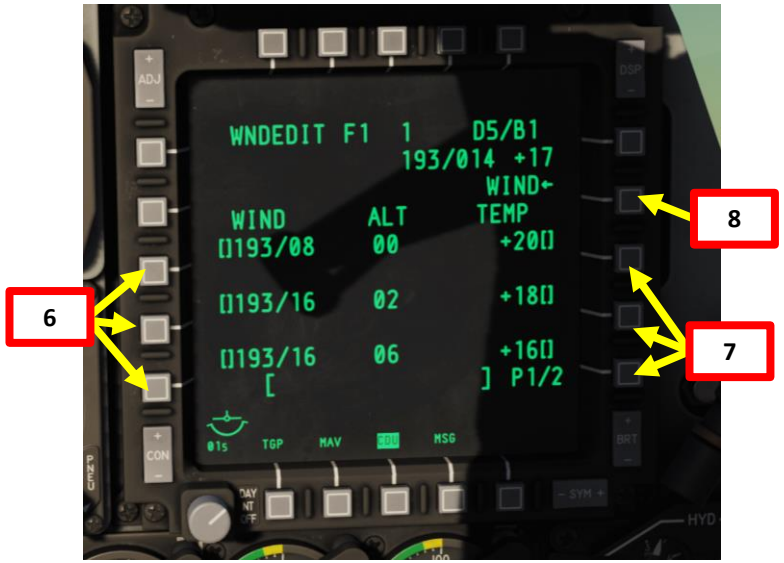
First enter the CDU System page by pressing SYS on the CDU or FUNC – 1 (SYS) on the UFC.
Then press OSB 7 to enter the LASTE menu.



LASTE (LOW ALTITUDE SAFETY & TARGET ENHANCEMENT)
WIND PROFILE CORRECTION

LASTE Wind/Temp Profile Spreadsheet
https://docs.google.com/spreadsheets/d/1rTUQqJYqq3yHsXjxUMA6MVvxgfI8nudMf8Nw95V2Mqk/edit#gid=0





LASTE CDU Wind Correction

File Edit View Insert Format Data Tools Add-ons Help

100% View only

Data ready for CDU Entry

	A	B	C	D	E
1	Insert data from mission briefing				
2	Altitude (m)	Speed (m/s)	Direction (to)	Temp (c)	MagVar
3	0	4	005	24	13
4	2000	6	353		Use -7 for Caucasus Theater
5	8000	8	331		
6					
7	Corrected data				
8	Altitude (ft)	Speed (kt)	Direction (raw)	Direction (from)	
9	0	8	198	198	
10	6560	12	186	186	
11	26240	16	164	164	
12					
13	Data ready for CDU Entry				
14	ALT	Wind		Temp (c)	
15	00	198	08	24	
16	01	198	16	22	
17	02	198	16	20	
18	07	186	12	10	
19	26	164	16	-28	
20					
21					
22					
23	Method based on explanation by Boris at the Eagle Dynamics Forum				

NAVIGATION SECTION STRUCTURE

- 1 – Navigation Introduction
- 2 – Navigation Mode Select Panel
- 3 – TAD (Tactical Awareness Display) & Moving Map Display
- 4 – HSI (Horizontal Situation Indicator)
- 5 – Navigation Point Types
- 6 – Waypoints
  - 6.1 – Waypoint Navigation
  - 6.2 – How to Add Waypoints
  - 6.3 – How to Edit Waypoints
  - 6.4 – Waypoint Offset
- 7 – Markpoints
  - 7.1 – Markpoint Navigation
  - 7.2 – How to Add Markpoints
  - 7.3 – Using Markpoints
- 8 – Flight Plans
  - 8.1 – Creating a Flight Plan
  - 8.2 – Using a Flight Plan
- 9 – Divert Function
- 10 – ADF (Automatic Direction Finder) Navigation
- 11 – TACAN Navigation
- 12 – Anchor Point/Bullseye
- 13 – ILS (Instrument Landing System) Tutorial

1 – NAVIGATION INTRODUCTION

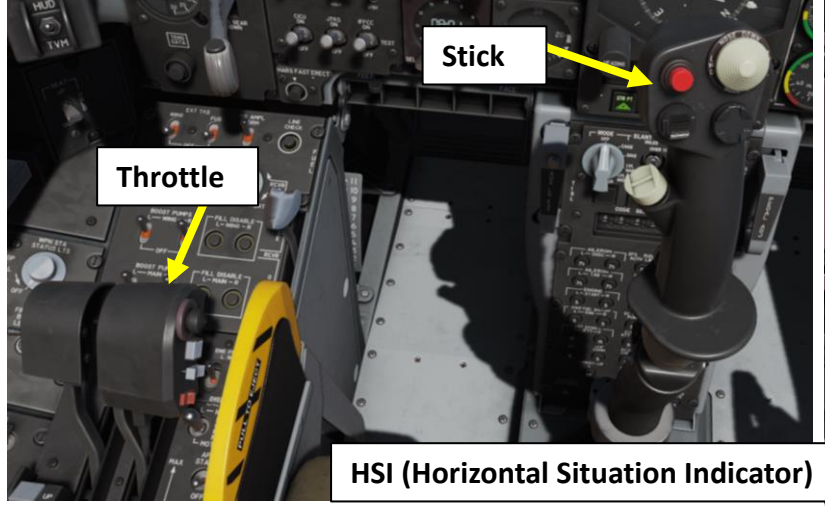
Navigation in the A-10C is mostly done through the TAD (Tactical Awareness Display), HSI (Horizontal Situation Indicator), HUD (Heads-Up Display) and ADI (Attitude Director Indicator) localizer & glide slope reference bars. The Standby Magnetic Compass can also be used as a backup. The A-10C uses a variety of navigation methods to direct you to mission locations. Depending on the mission or stage in the mission, you may use different navigation sources.

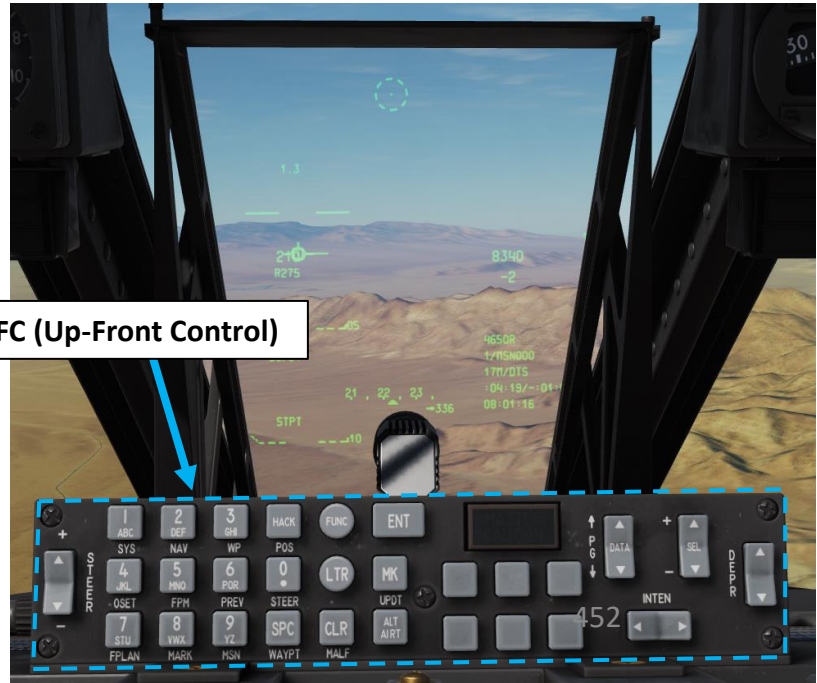
1 – NAVIGATION INTRODUCTION

CONTROL INTERFACES

Navigation systems can be controlled with four main interfaces:

- **CDU** (Control Display Unit) and **AAP** (Auxiliary Avionics Panel)
- **CDU** (Control Display Unit) **Page Repeater** and **UFC** (Up-Front Control) Scratchpad
- **NMSP** (Navigation Mode Select Panel)
- **HOTAS** (Hands-On-Throttle-and-Stick) Controls depending on the selected Sensor of Interest (SOI)

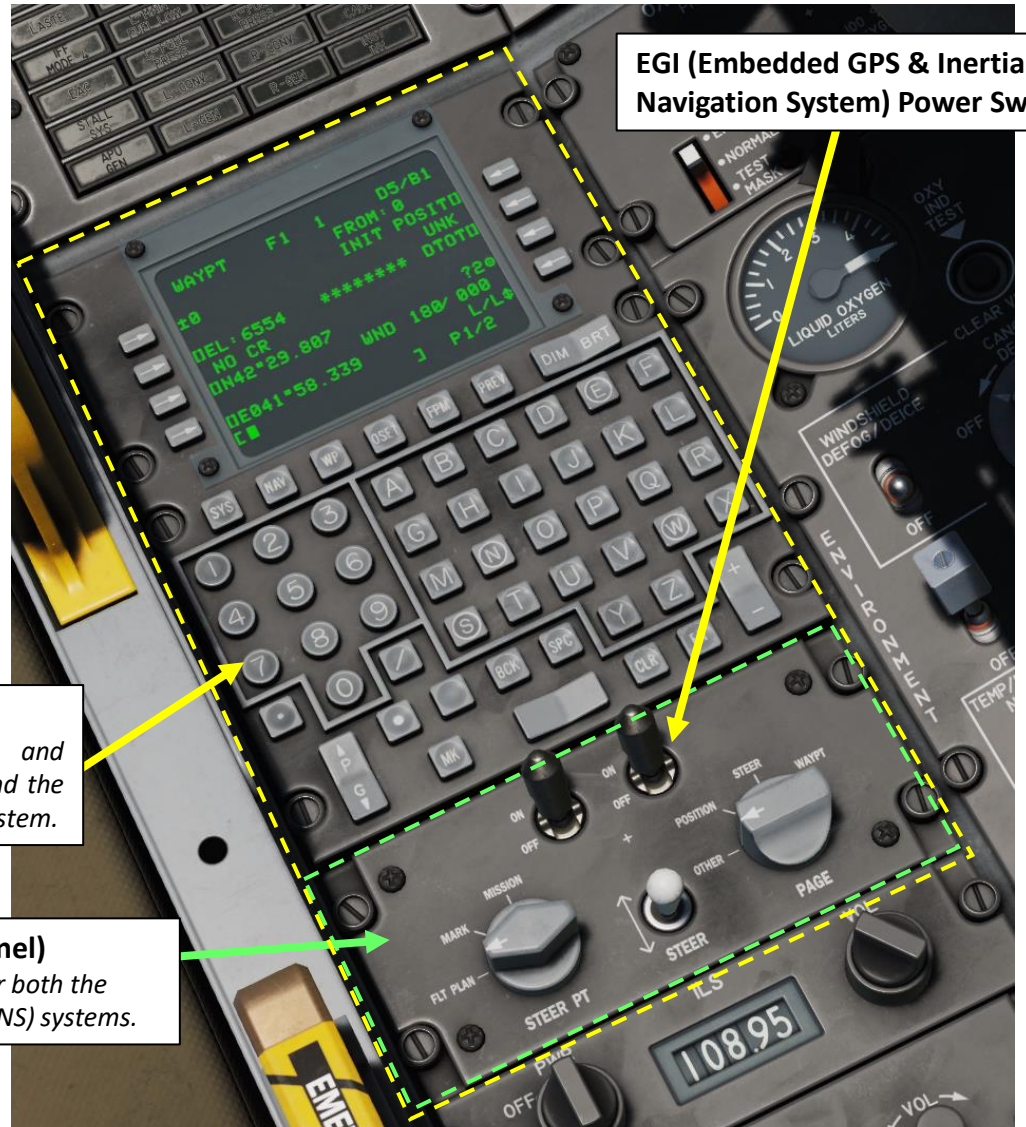




1 – NAVIGATION INTRODUCTION

EGI (EMBEDDED GPS & INERTIAL NAVIGATION SYSTEM)

The EGI is the primary navigation system of the A-10C and provides accurate attitude, navigation, and vertical and horizontal steering information. If EGI fails, HARS can be used as a backup. The Control Display Unit (CDU) is the primary interface device to the EGI, but can also be mirrored to an MFCD as the CDU Repeater Page.



1 – NAVIGATION INTRODUCTION

HARS (HEADING & ATTITUDE REFERENCE SYSTEM)

The Heading Attitude Reference System (HARS) is a gyro-platform navigation system that served as the initial, primary navigation system of the A-10A. As the A-10A evolved into later versions, EGI was added and HARS has become a back-up system to the Inertial Navigation System (INS) when the EGI is inoperative.

When the INS of the EGI is not available, HARS is selected automatically on the Navigation Mode Select Panel. You can also select it manually when EGI is working, but there would be no good reason to do so. As a backup system, HARS can provide good heading and attitude information, but it can become inaccurate with hard maneuvering or if taken out of Slave to compass mode. It also cannot provide a TVV (Total Velocity Vector) on the HUD.

HARS (Heading & Attitude Reference System) Mode Switch
- ***SLAVED****: SLAVE mode, also called gyro-magnetic mode, allows the HARS gyro to be fed by the compass signal.*
- ***DG****: Directional gyro mode. If Slave mode fails, the DG (Directional Gyro) mode acts as a backup. In DG mode the Gyro is uncoupled from the compass and works autonomously.*

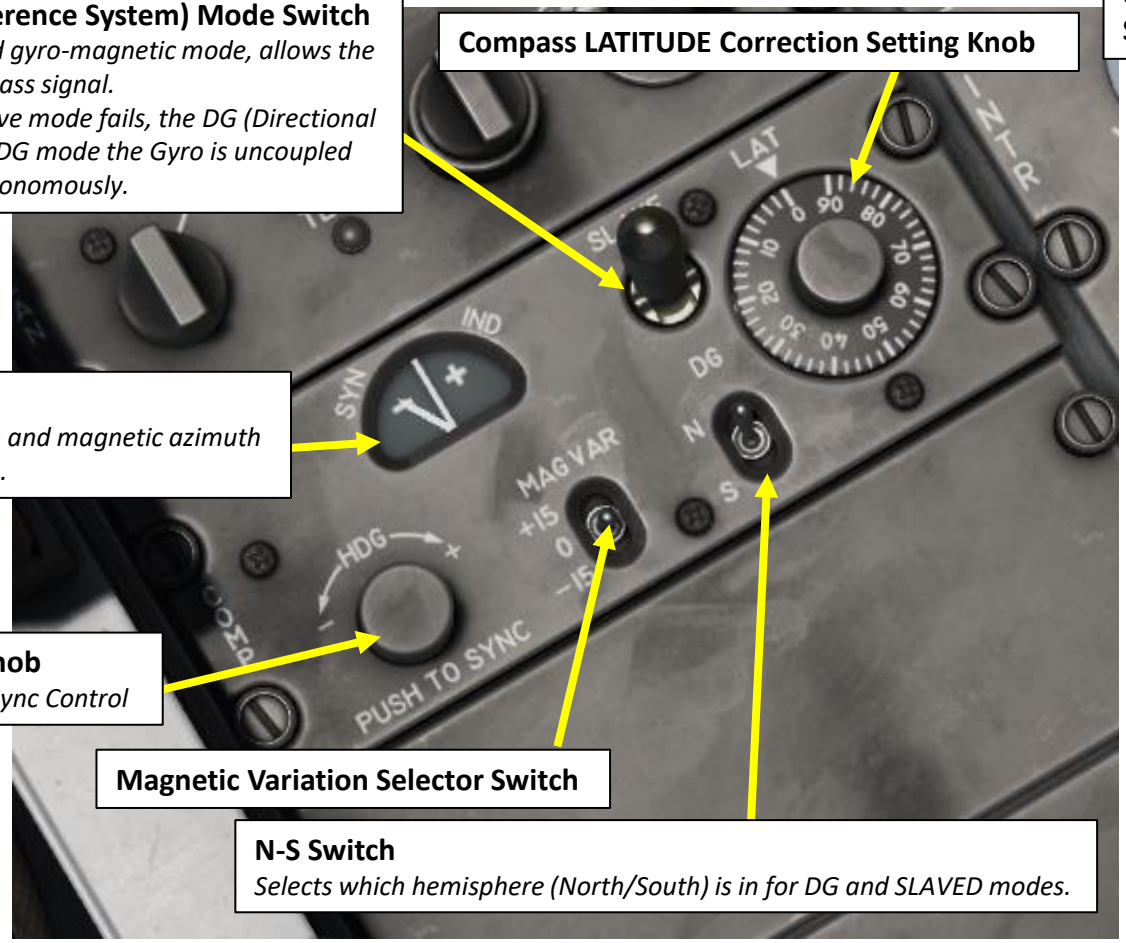
Compass LATITUDE Correction Setting Knob

SYNC IND
Shows sync between HARS gyro and magnetic azimuth detector. Used in SLAVED mode.

HDG (Heading) Knob
Heading & Push-to-Sync Control

Magnetic Variation Selector Switch

N-S Switch
Selects which hemisphere (North/South) is in for DG and SLAVED modes.



HARS (Heading Attitude Reference System) Mode Selector

2 – NAVIGATION MODE SELECT PANEL

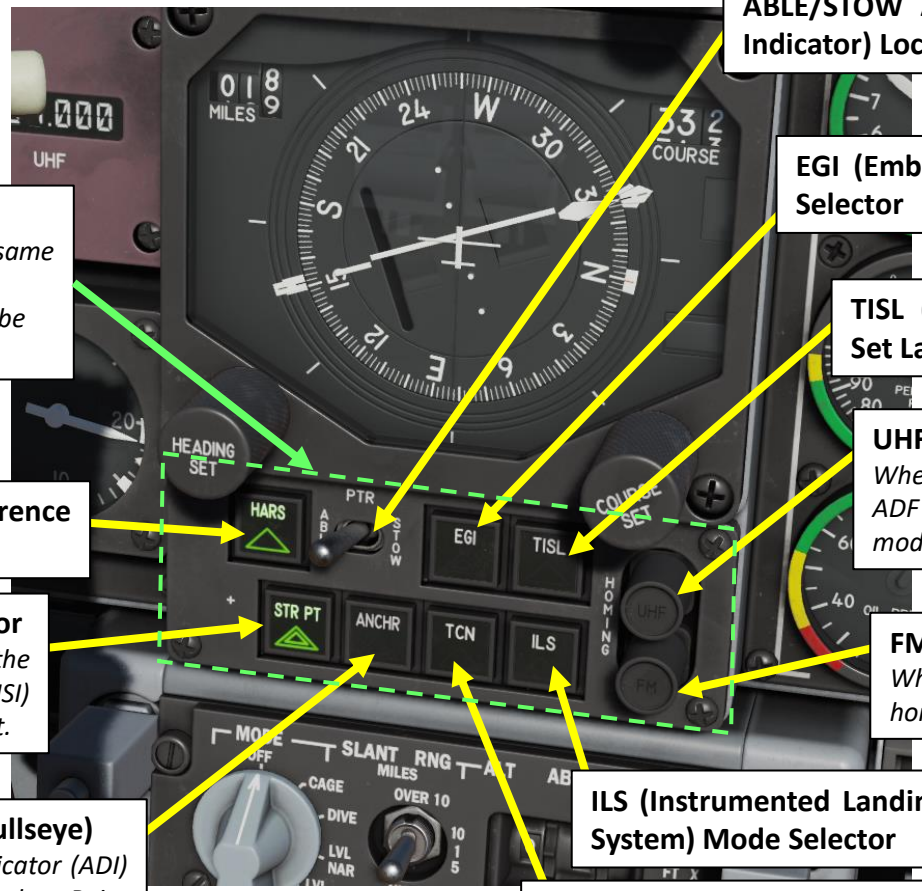
The primary means of selecting sources of navigation is the NMSP (Navigation Mode Select Panel). From here you can determine what navigation is displayed on the HUD or feeds data to your flight instruments like the ADI and HSI. When a selection is active, the green triangle on the button will light.

There are two primary systems that can direct heading and attitude data. Both of these systems provide data to the HUD, ADI and HSI.

- **HARS** (Heading Attitude Reference System). This and the EGI button cannot be active at the same time. Pressing one will deactivate the other.
- **EGI** (Embedded GPS INS). This and the HARS button cannot be active at the same time. Pressing one will deactivate the other.

NMSP/NIMSIP: NAVIGATION MODE SELECT PANEL

- *HARS and EGI send data to HUD, ADI and HSI and cannot be used at the same time. HARS is usually used as a backup system to EGI.*
- *TISL, TACAN and ILS use beacons and stations to navigate to and cannot be used at the same time.*



HARS (Heading Attitude Reference System) Mode Selector

STR PT (Steer Point) Mode Selector
Course Deviator Indicator (CDI) on the Horizontal Situation Indicator (HSI) operates in relationship to a steer point.

ANCHR (Anchor Point / Bullseye)
HSI and Attitude Director Indicator (ADI) needles will point to the Anchor Point (Bullseye).

ABLE/STOW ADI (Attitude Director Indicator) Localizer Bar Switch

EGI (Embedded GPS INS) Mode Selector

TISL (Target Identification Set Laser) Mode Selector

UHF Homing Light
When the UHF control panel is set to ADF (Automatic Direction Finder) mode, the UHF light will turn amber

FM Homing Light
When the VHF/FM control panel is set to homing mode, the FM light will turn amber.

ILS (Instrumented Landing System) Mode Selector

TCN (TACAN) Mode Selector

3 – TAD (TACTICAL AWARENESS DISPLAY) & MOVING MAP DISPLAY

OVERVIEW

The TAD (Tactical Awareness Display) is one of the most important tools at your disposal for navigation.

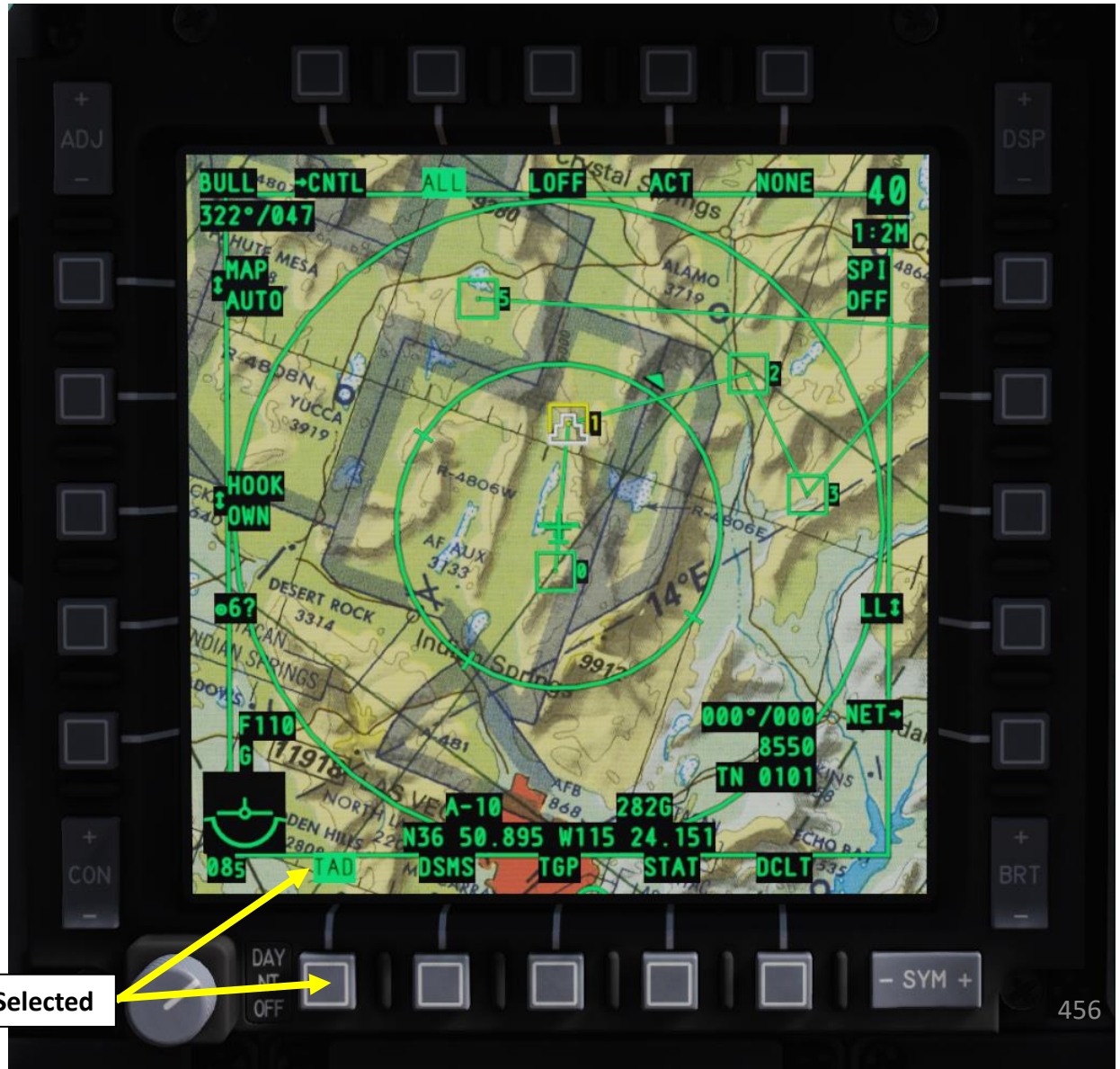
The TAD displays a plan-view of your current tactical situation with the symbols representing your aircraft position (Ownship), the Sensor Point of Interest (SPI), the Anchor Point/ Bullseye, current steerpoint, active markpoint, datalink symbols, or active flight plan with waypoints, and range rings.

The TAD can be a Sensor Of Interest (SOI) which can be used to designate the SPI using a cursor that is controlled by the HOTAS allowing the pilot to hook symbols on the display.

A moving map with different scales can also be displayed. This map has multiple scales with each scale using a different air navigation chart type.

The TAD page is accessed by either pressing a page select OSB with the TAD label or using the HOTAS to cycle MFCD pages.

On the TAD, a slewable cursor is displayed that can be commanded with the HOTAS slew functions when the TAD page is the SOI. The cursor is your means to select objects/symbols on the TAD.



3 – TAD (TACTICAL AWARENESS DISPLAY) & MOVING MAP DISPLAY

MOVING MAP

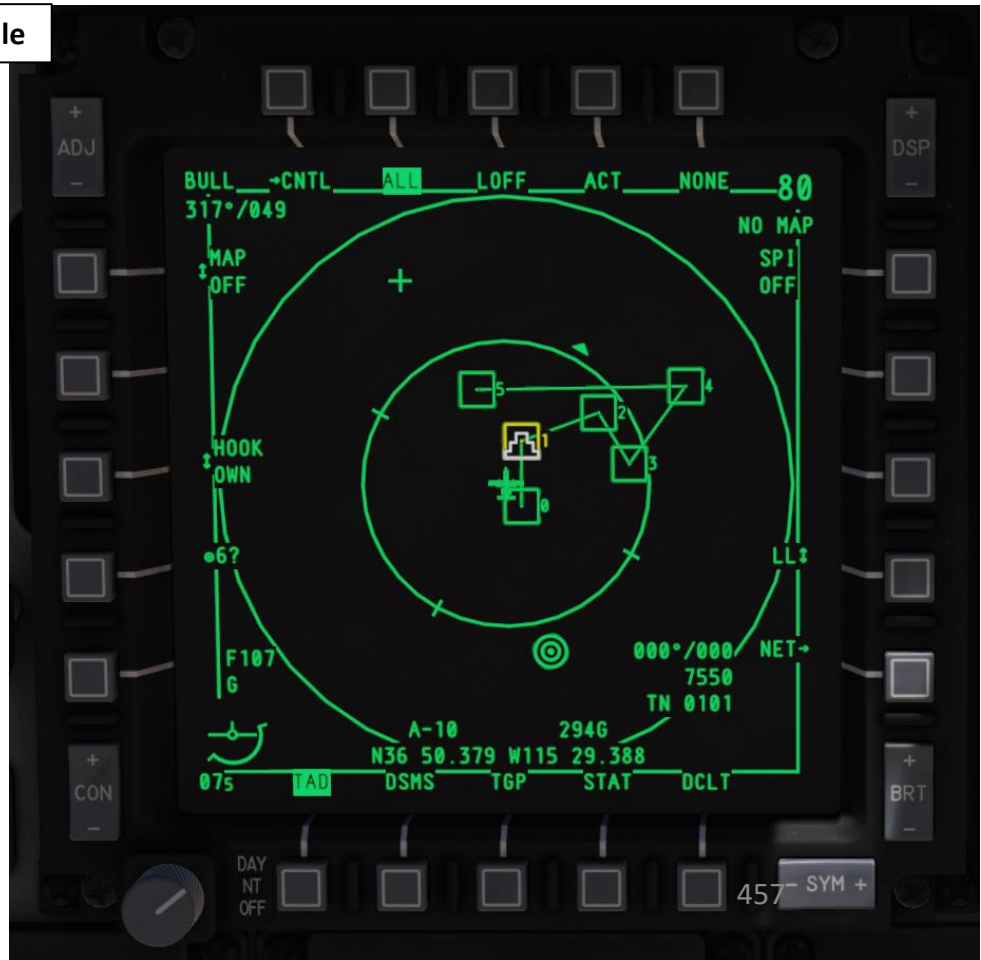
The moving map has three modes: MAN (Manual), AUTO (Automatic) and OFF.

- **MAN**: Map scale can only be changed manually with the ADJ +/- rocker switch.
- **AUTO**: Map scale is automatically changed. Each map chart format is automatically assigned to its corresponding default map scale. Each TAD range scale for both the CEN (Centered Mode) and DEP (Depressed Mode) ownship positions is automatically assigned to a corresponding map scale.
- **OFF**: Moving Map is removed but TAD symbology is still visible.

TAD Range Scale		Corresponding Digital Map Format	
CEN Ownship Position	DEP Ownship Position		
5 NM	7.5 NM	JOG	(1:250K)
10 NM	15 NM	TPC	(1:500K)
20 NM	30 NM	ONC	(1:1M)
40 NM	60 NM	JNC	(1:2M)
80 NM	120 NM	GNC	(1:5M)
160 NM	240 NM	GNC	(1:5M)

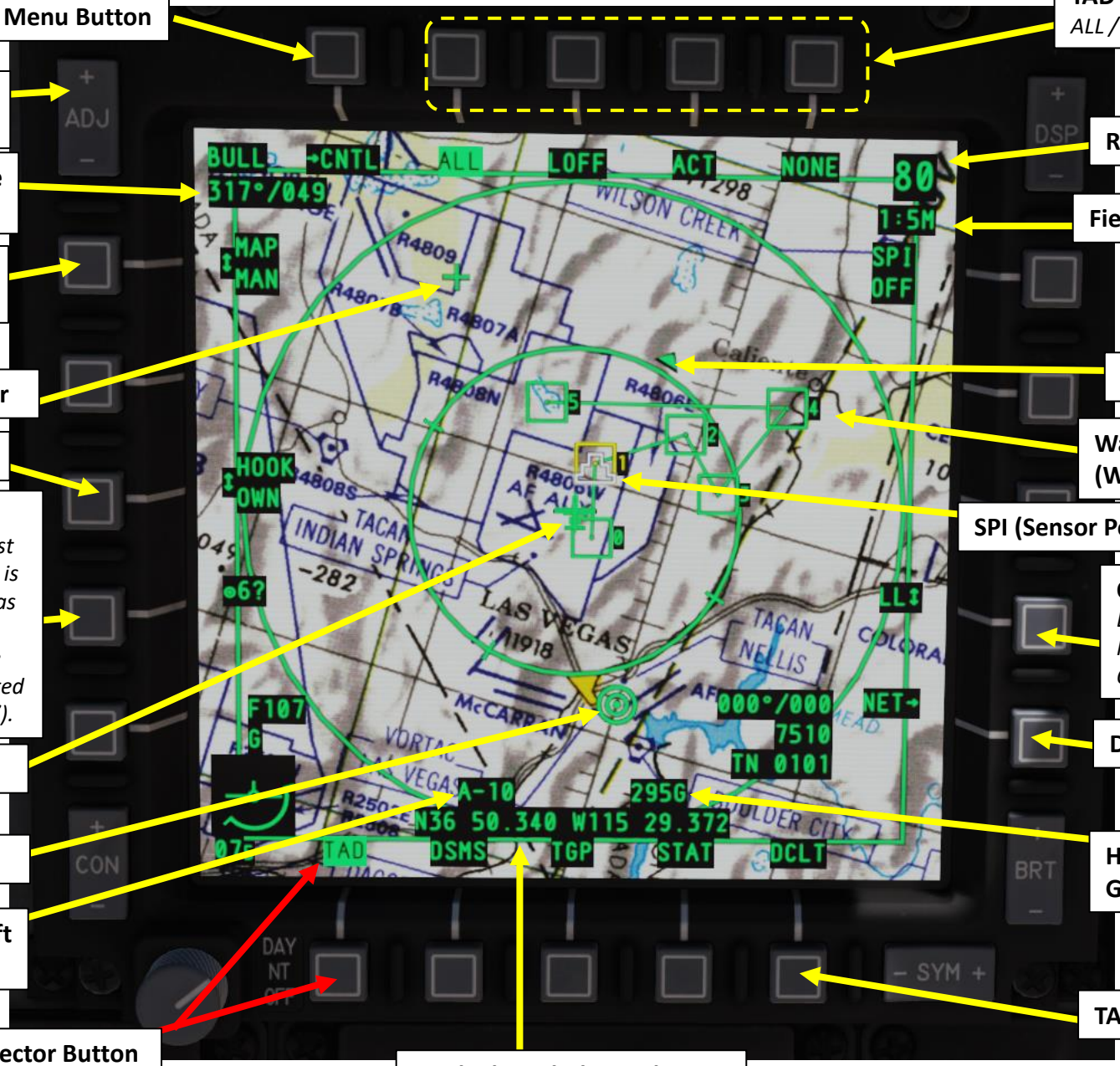
ADJ +/- Rocker Switch
Changes Map scale in MAN mode only

Moving Map Mode Selector
MAN/AUTO/OFF



3 – TAD (TACTICAL AWARENESS DISPLAY) & MOVING MAP DISPLAY

DISPLAY



TAD Control Menu Button

TAD Profile Selectors
ALL / LOFF / ACT / NONE

ADJ +/- Rocker Switch
Changes Map scale in MAN mode only

Range Scale

Bearing / Distance (nm) to Bullseye (Anchor Point)

Field-of-View Scale

Moving Map Mode Selector
MAN/AUTO/OFF

TAD Cursor

North Reference

Hook Mode Selector

Waypoint Symbol (Waypoint 4)

TAD Copy Function
- *Function is only displayed if a symbol has first been hooked. If a symbol is hooked and OSB is pressed, the hooked symbol will be created as a new mission waypoint in the CDU*
- *If an open mission waypoint is available, the number of the available waypoint will be listed with a "?" mark next to it (for example, "6?").*

SPI (Sensor Point of Interest) (Waypoint 1)

Coordinate Format
LL: Latitude/Longitude
MGRS: Military Grid Reference System
OFF

Datalink SADL Network Configuration

Ownship Symbol

Bullseye / Anchor Point

Hooked Symbol Aircraft Ground Speed (kts) (if applicable)

Hooked Symbol Aircraft Type (if applicable)

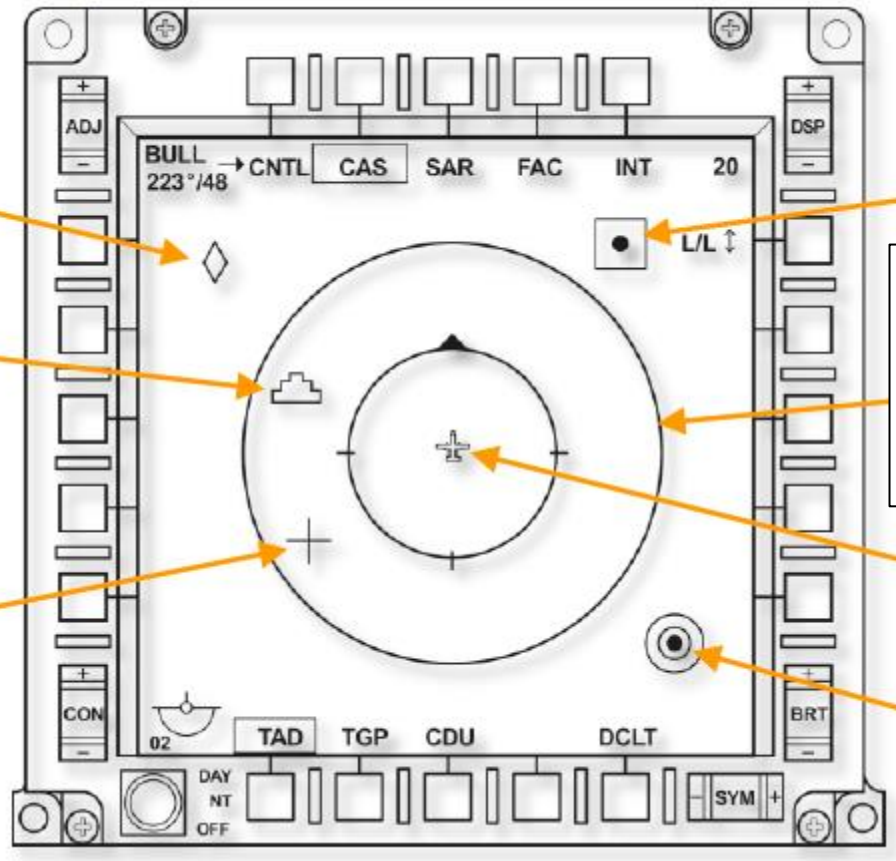
TAD Declutter Function

TAD Page Selector Button

Hooked Symbol Coordinates

3 – TAD (TACTICAL AWARENESS DISPLAY) & MOVING MAP DISPLAY

SYMBOLOGY



TGP (Targeting Pod) Diamond
When the targeting pod (TGP) is on, a green diamond is displayed on the TAD that represents the line of sight point that the TGP is pointed towards

SPI (Sensor Point of Interest) Symbol

TAD Cursor Symbol

Waypoint/Steerpoint Symbol

Range Ring
Outer & Inner range rings are centered on the ownship symbol and provide you a quick means to judge ranges on the TAD. The outside range ring represents the range set on the TAD scale, from ownship symbol to outside range ring. For example, a 20 scale setting equates to 20 nautical miles between the ownship symbol and the outside range ring.

Ownship Symbol (You!)

Bullseye (Anchor Point) Symbol

3 – TAD (TACTICAL AWARENESS DISPLAY) & MOVING MAP DISPLAY

CONTROLS (A-10C LEGACY)

If the TAD is the current SOI (Sensor of Interest), HOTAS controls can provide a number of interesting functions. To set the TAD as the SOI, press and hold the Coolie Hat Switch in the direction of the MFCD screen displaying the TAD.

- **TMS SWITCH: Target Management System**
  - FWD SHORT: Hook up TAD symbol
  - AFT SHORT: Un-hook TAD symbol

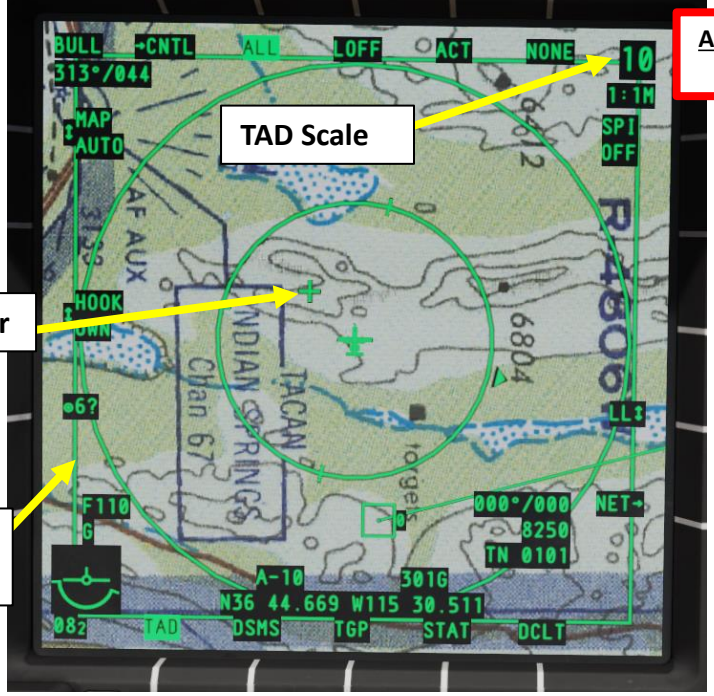
Note: TAD symbols can include the SPI, TGP diamond, waypoint/steerpoint, or bullseye.

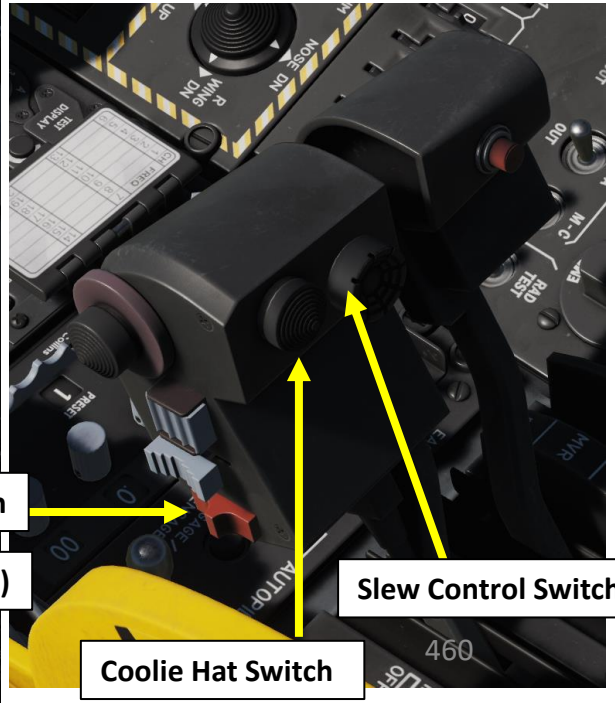
- **DMS SWITCH: Data Management Switch**
  - FWD SHORT: TAD scale Increase
  - AFT SHORT: TAD scale Decrease
  - LEFT LONG: SPI Broadcast
  - RIGHT SHORT: TAD Center/Depressed Mode

- **CHINA HAT**
  - FWD SHORT: FOV (Field of View) EXP (Expand) Toggle
  - AFT SHORT: Resets TAD cursor

- **COOLIE HAT SWITCH**
  - LEFT/RIGHT/UP LONG: Sets SOI (Sensor of Interest)

- **SLEW CONTROL SWITCH**
  - LEFT/RIGHT/UP/DOWN: moves TAD cursor





3 – TAD (TACTICAL AWARENESS DISPLAY) & MOVING MAP DISPLAY

A-10C II Tank Killer Expansion Only

CONTROLS (A-10C II TANK KILLER)

If the TAD is the current SOI (Sensor of Interest), HOTAS controls can provide a number of interesting functions. To set the TAD as the SOI, press and hold the Coolie Hat Switch in the direction of the MFCD screen displaying the TAD.

- **TMS SWITCH: Target Management System**
  - FWD SHORT: Hook up TAD symbol
  - AFT SHORT: Un-hook TAD symbol
  - **LEFT LONG: SPI Broadcast**

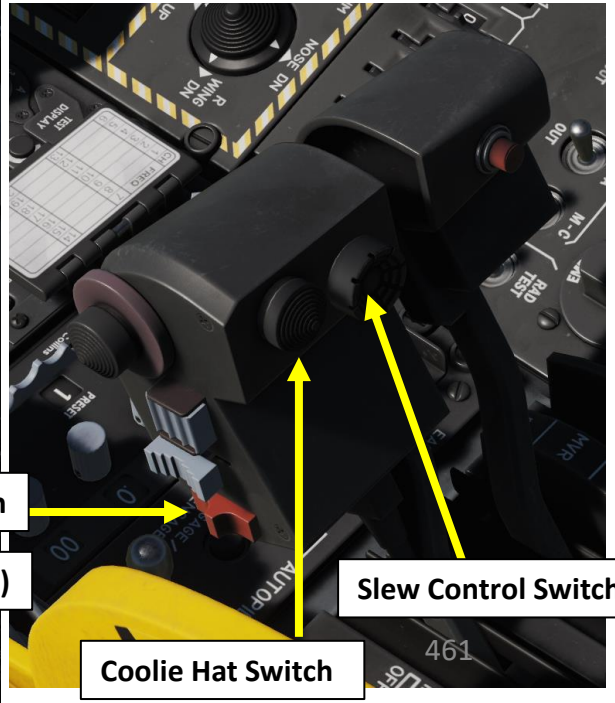
Note: TAD symbols can include the SPI, TGP diamond, waypoint/steerpoint, or bullseye.

- **DMS SWITCH: Data Management Switch**
  - FWD SHORT: TAD scale Increase
  - **FWD LONG: Map Quick Toggle**
  - AFT SHORT: TAD scale Decrease
  - **AFT LONG: Select TAD Center Option**
  - **LEFT SHORT: CEN/DEP Mode CENTR OWN**
  - **LEFT LONG: HMD (Helmet-Mounted Display) ON/OFF**
  - RIGHT SHORT: Cycle TAD Center/Depressed Mode
  - **RIGHT LONG: Slave TGP (Targeting Pod) to HMIT (Helmet-Mounted Integrated Targeting) Line-of-Sight**

- **CHINA HAT**
  - FWD SHORT: FOV (Field of View) EXP (Expand) Toggle
  - AFT SHORT: Resets TAD cursor

- **COOLIE HAT SWITCH**
  - LEFT/RIGHT LONG: Sets SOI (Sensor of Interest)

- **SLEW CONTROL SWITCH**
  - LEFT/RIGHT/UP/DOWN: moves TAD cursor



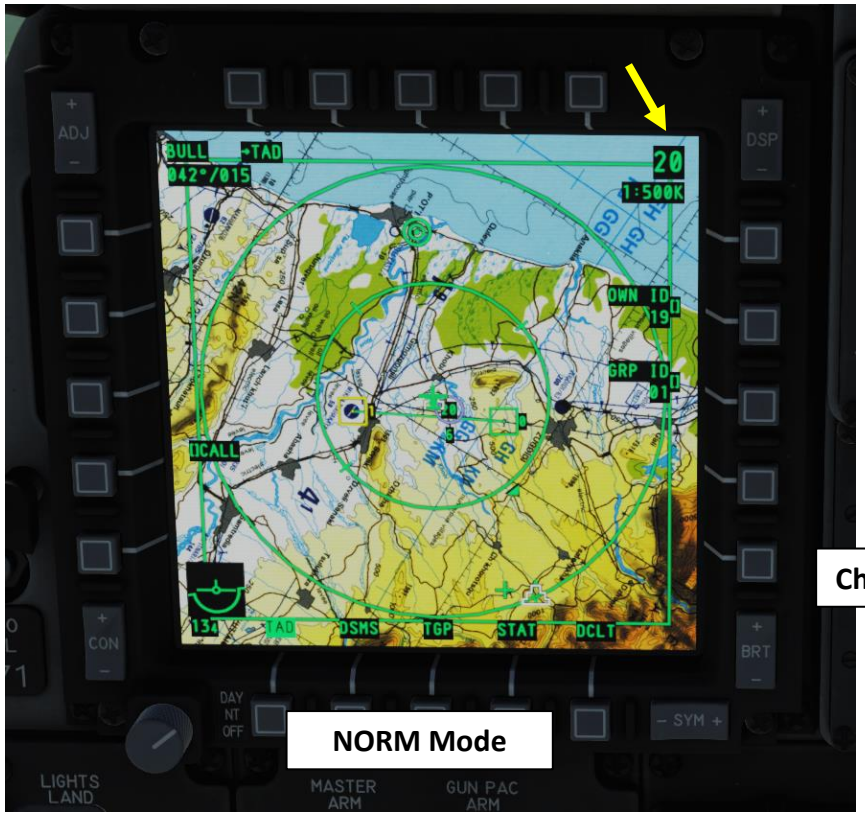
3 – TAD (TACTICAL AWARENESS DISPLAY) & MOVING MAP DISPLAY

EXPANDED MODES EXP1 & EXP2

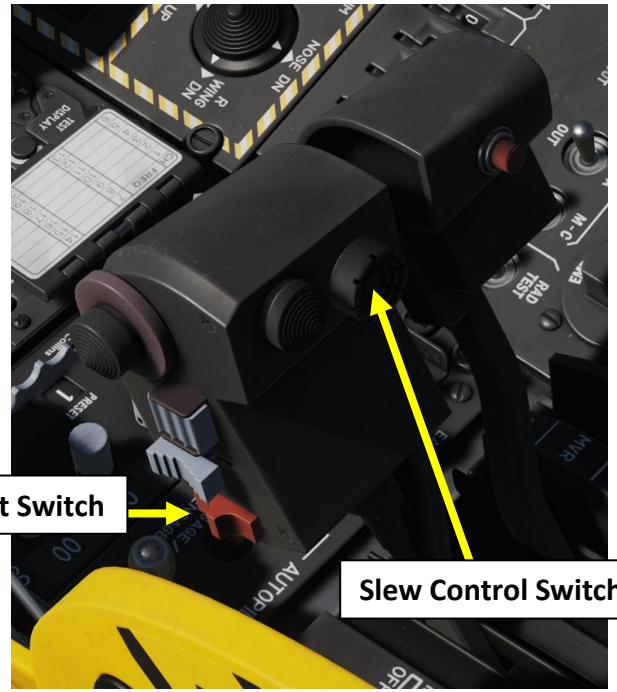
If the TAD is the current SOI (Sensor of Interest), the China Hat FWD SHORT will toggle NORM, EXP1 and EXP2 expanded modes each time the switch is pressed. The Slew Control Switch will then move the map itself.

- **For EXP1:** For any given TAD range scale, this causes the current digital map format to "narrow" by one increment. In other words, if the current digital map scale in NORM mode was 1:2M, it will "narrow" to 1:1M once EXP1 mode is entered, regardless of the TAD range scale that was initially displayed in NORM mode.

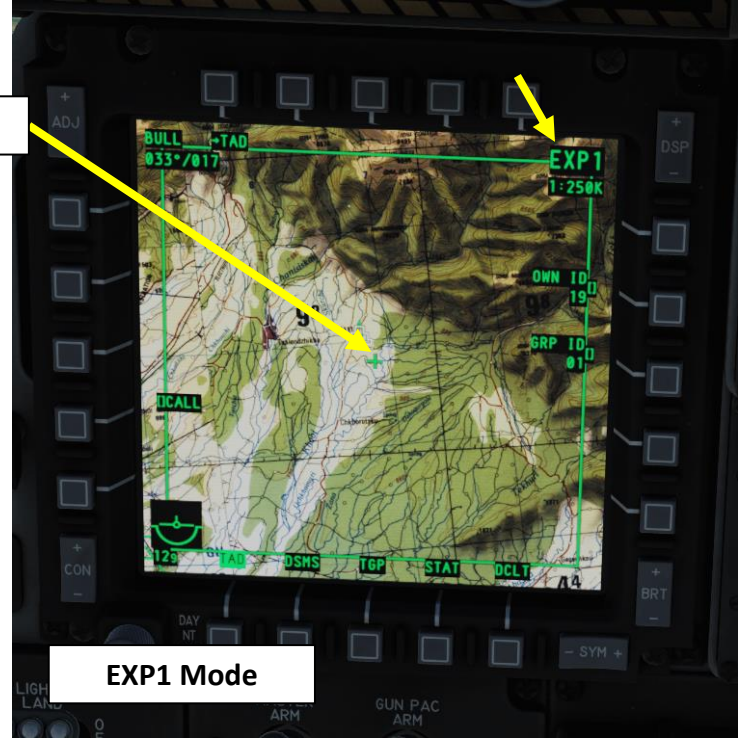
- **For EXP2:** For any given TAD range scale, this causes the current digital map format to "narrow" by one more increment. In other words, if the current digital map scale in EXP1 mode was 1:1M (as is the case in the previous paragraph), it will "narrow" to 1:500K once EXP2 mode is entered, regardless of the TAD range scale that was initially displayed in NORM mode.



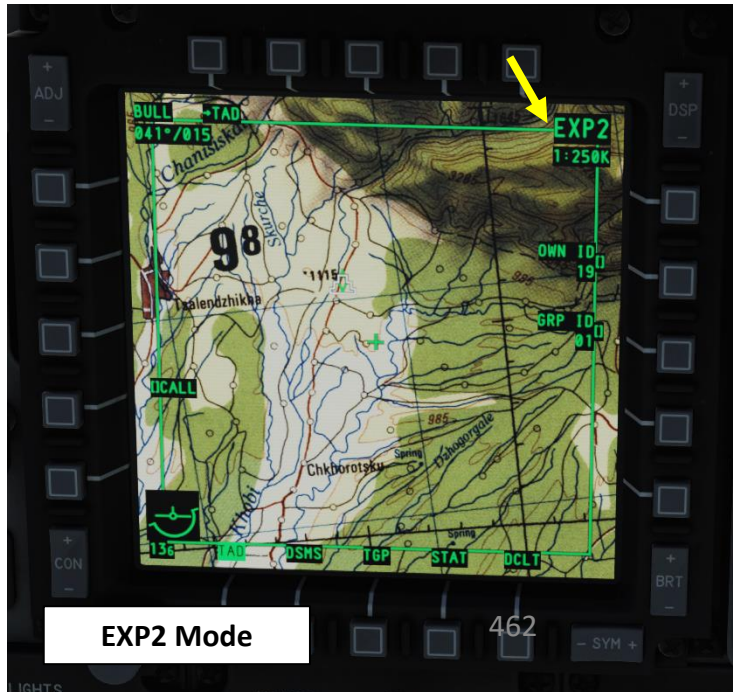
NORM Mode



Map moves with TDC



EXP1 Mode



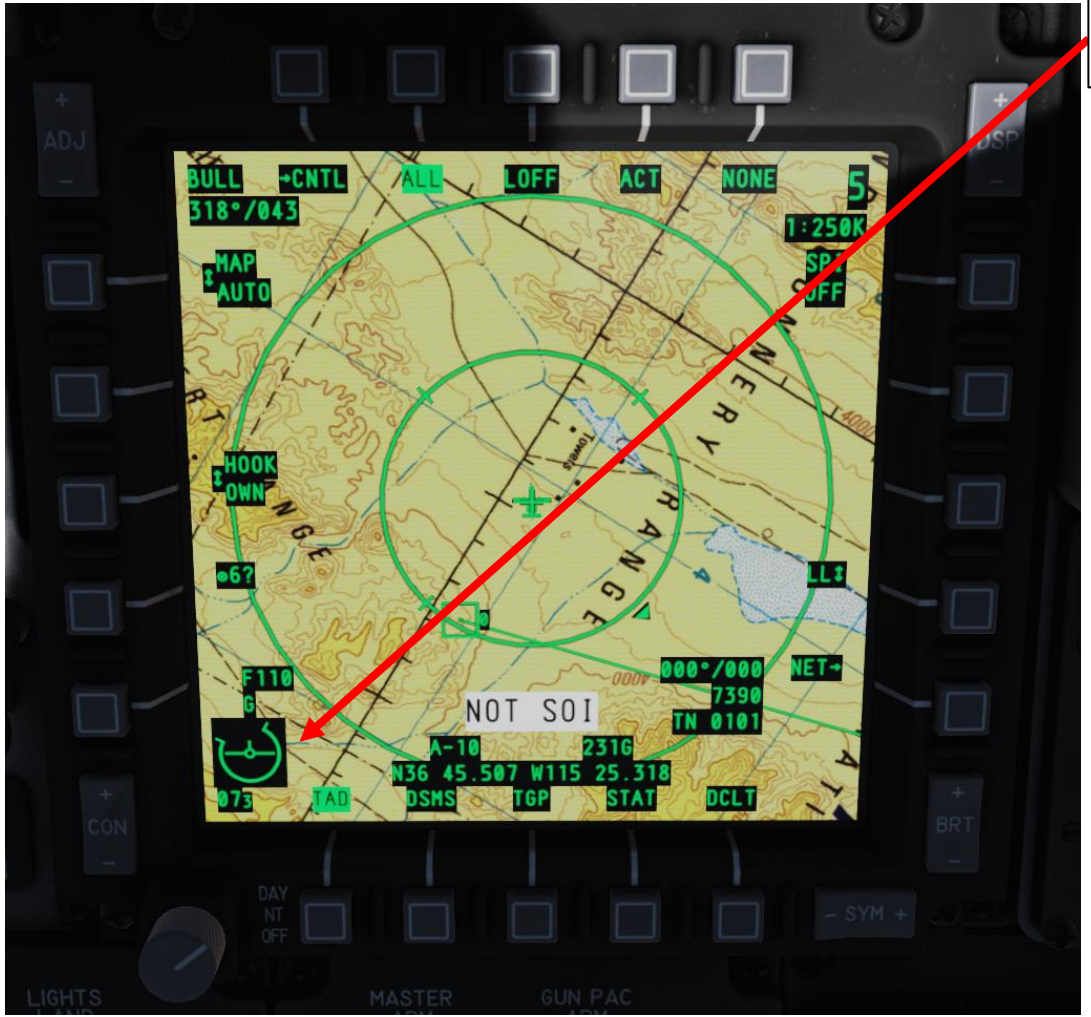
EXP2 Mode

3 – TAD (TACTICAL AWARENESS DISPLAY) & MOVING MAP DISPLAY

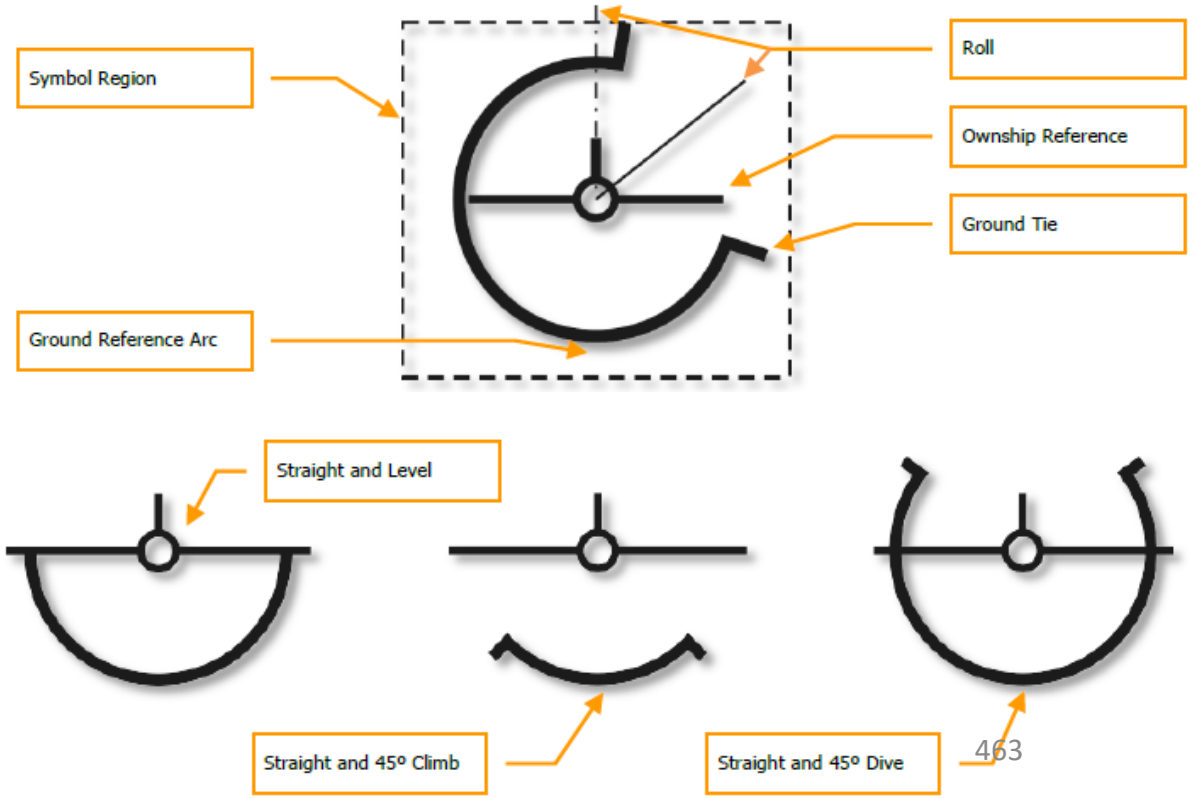
ARS (ATTITUDE REFERENCE SYMBOL)

In the lower left corner of each MFCD is the Attitude Reference Symbol (ARS). It provides you an indication of the aircraft's current pitch, roll and barometric altitude. The ARS symbol is composed of three primary components:

- **Ownship reference**
- **Ground reference**
- **Ownship altitude** (073 = 7300 ft)



ARS (Attitude Reference Symbol)
Shown: 45 deg dive, banking slightly right, altitude 7300 ft



4 – HSI (HORIZONTAL SITUATION INDICATOR)

The HSI (Horizontal Situation Indicator) is your primary gauge to assist in navigation to steerpoints, TACAN beacons, and radio beacons. While you will likely be using HUD symbology for most of your navigation purposes, a firm understanding of the HSI is necessary for access to additional navigation data that is not present on the HUD or CDU displays, and in case of battle damage.

4 – HSI (HORIZONTAL SITUATION INDICATOR)

Lubber Line (Current Heading)

Bearing Pointer 2
Points to current Steerpoint

Range Indicator (nm)

Bearing Pointer 1
Points to magnetic bearing of selected TACAN station when TACAN mode is selected. When in ADF mode, this indicator points to magnetic bearing of the selected UHF station. If both TACAN and ADF are selected, the ADF takes priority. If neither TACAN nor ADF modes are selected, the indicator aligns with Bearing Pointer 1.

Aircraft Symbol

CDI (Course Deviation Indicator)

Heading Set Knob

Bearing Pointer 2 Reciprocal Heading

Bearing Pointer 1 Reciprocal Heading

Selected Heading Bug/Marker

Course Selector Window

Course Arrow

Power OFF Flag

Compass Card

Bearing Validity Flag

TO-FROM Indicator

Course Set Knob

5 – NAVIGATION POINT TYPES

These are the available Navigation Point types used in the Warthog:

- **Waypoints**
  - Waypoints are pre-planned navigational points of reference for you to follow on route to your area of operation. You can create new ones, edit their coordinates and create flight plans with them. The CDU database can hold up to 2,050 waypoints. It is important to understand that any waypoint can be set as the current steerpoint or anchor point.

- **Steerpoint**
  - A Steerpoint is the waypoint or markpoint currently selected.

- **Markpoints**
  - Markpoints are used to "mark" a point of interest, whether flying over an interesting area or an enemy sighting. You can create up to 26 markpoints; they are numbered from A to Z.

- **Anchor Point / Bullseye**
  - Also referred to as a “Bullseye”, an anchor point serves as a common geographic reference for a mission amongst friendly forces.

Auxiliary Avionics Panel (AAP) Steerpoint Selector Knob

- ***FLT PLAN****: Select flight plan to make all the waypoints in the active flight plan active. If selected, use of the Steerpoint toggle switch will cycle between flight plan waypoints. FLT PLAN must be selected to display the flight plan route on the Tactical Awareness Display (TAD).*
- ***MARK****: When Markpoint is selected, cycling through waypoints will only cycle through the markpoints that you created (A-Z). Note that Z is automatically created when a weapon is used.*
- ***MISSION****: Selecting Mission will allow you to access the entire mission waypoint database*

Auxiliary Avionics Panel (AAP) CDU (Control Display Unit) Page Selector Knob

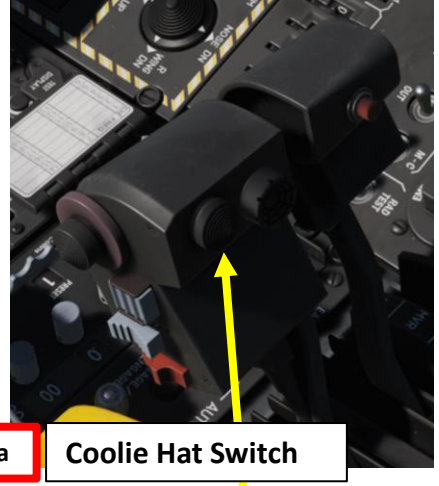
- ***OTHER****: In order to use the function select keys (FSK) on the CDU, the OTHER selection must be chosen. From OTHER you will be able to add and modify data to the CDU and view additional information.*
- ***POSITION****: Displays the POSINFO CDU page. This will provide information about your current position.*
- ***STEER****: Displays the STRINFO page that will provide detailed information about your steerpoint.*
- ***WAYPT****: Displays the WP INFO page. From this page you can view basic information about your selected waypoint, steerpoint, and your anchor point.*

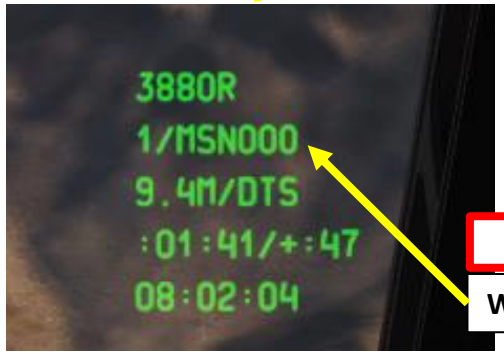
Steerpoint Increment/Toggle Switch

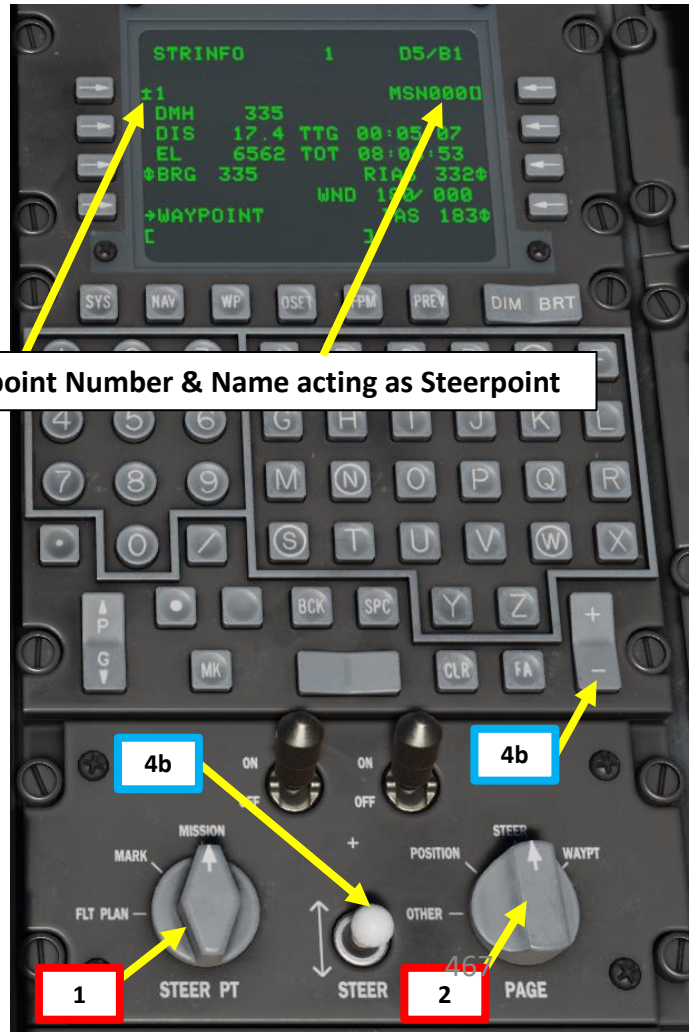
6 – WAYPOINTS
6.1 – WAYPOINT NAVIGATION

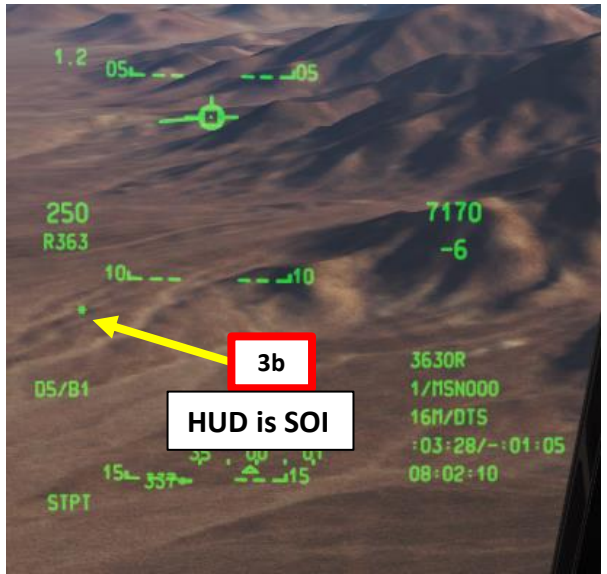
A: HOW TO DESIGNATE A STEERPOINT FROM WAYPOINT DATABASE

1. Set Auxiliary Avionics Panel (AAP) Steerpoint Selector Knob to MISSION (you access all waypoints available for the current mission)
2. Set Auxiliary Avionics Panel (AAP) CDU (Control Display Unit) Selector Knob to STEER
3. Press Coolie Hat UP to set HUD (Heads-Up Display) as the Sensor of Interest (SOI)
4. Select what Waypoint you want to use as your current Steerpoint. Three different methods are available:
   - **METHOD A (DMS):** While HUD is SOI, press the DMS (Data Management Switch) UP/DOWN to cycle between waypoints. Each waypoint selected will be set as the Steerpoint
   - **METHOD B (CDU):** On the CDU (Control Display Unit), use the STEER switch on the CDU or the +/- Rocker Switch
   - **METHOD C (UFC):** On the UFC (Up Front Control), use the STEER rocker switch.
5. Selected Waypoint acting as the Steerpoint will be displayed on the HUD and CDU.





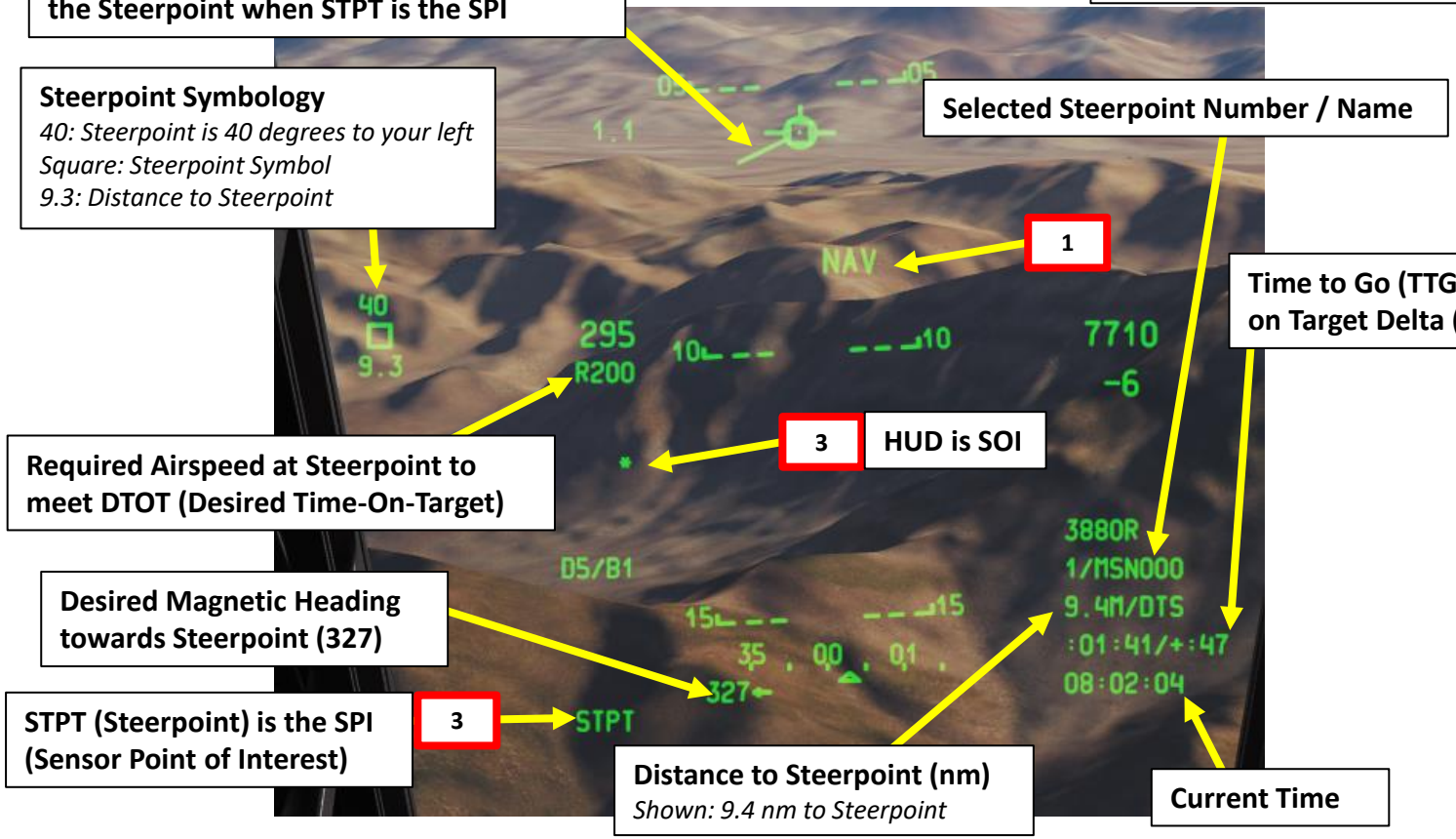


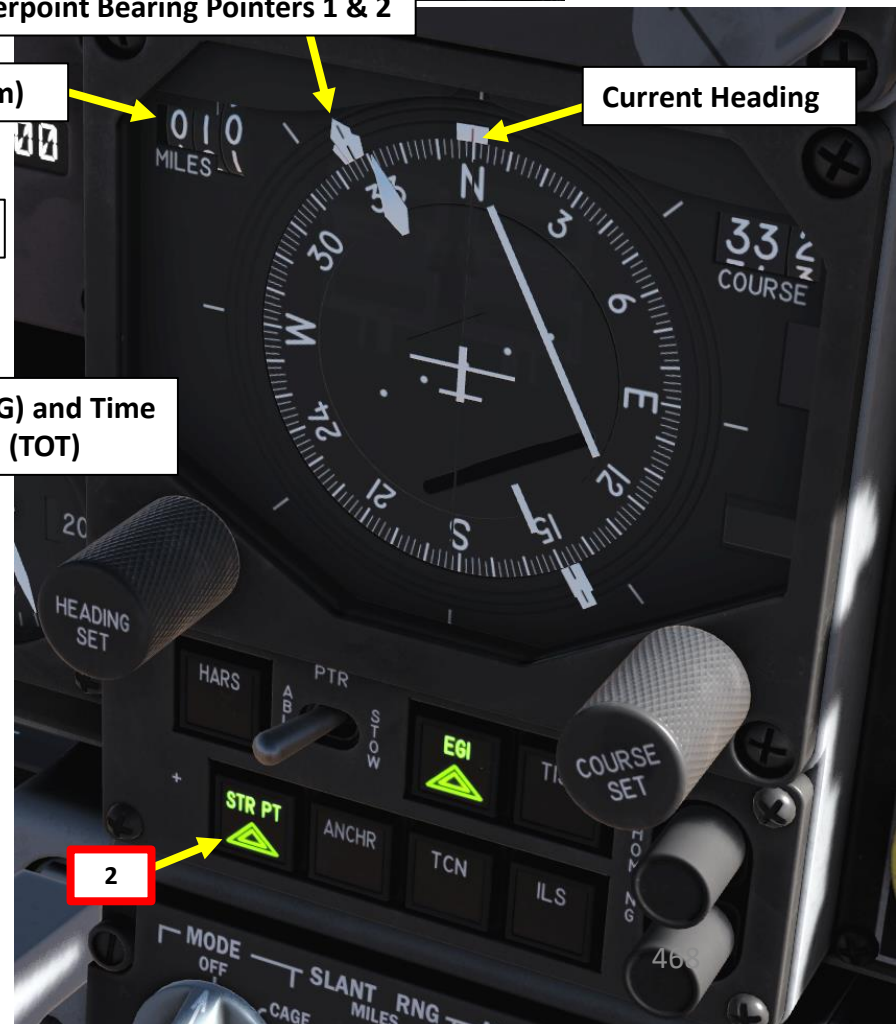


6 – WAYPOINTS
6.1 – WAYPOINT NAVIGATION

B: HOW TO NAVIGATE TO A STEERPOINT

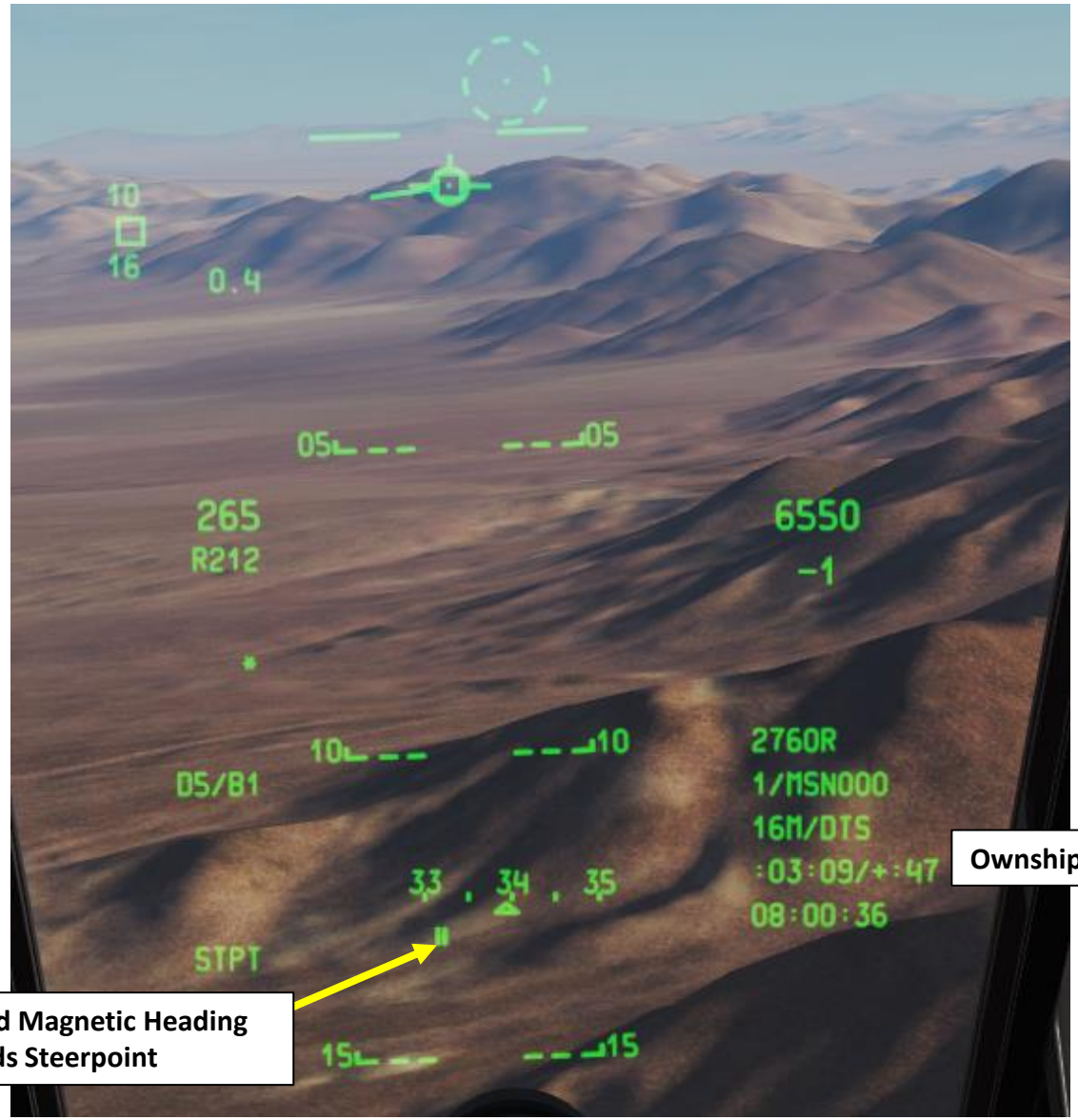
1. Once Steerpoint has been designated, cycle Master Mode to NAV using the Master Mode Button
2. Select STR PT Navigation Mode on the NMSP (Navigation Mode Select Panel)
3. If the SPI (Sensor Point of Interest) isn't set to STPT (Steerpoint), press the TMS (Target Management System) Switch AFT LONG to set the Steerpoint as the SPI. Make sure HUD is SOI (Sensor of Interest) with the Coolie Hat UP
4. Follow steering cues on the HSI (Horizontal Situation Indicator) and HUD (Heads-Up Display)



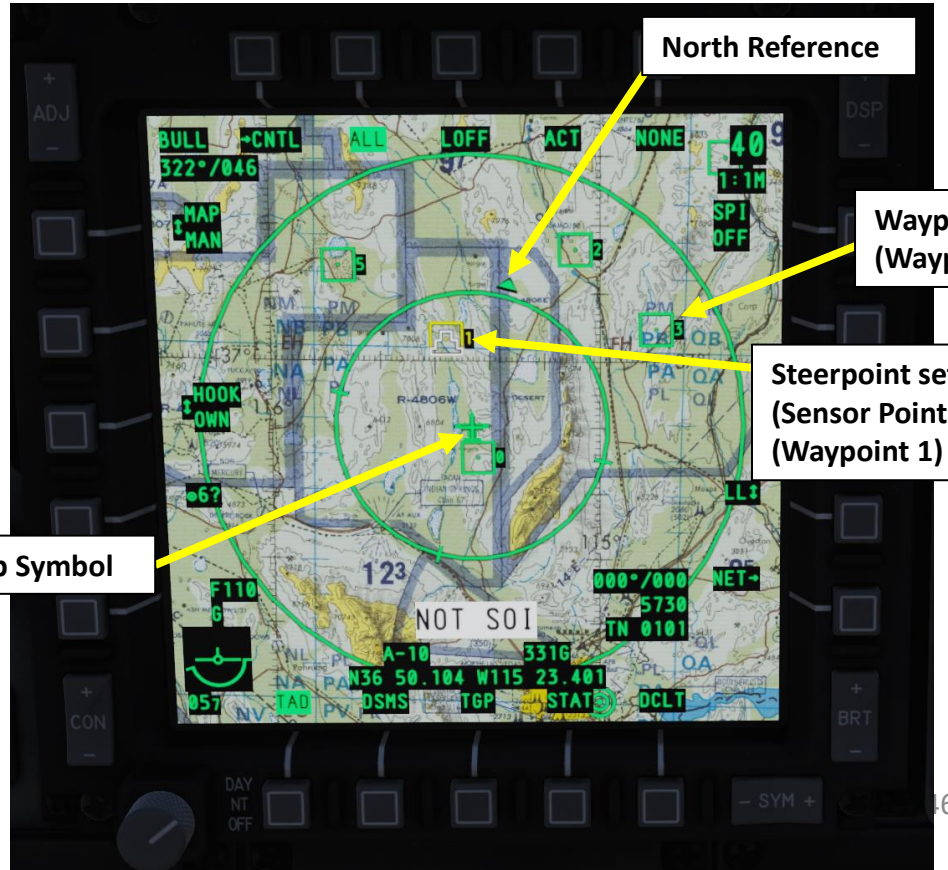


6 – WAYPOINTS
6.1 – WAYPOINT NAVIGATION

B: HOW TO NAVIGATE TO A STEERPOINT



Desired Magnetic Heading towards Steerpoint



North Reference

Waypoint Symbol (Waypoint 3)

Steerpoint set to SPI (Sensor Point of Interest) (Waypoint 1)

Ownship Symbol

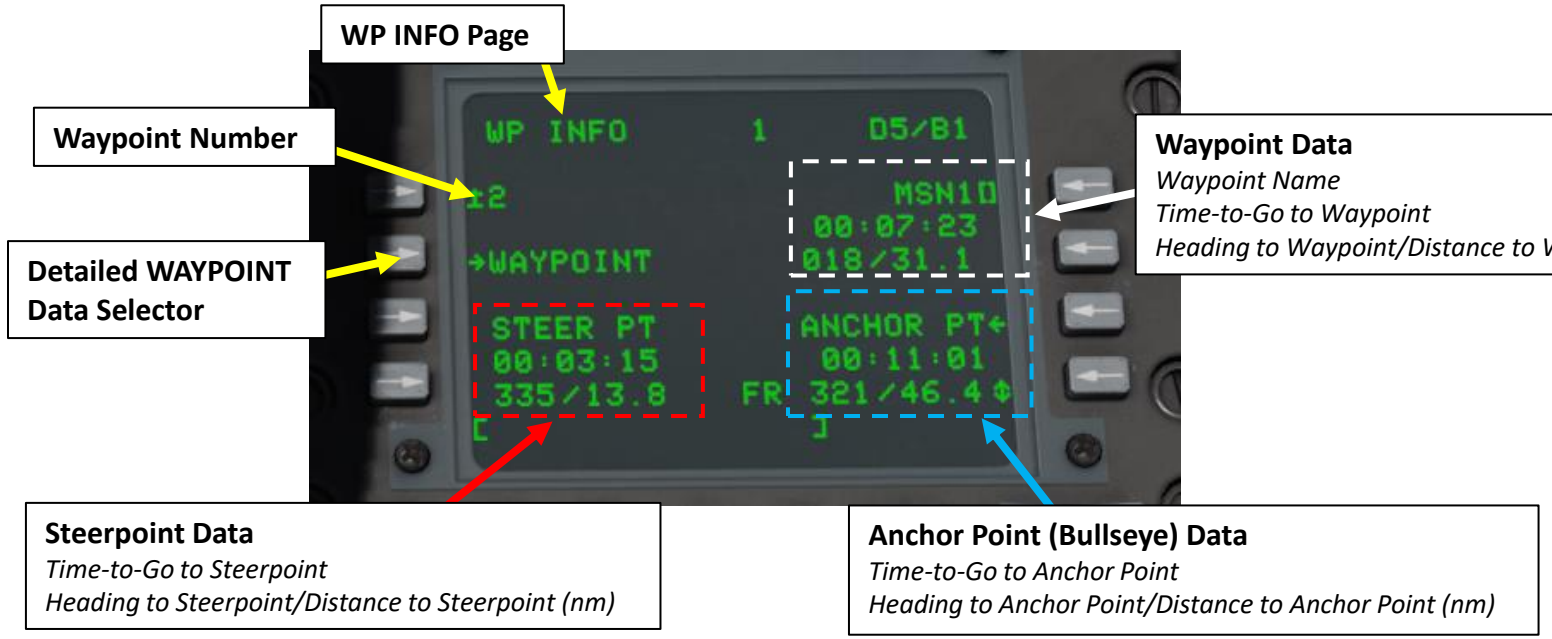
6 – WAYPOINTS
6.1 – WAYPOINT NAVIGATION

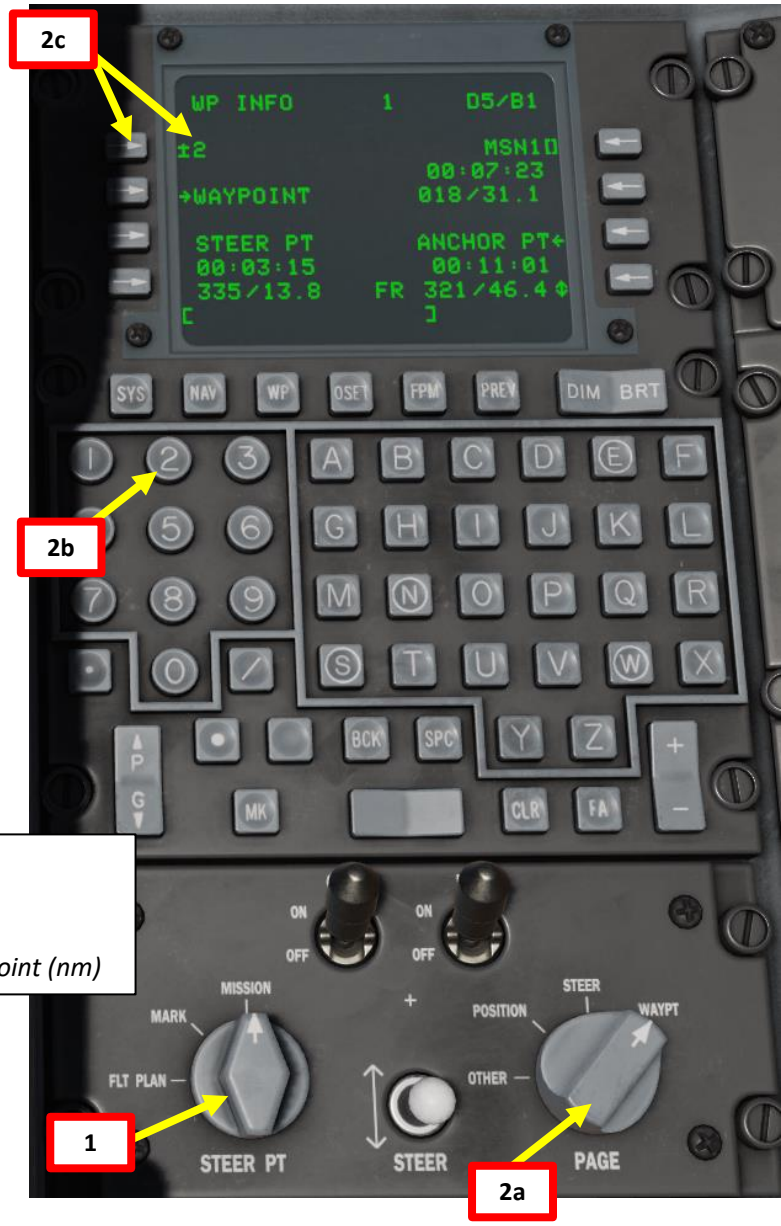
B: HOW TO NAVIGATE TO A STEERPOINT

6 – WAYPOINTS
6.1 – WAYPOINT NAVIGATION

C: CONSULTING WAYPOINT DATA FROM CDU

1. Set Auxiliary Avionics Panel (AAP) Steerpoint Selector Knob to MISSION (you access all waypoints available for the current mission)
2. To consult data on a desired waypoint:
   a) Set Auxiliary Avionics Panel (AAP) CDU (Control Display Unit) Selector Knob to WAYPT. This will display the WP INFO Page.
   b) On the CDU keypad, enter desired waypoint number (i.e. “2” for Waypoint 2).
   c) Press LSK (Line Select Key) next to Waypoint Number Field.

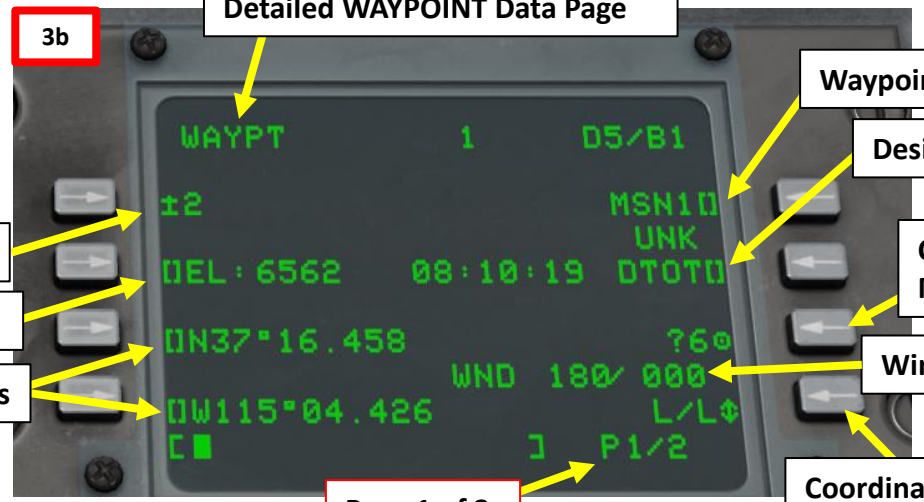


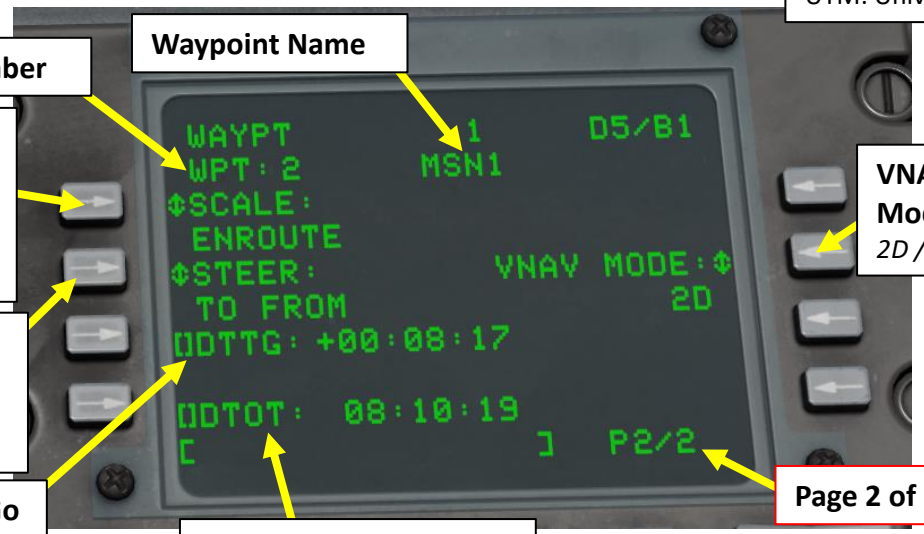


6 – WAYPOINTS
6.1 – WAYPOINT NAVIGATION

C: CONSULTING WAYPOINT DATA FROM CDU

3. To consult further data on Waypoint 2, press LSK (Line Select Key) next to WAYPOINT.
4. Use the Page Increment/Decrement Rocker switch to cycle between WAYPOINT pages 1 and 2.



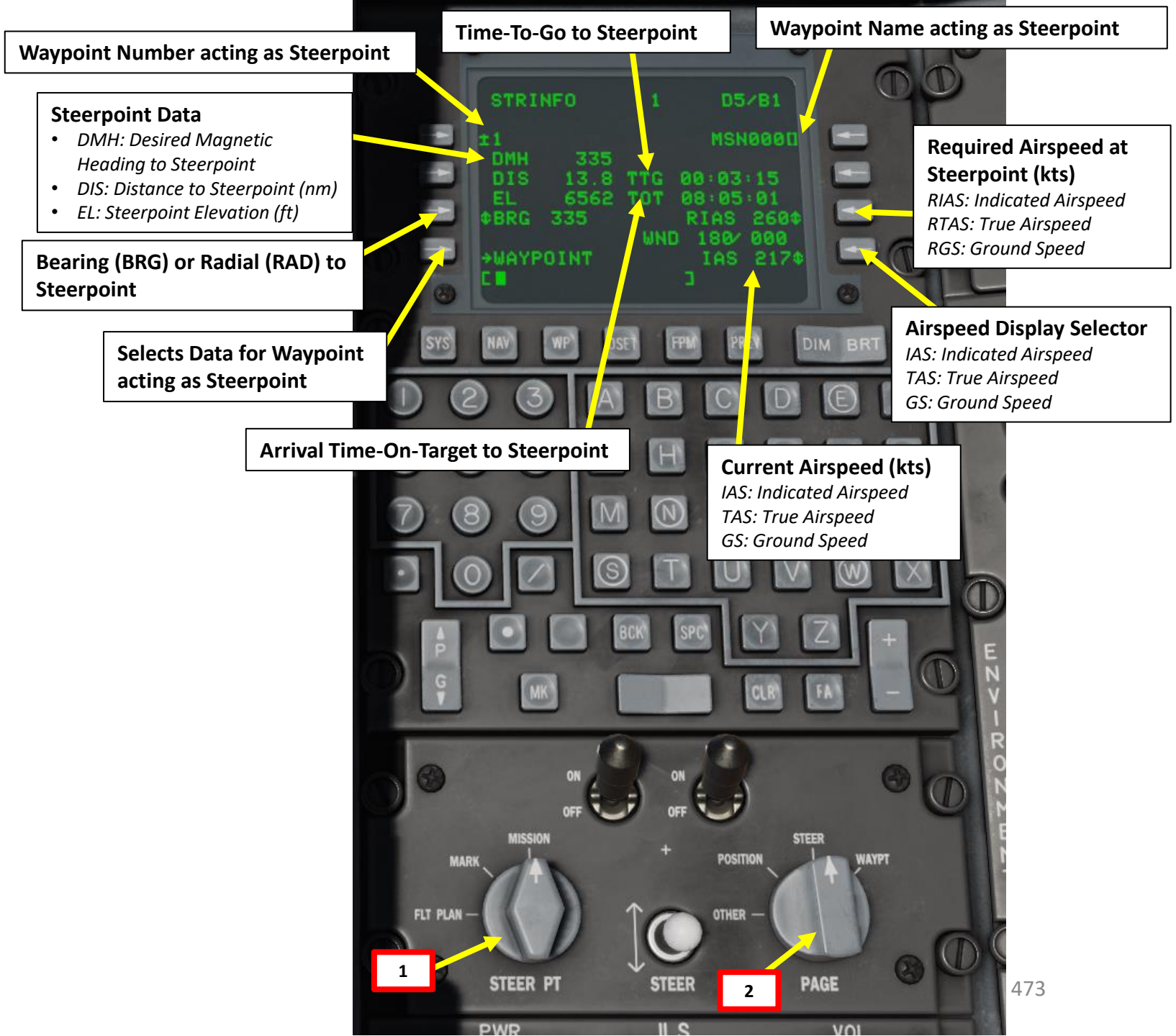


6 – WAYPOINTS

6.1 – WAYPOINT NAVIGATION

D: CONSULTING STEERPOINT DATA FROM CDU

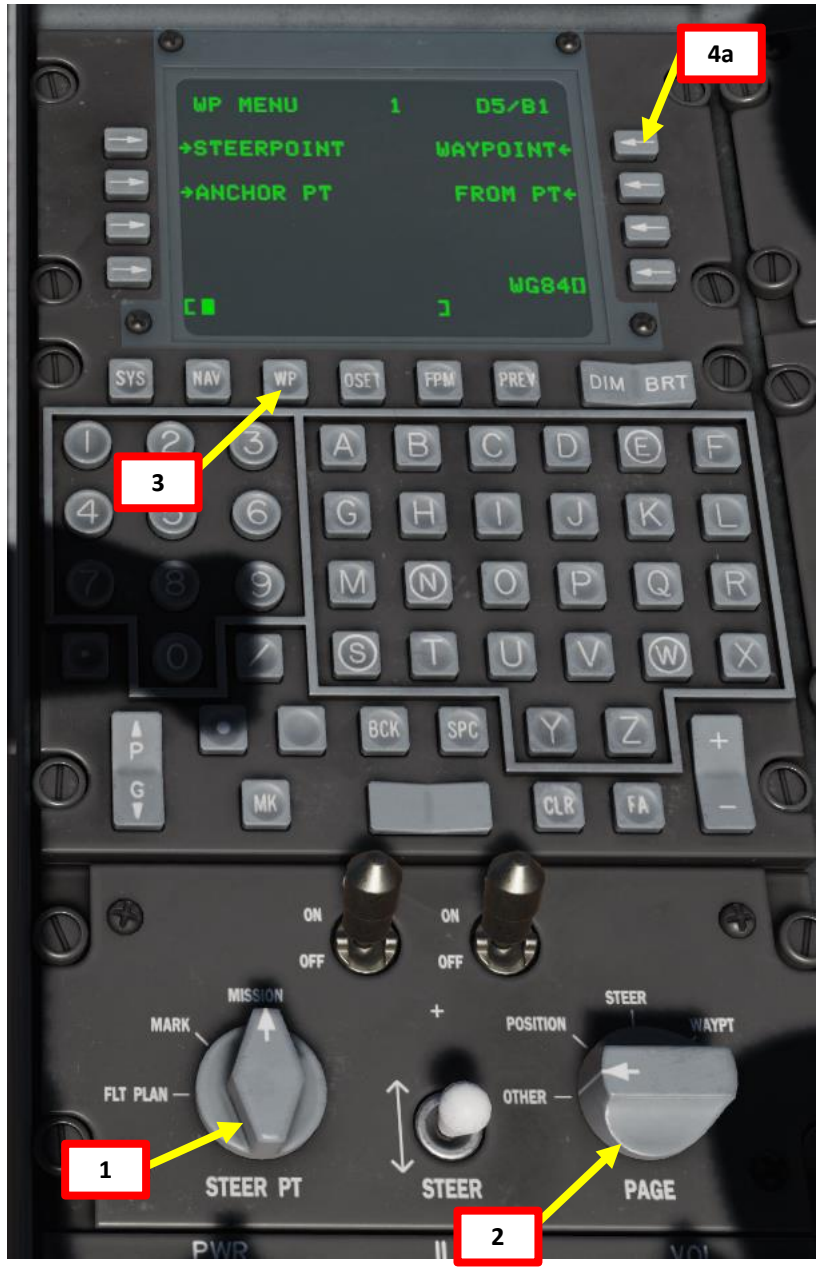
1. Set Auxiliary Avionics Panel (AAP) Steerpoint Selector Knob to MISSION (you access all waypoints available for the current mission).
2. To consult data on the selected Steerpoint, set Auxiliary Avionics Panel (AAP) CDU (Control Display Unit) Selector Knob to STEER. This will display the STEERPOINT INFO Page.



6 – WAYPOINTS

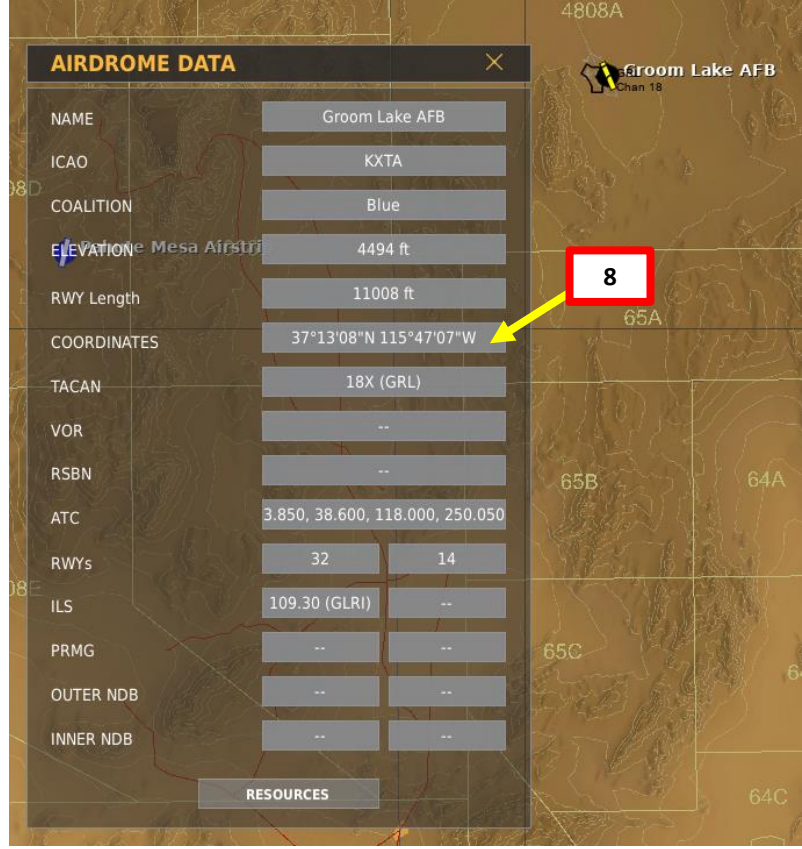
6.2 – HOW TO ADD WAYPOINTS

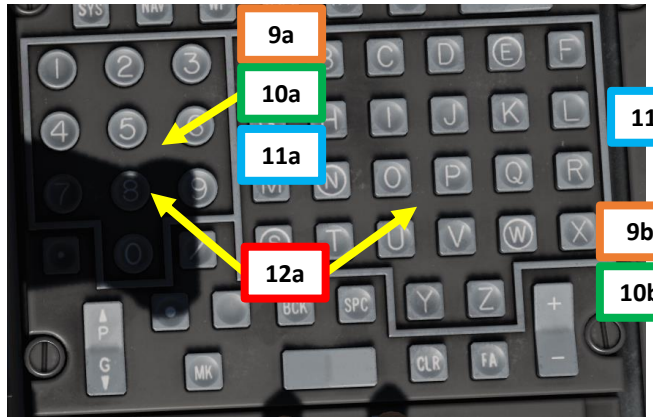
1. Set Auxiliary Avionics Panel (AAP) Steerpoint Selector Knob to MISSION (you access all waypoints available for the current mission).
2. Set Auxiliary Avionics Panel (AAP) CDU (Control Display Unit) Selector Knob to OTHER. This will allow you to use the F*unction Select Keys (FSK)*.
3. Press the WP (Waypoint) FSK.
4. Select the WAYPOINT branch.
5. Select the "Copy to available mission point" LSK (?6 as shown in image below).
6. This will copy the contents of the selected waypoint into an available mission point slot that is not currently being used (slot 6 in the case below).



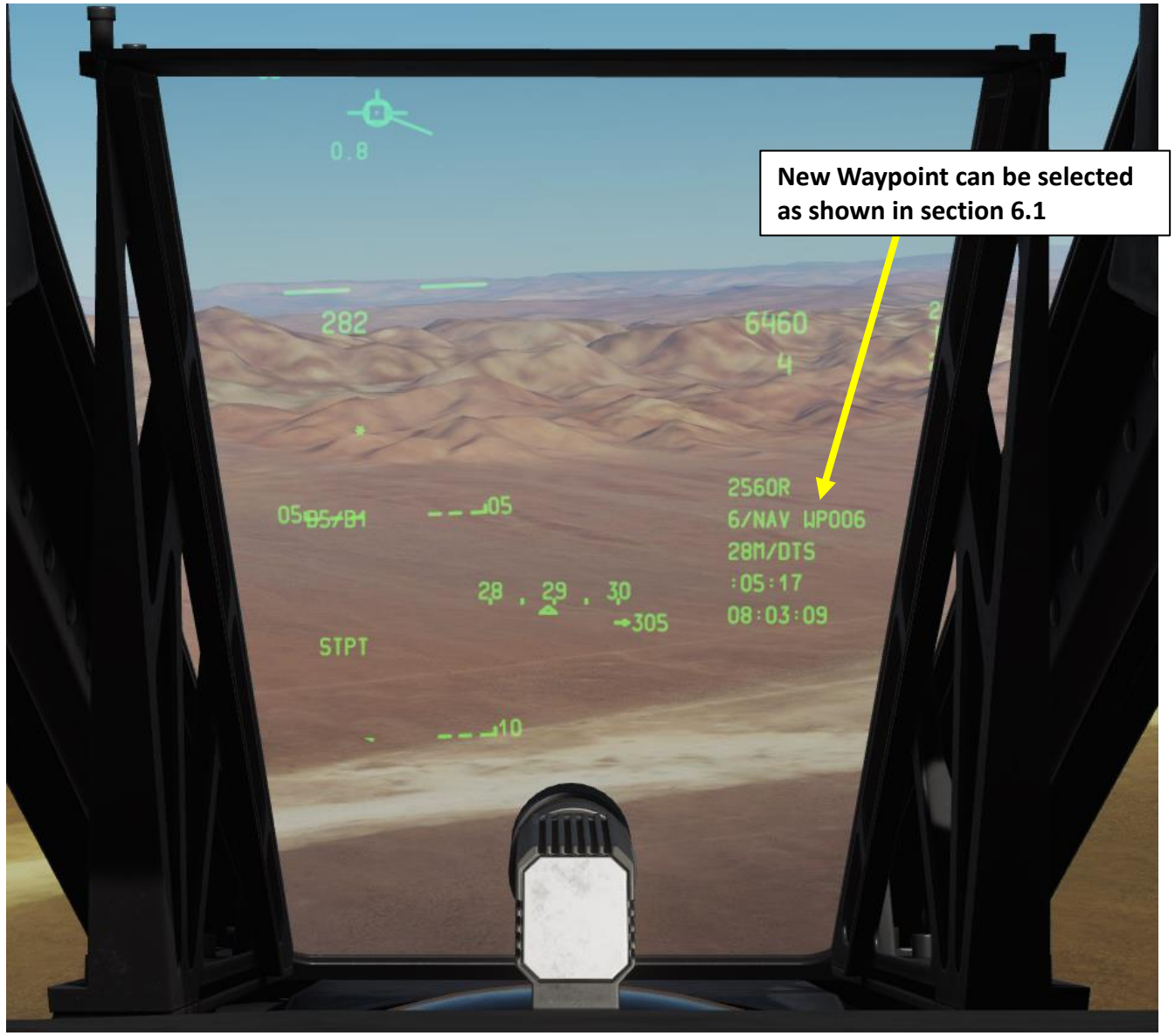
6 – WAYPOINTS
6.2 – HOW TO ADD WAYPOINTS

7. Select desired coordinate format.
    - L/L stands for Latitude/Longitude.
    - UTM stands for Universal Transverse Mercator, which is related to MGRS (Military Grid Reference System) coordinate format.
    - We will choose L/L for simplicity. See the GBU-38 JTAC tutorial for UTM coordinates.
8. We will add the coordinates (Deg, minutes, decimal minutes) for Groom Lake AFB:
    - **37°13'08'' North 115°47'07'' West (Deg, minutes, seconds)**
    - **37°13.133' North 115°47.116' West (Deg, minutes, decimal minutes)**
    - **Elevation 4494 ft**
9. Enter the latitude of the new waypoint using the keypads/scratchpad (***3713133***) and press the LSK (Line Select Key) next to the latitude field (N or S).
10. Enter the longitude of the new waypoint using the keypads/scratchpad (***11547116***) and press the LSK next to the longitude field (E or W).
11. Enter the elevation of the new waypoint in feet using the keypads/scratchpad (***4494***) and press the LSK next to the elevation field (EL).
12. Enter a unique name for the new waypoint (i.e. NAV WP006) using the keypads/scratchpad and press the LSK next to the name field.
13. And that's it! Your new waypoint is now created.





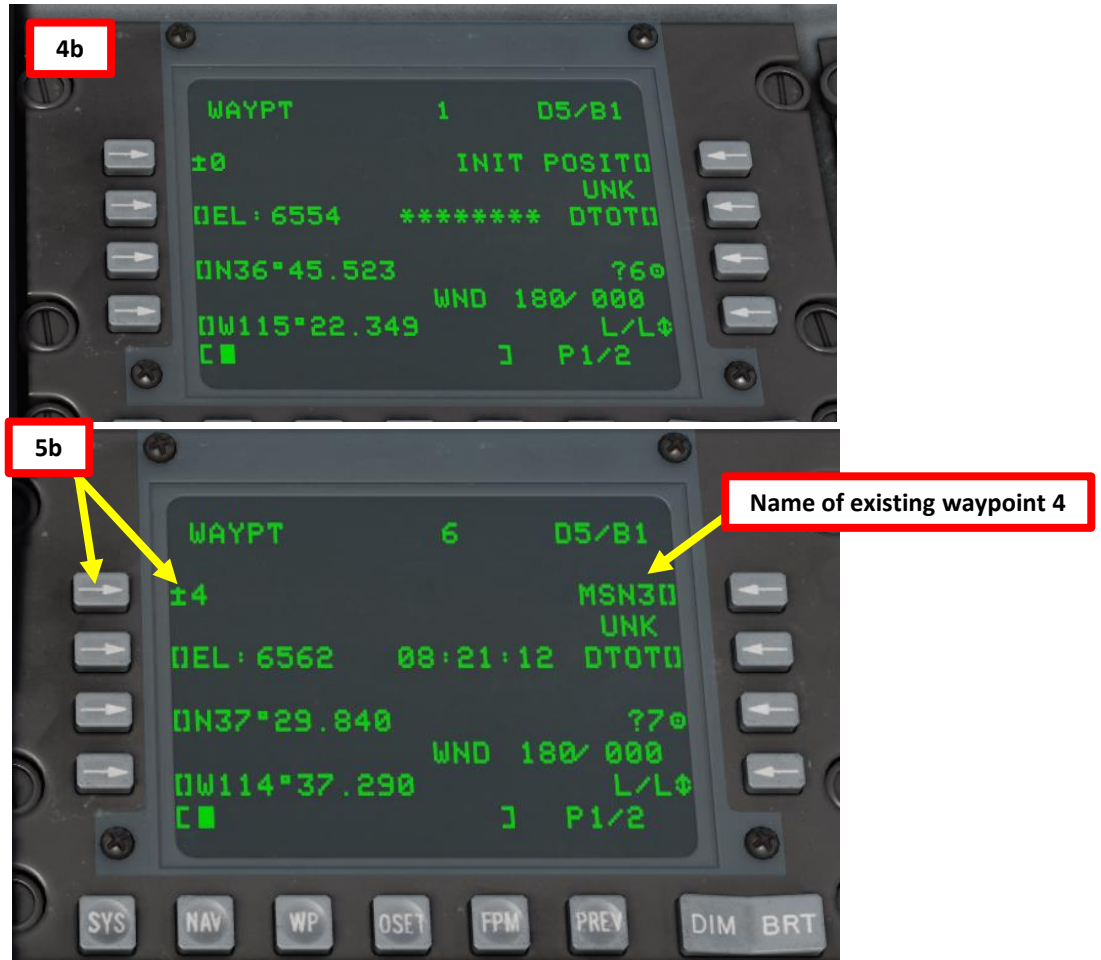
6 – WAYPOINTS
6.2 – HOW TO ADD WAYPOINTS



6 – WAYPOINTS

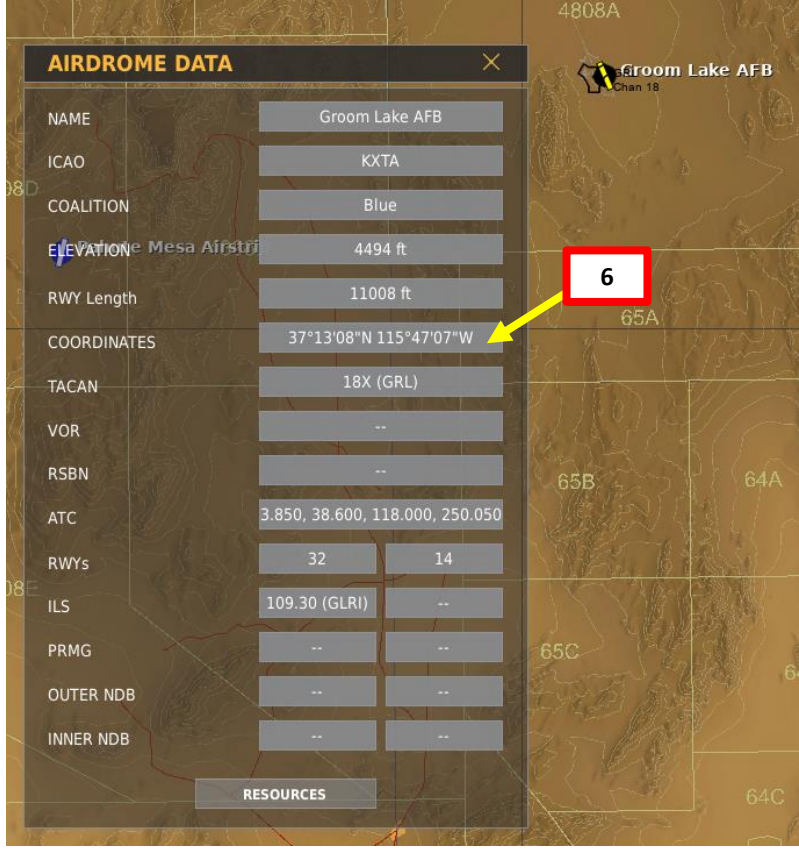
6.3 – HOW TO EDIT WAYPOINTS

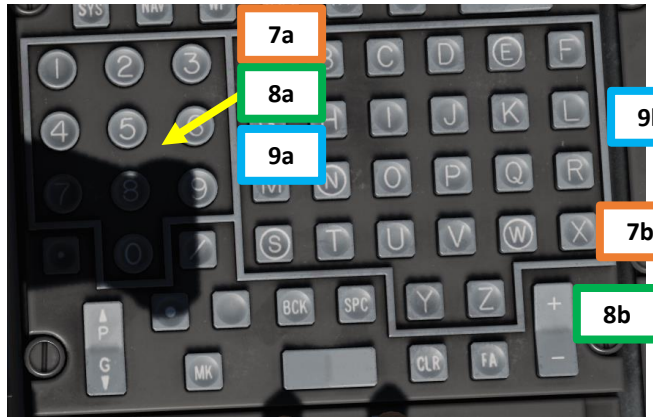
1. Set Auxiliary Avionics Panel (AAP) Steerpoint Selector Knob to MISSION (you access all waypoints available for the current mission)
2. Set Auxiliary Avionics Panel (AAP) CDU (Control Display Unit) Selector Knob to OTHER. This will allow you to use the F*unction Select Keys (FSK)*.
3. Press the WP (Waypoint) FSK.
4. Select the WAYPOINT branch.
5. Select the waypoint you want to edit entering its number on the CDU keypad, then selecting the LSK (Line Select Key) next to the Waypoint Number field.



6 – WAYPOINTS
6.3 – HOW TO EDIT WAYPOINTS

6. We will modify Waypoint 4's coordinates (Deg, minutes, decimal minutes) to the coordinates for Groom Lake AFB:
   - **37°13'08'' North 115°47'07'' West (Deg, minutes, seconds)**
   - **37°13.133' North 115°47.116' West (Deg, minutes, decimal minutes)**
   - **Elevation 4494 ft**
7. Edit the latitude of the existing waypoint using the keypads/scratchpad (***3713133***) and press the LSK (Line Select Key) next to the latitude field (N or S).
8. Edit the longitude of the existing waypoint using the keypads/scratchpad (***11547116***) and press the LSK next to the longitude field (E or W).
9. Edit the elevation of the existing waypoint in feet using the keypads/scratchpad (***4494***) and press the LSK next to the elevation field (EL).

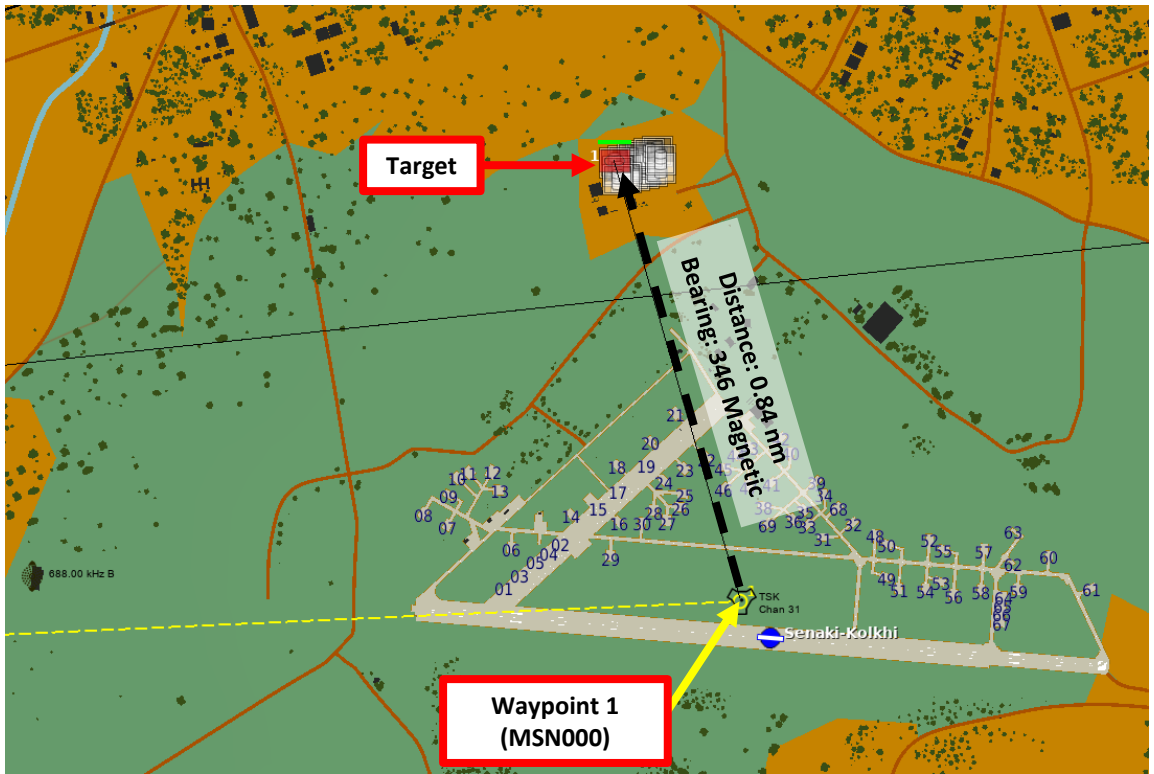


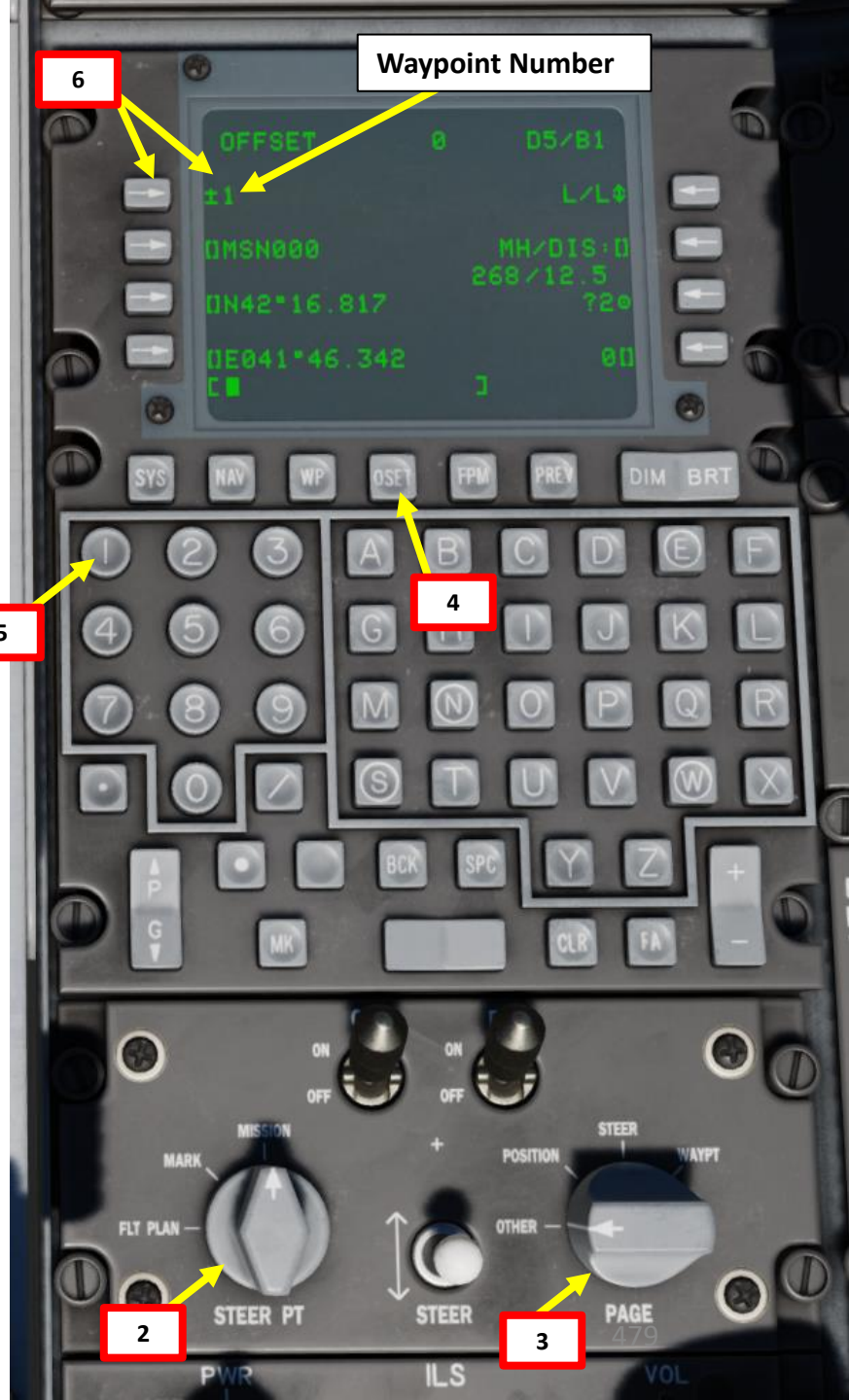


6 – WAYPOINTS

6.4 – WAYPOINT OFFSET (OSET)

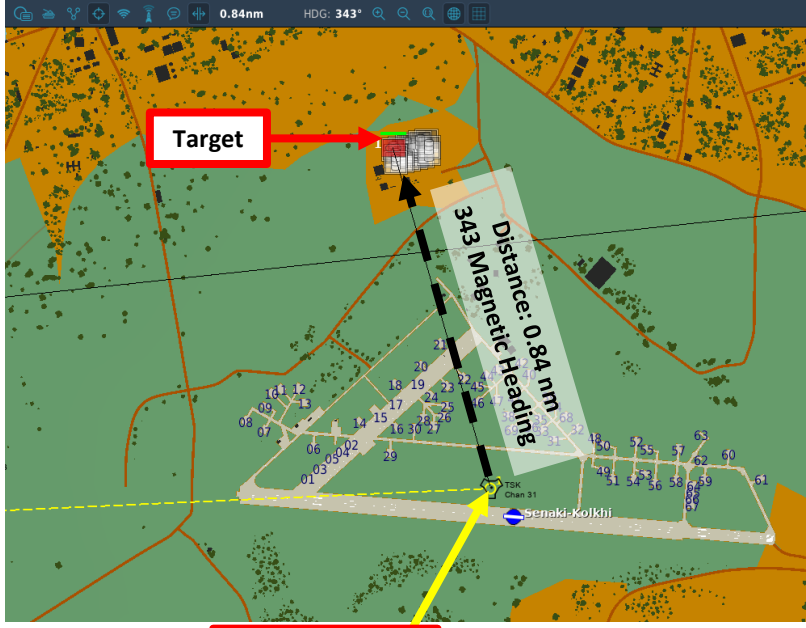
1. If a target location is given to you in relationship to an existing waypoint, you can create a new waypoint with the "Waypoint Offset" function. In this example, the target is located 0.84 nm of Waypoint 1 with a Magnetic Heading of 346 deg.
2. Set Auxiliary Avionics Panel (AAP) Steerpoint Selector Knob to MISSION (you access all waypoints available for the current mission).
3. Set Auxiliary Avionics Panel (AAP) CDU (Control Display Unit) Selector Knob to OTHER. This will allow you to use the F*unction Select Keys (FSK)*.
4. Press the OSET (Offset) FSK.
5. On the CDU keypad, enter reference waypoint number that we will use to set the offset from (i.e. "1" for Waypoint 1).
6. Press LSK (Line Select Key) next to Waypoint Number Field.

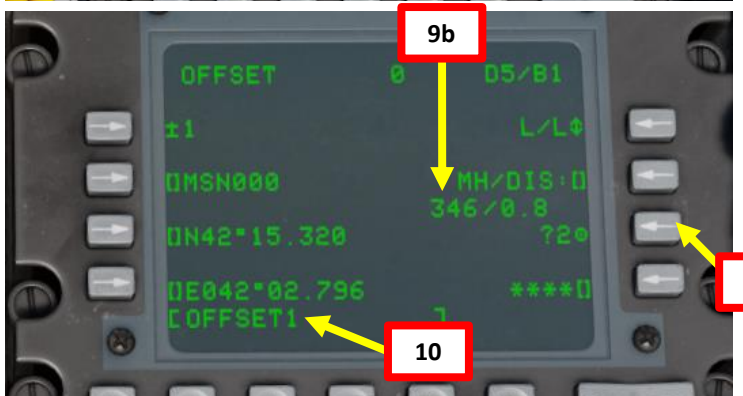


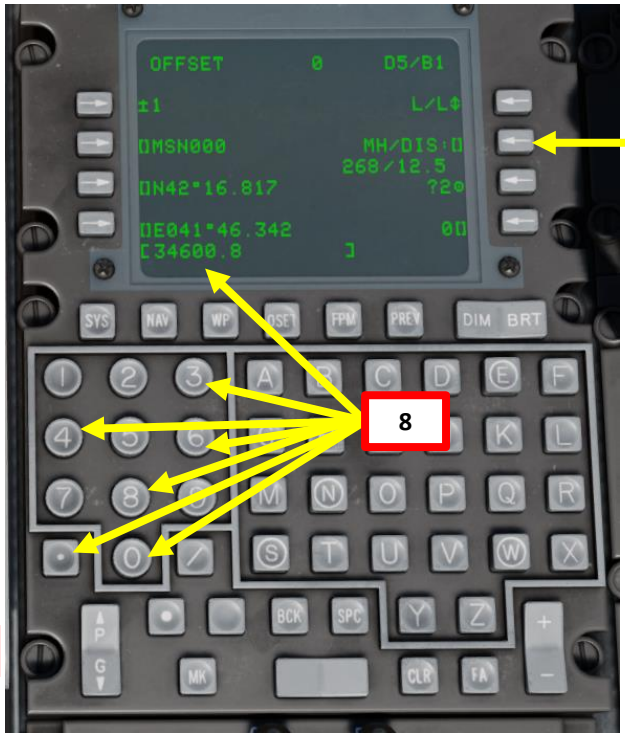


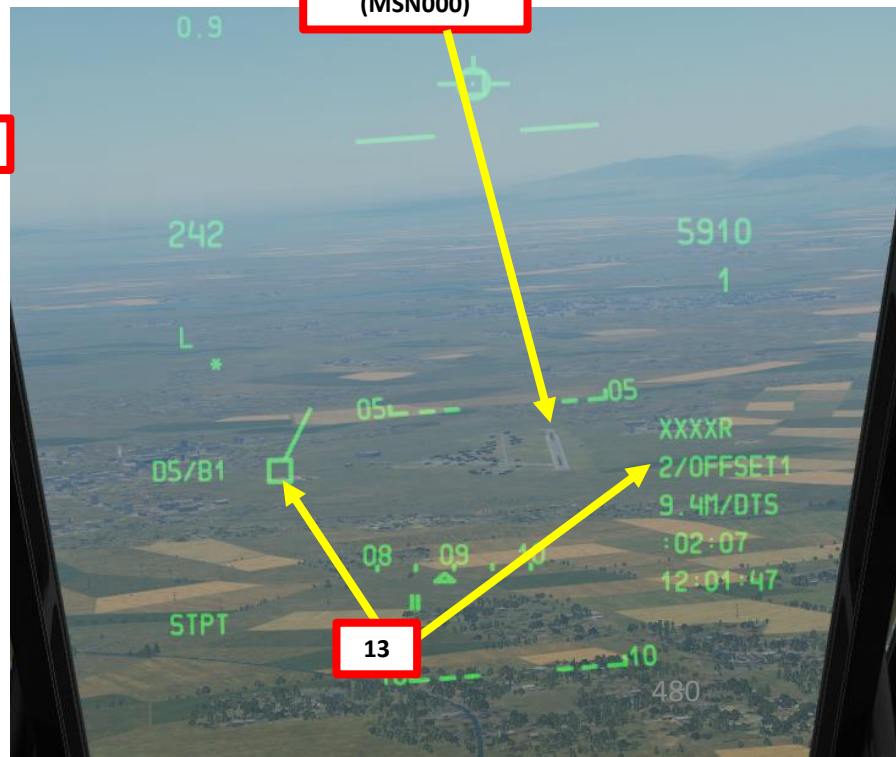
6 – WAYPOINTS
6.4 – WAYPOINT OFFSET (OSET)

7. Our Target position is Waypoint 1 offset by 0.84 nm at a bearing of 346 deg Magnetic.
8. On the CDU keypad enter Magnetic Heading and Distance Offset. Magnetic heading and distance are entered as HHHDD.T when the distance is less than 100 NM, HHHDDD.T when the distance is 100 NM or more but less than 1000 NM, and HHHDDDD.T when the distance is 1000 NM or more and equal to or less than 9999.9 NM. As an example, we will enter 34600.8 (magnetic heading 346, distance 0.8 nm). *Don't forget the dot between 00 and 8.*
9. Press on the LSK next to MH/DIS to enter Magnetic Heading and Distance offset.
10. On the CDU keypad, type the desired Offset Waypoint name (OFFSET1).
11. Select the "Copy to available mission point" LSK (?2 as shown in image below).
12. This will copy the contents of the selected waypoint offset into an available mission point slot that is not currently being used (slot 2 in the case below).
13. The new waypoint generated from Waypoint 1 offset will be called OFFSET1 and can be selected like any other normal waypoint.







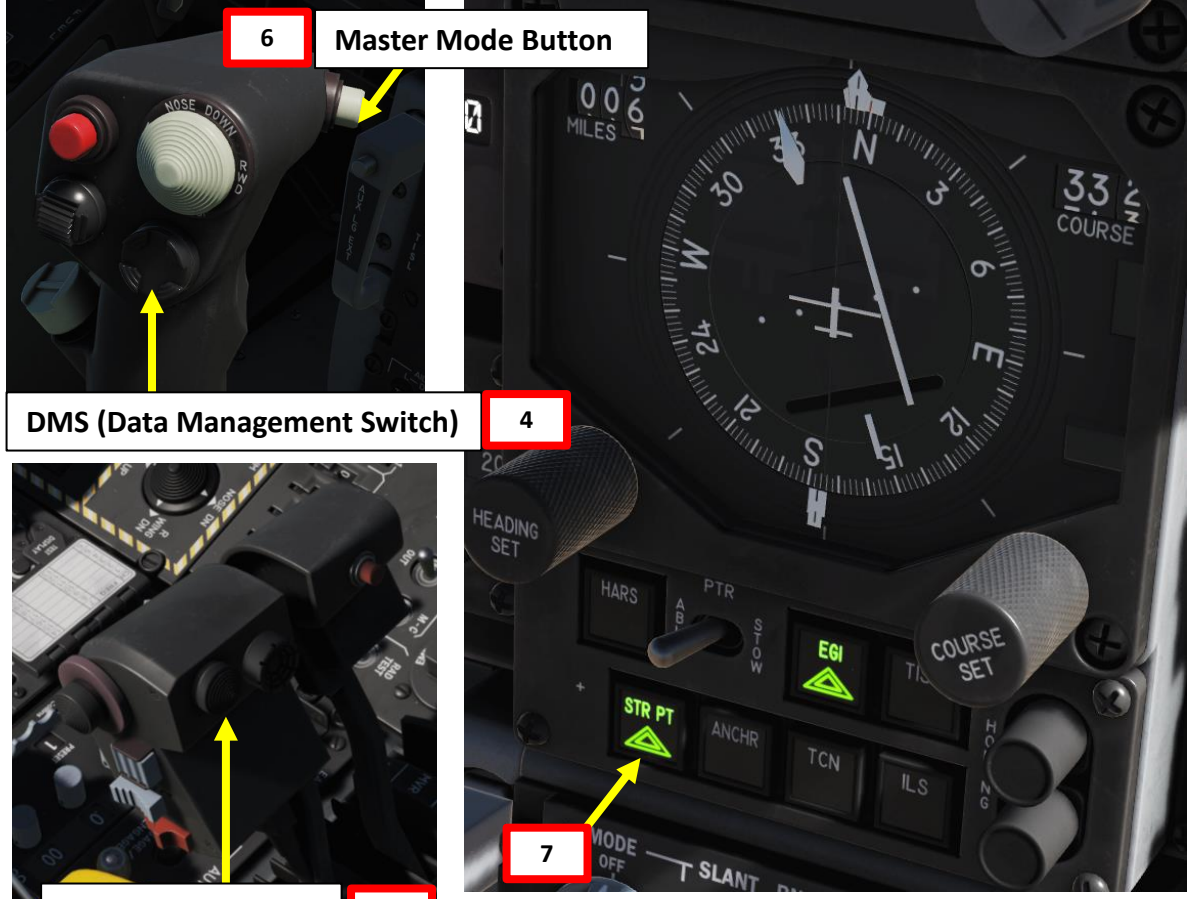


7 – MARKPOINTS

7.1 – MARKPOINT NAVIGATION

A: HOW TO NAVIGATE TO A MARKPOINT

1. Set Auxiliary Avionics Panel (AAP) Steerpoint Selector Knob to MARK (you access all markpoints)
2. Set Auxiliary Avionics Panel (AAP) CDU (Control Display Unit) Selector Knob to OTHER
3. Press Coolie Hat UP to set HUD (Heads-Up Display) as the Sensor of Interest (SOI)
4. Select what Markpoint you want to use as your current Steerpoint. Three different methods are available and are listed in the WAYPOINT section. We will use the DMS switch method.
    - While HUD is SOI, press the DMS (Data Management Switch) UP/DOWN to cycle between waypoints. Each markpoint selected will be set as the Steerpoint
5. Selected Markpoint acting as the Steerpoint will be displayed on the HUD and CDU.
6. Once Steerpoint has been designated, cycle Master Mode to NAV using the Master Mode Button
7. Select STR PT Navigation Mode on the NMSP (Navigation Mode Select Panel)



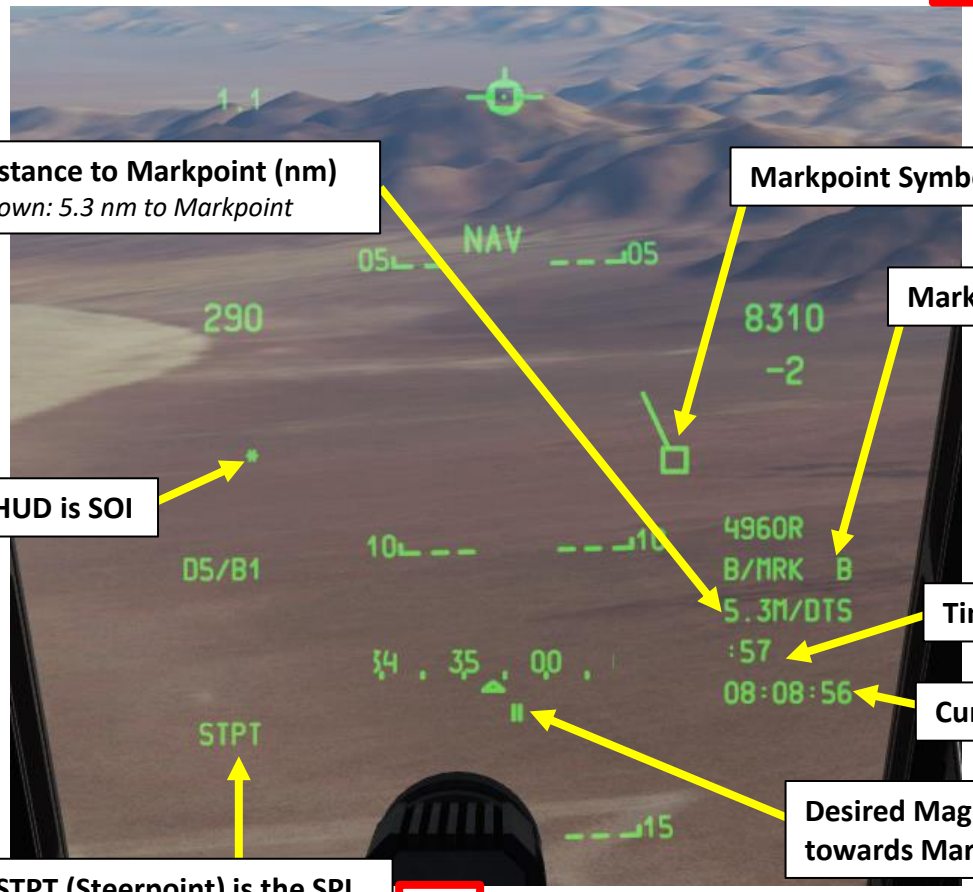
7 – MARKPOINTS
7.1 – MARKPOINT NAVIGATION

A: HOW TO NAVIGATE TO A MARKPOINT

8. If the SPI (Sensor Point of Interest) isn't set to STPT (Steerpoint), press the TMS (Target Management System) Switch AFT LONG to set the Steerpoint/Markpoint as the SPI. Make sure HUD is SOI (Sensor of Interest) with the Coolie Hat UP.
9. Follow steering cues on the HSI (Horizontal Situation Indicator) and HUD (Heads-Up Display)

8

TMS (Target Management System) Switch



Distance to Markpoint (nm)
Shown: 5.3 nm to Markpoint

Markpoint Symbol

Markpoint Number / Name

HUD is SOI

Time to Go (TTG)

Current Time

Desired Magnetic Heading towards Markpoint

STPT (Steerpoint) is the SPI (Sensor Point of Interest)

8

Markpoint Bearing Pointers 1 & 2

Current Heading

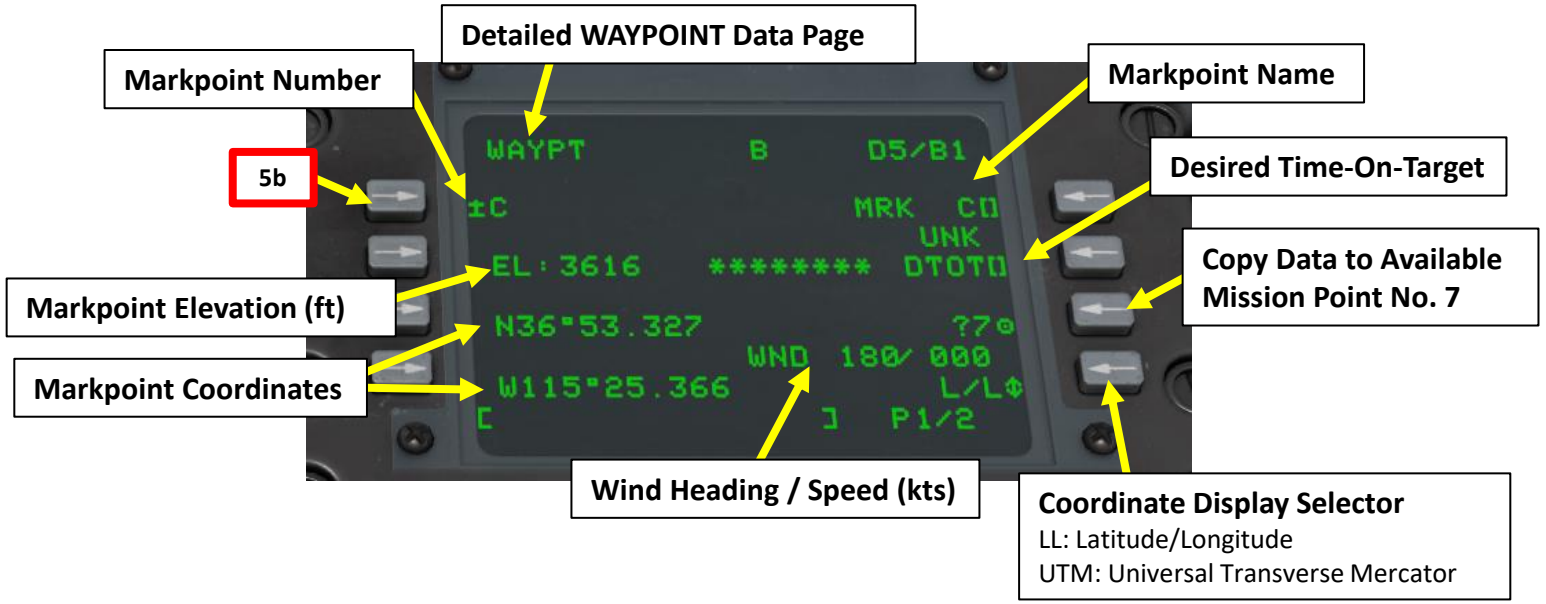
Distance to Markpoint (nm)

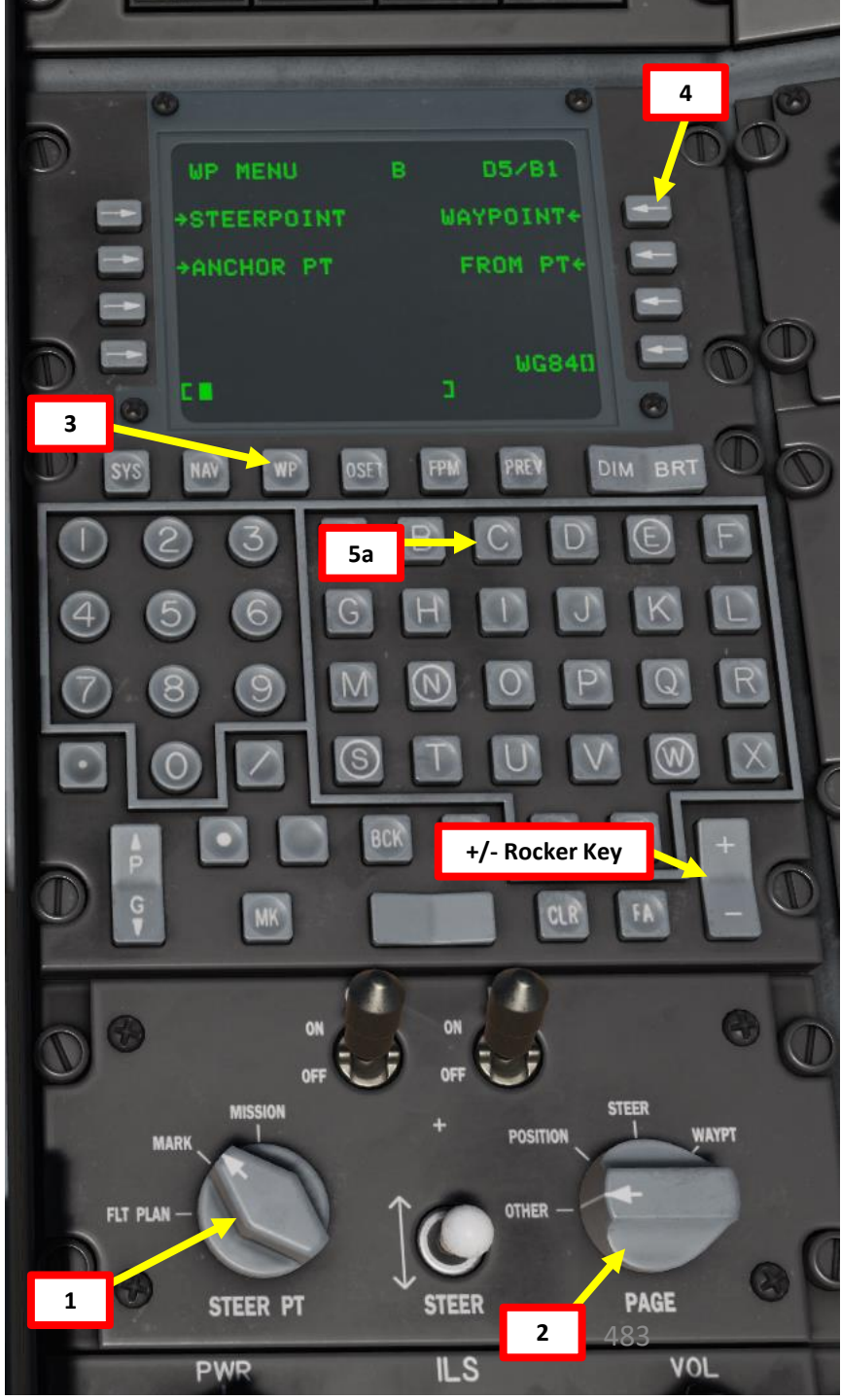
7 – MARKPOINTS

7.1 – MARKPOINT NAVIGATION

B: HOW TO CONSULT MARKPOINT DATA FROM THE CDU

1. Set Auxiliary Avionics Panel (AAP) Steerpoint Selector Knob to MARK (you access all markpoints)
2. Set Auxiliary Avionics Panel (AAP) CDU (Control Display Unit) Selector Knob to OTHER. This will allow you to use the F*unction Select Keys (FSK)*.
3. Press the WP (Waypoint) FSK.
4. Select the WAYPOINT branch.
5. Select the markpoint you want to consult entering its number on the CDU keypad, then selecting the LSK (Line Select Key) next to the Waypoint Number field. We will select Markpoint C.
    - Alternatively, you could also use the +/- rocker key to cycle between markpoints.





7 – MARKPOINTS

7.2 – HOW TO ADD MARKPOINTS

There are three main methods to create markpoints:

Overhead Markpoint

- If you press the MK (markpoint) button on the CDU, a new markpoint will be created at the aircraft location. Each time you press the MK button, a new markpoint will be created in A-Y order (Z is reserved for a weapon release markpoint).

Designated Markpoint

- A point on the ground can be set as a markpoint as determined by the line of sight of an aircraft designation source. These sources include the HUD TDC, the Targeting Pod, Maverick Seeker, or TAD Cursor. To create a markpoint in this fashion, place the designation point at the desired location and then perform a TMS RIGHT SHORT press on the control stick.
- Each TMS right short press will create a new markpoint in order (A-Y).
- For **A-10C II TANK KILLER EXPANSION:** TMS RIGHT LONG will create a SPI (Sensor Point of Interest) on the last created Markpoint.
- To consult an example of how a markpoint is created using a TGP, see **Weapons section 2.6 – GBU-38 JDAM (TARGETING POD).**

Weapon Event

- Each time a weapon is released, a Z markpoint is created. Each subsequent weapon release replaces the last Z markpoint.

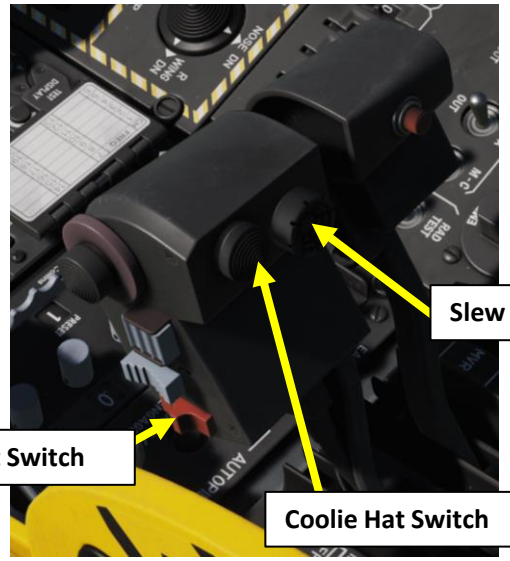
7 – MARKPOINTS
7.2 – HOW TO ADD MARKPOINTS

For owners of the A-10C II "Tank Killer" expansion, there is also an additional way to create markpoints with the HMCS (Helmet-Mounted Cueing System):

Markpoint Creation via HMCS

1. Turn on HMCS Power using the HMCS POWER switch.
2. Set the HMCS as the SOI (press the Coolie Hat Switch DOWN). Make sure the HMCS SOI Asterisk is visible.
3. Press China Hat AFT SHORT to recage the HDC (Helmet Designation Cursor) to the HMD Crosshair
4. Move your helmet to place the HMD crosshair near the desired target you want to designate and create a markpoint over.
5. Use the Slew Control Switch to move the ground-stabilized HDC over the target you want to create a markpoint on.
6. Once HDC is over the desired target, press TMS (Target Management System) RIGHT SHORT to create a markpoint on the HDC.
7. (Optional) You can create a SPI (Sensor Point of Interest) on the last created markpoint by pressing TMS RIGHT LONG.
8. In order to view all available markpoints, set Auxiliary Avionics Panel (AAP) Steerpoint Selector Knob to MARK (you will access all markpoints).

TMS (Target Management System) Switch

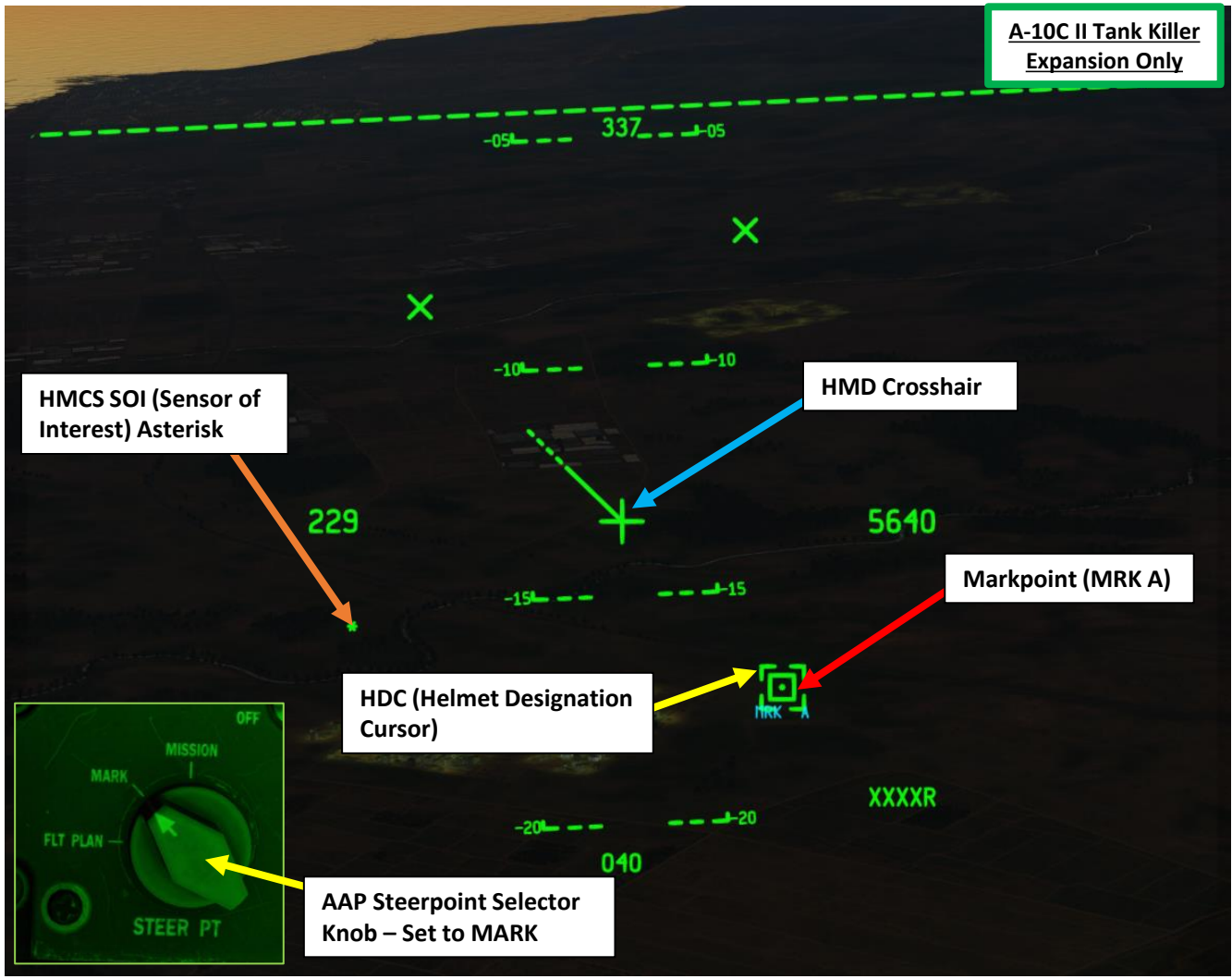


China Hat Switch

Slew Control Switch

Coolie Hat Switch

A-10C II Tank Killer Expansion Only



HMCS SOI (Sensor of Interest) Asterisk

HMD Crosshair

Markpoint (MRK A)

HDC (Helmet Designation Cursor)

AAP Steerpoint Selector Knob – Set to MARK

Scorpion HMCS (Helmet-Mounted Cueing System) Power Switch

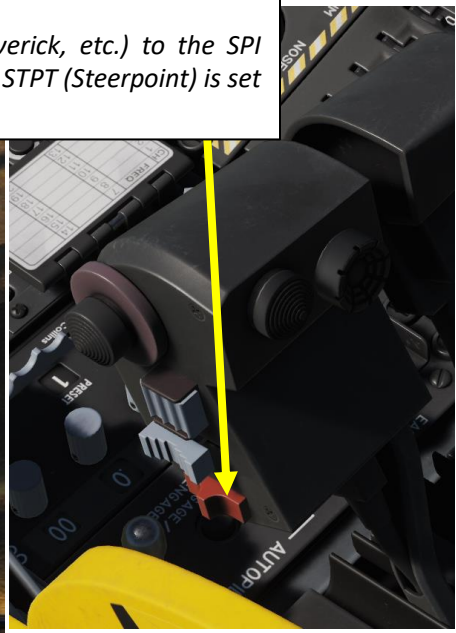
- *ON (FWD): Power to the HMCS through the aircraft electrical power supply system*

7 – MARKPOINTS
7.3 – USING MARKPOINTS

You can use markpoints just like regular waypoints. This means that they can be used to slave other sensors to them (i.e. targeting pod or Maverick Missile). An example of that is available in the **Weapons section 2.6 – GBU-38 JDAM (TARGETING POD).**

China Hat Switch FWD LONG

Allows you to slave all sensors (TGP, Maverick, etc.) to the SPI (Sensor Point of Interest), but only if current STPT (Steerpoint) is set to a markpoint and this steerpoint is the SPI.



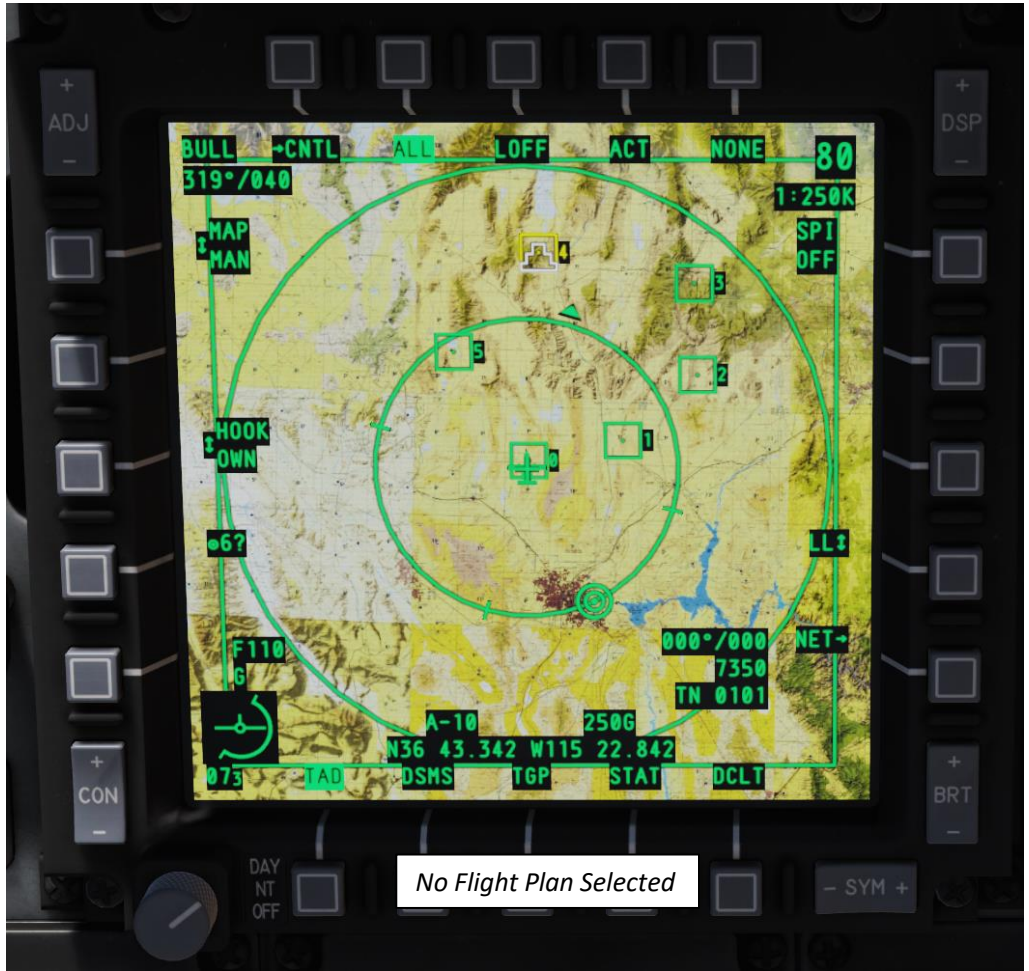
8 – FLIGHT PLANS

8.1 – CREATING A FLIGHT PLAN

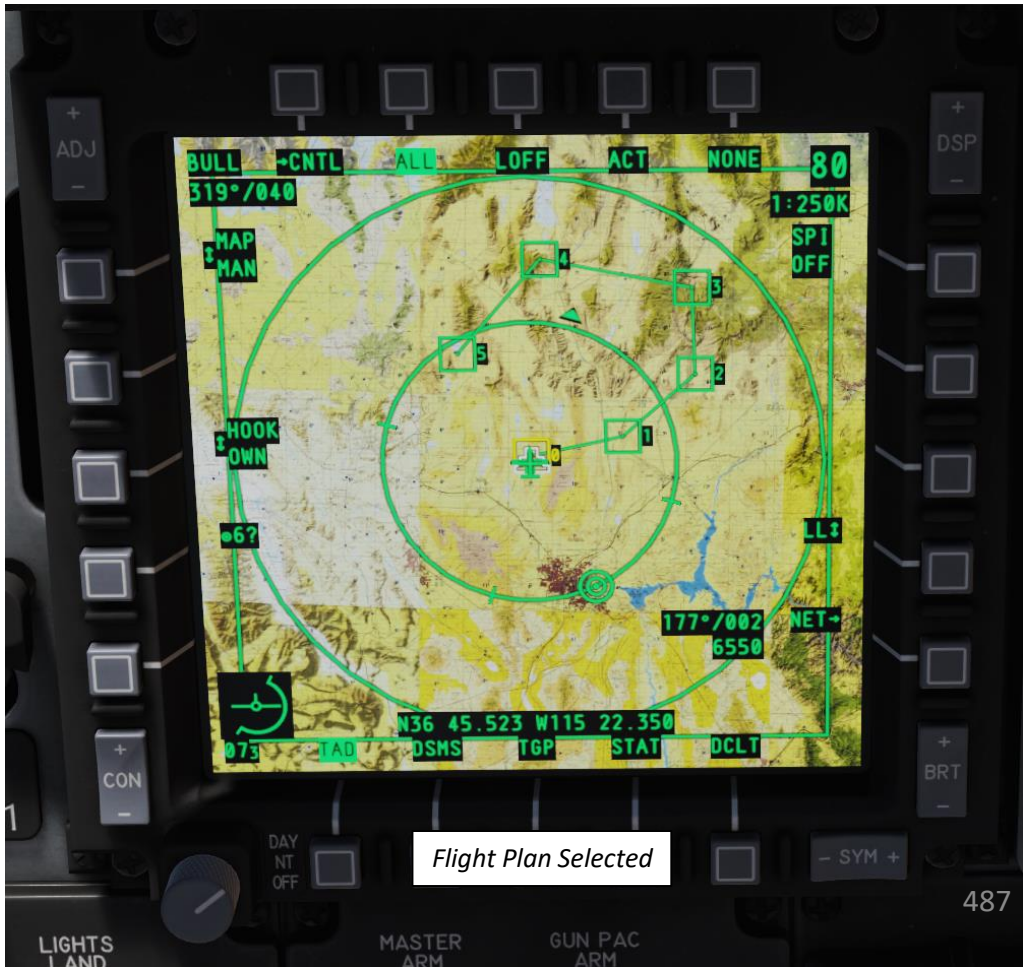
A Flight Plan is a pre-determined sequence of up to 40 waypoints. You can have multiple flight plans available.

The advantage of the Flight Plan is that it allows you to:

- View all waypoints of interest at once
- Drawing of lines between waypoints on the TAD (route)
- Ability to cycle through each waypoint in the Flight Plan and the selected Flight Plan waypoint becomes the steerpoint
- Create multiple Flight Plans



No Flight Plan Selected

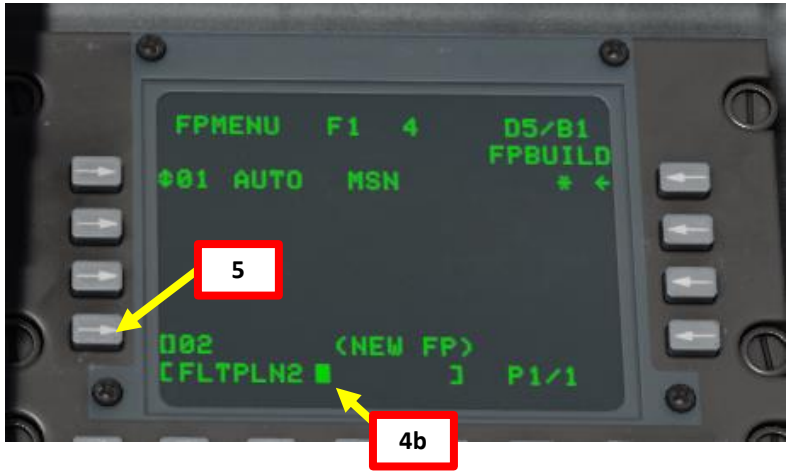


Flight Plan Selected

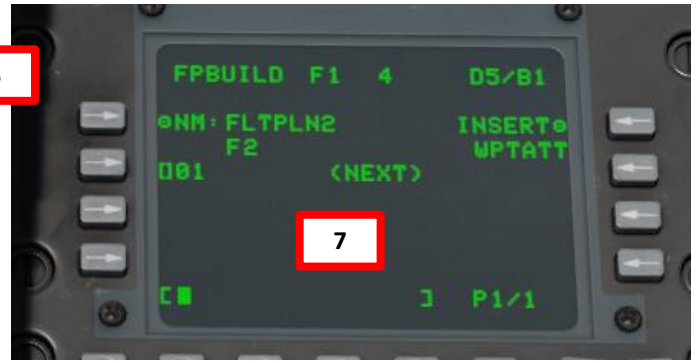
8 – FLIGHT PLANS

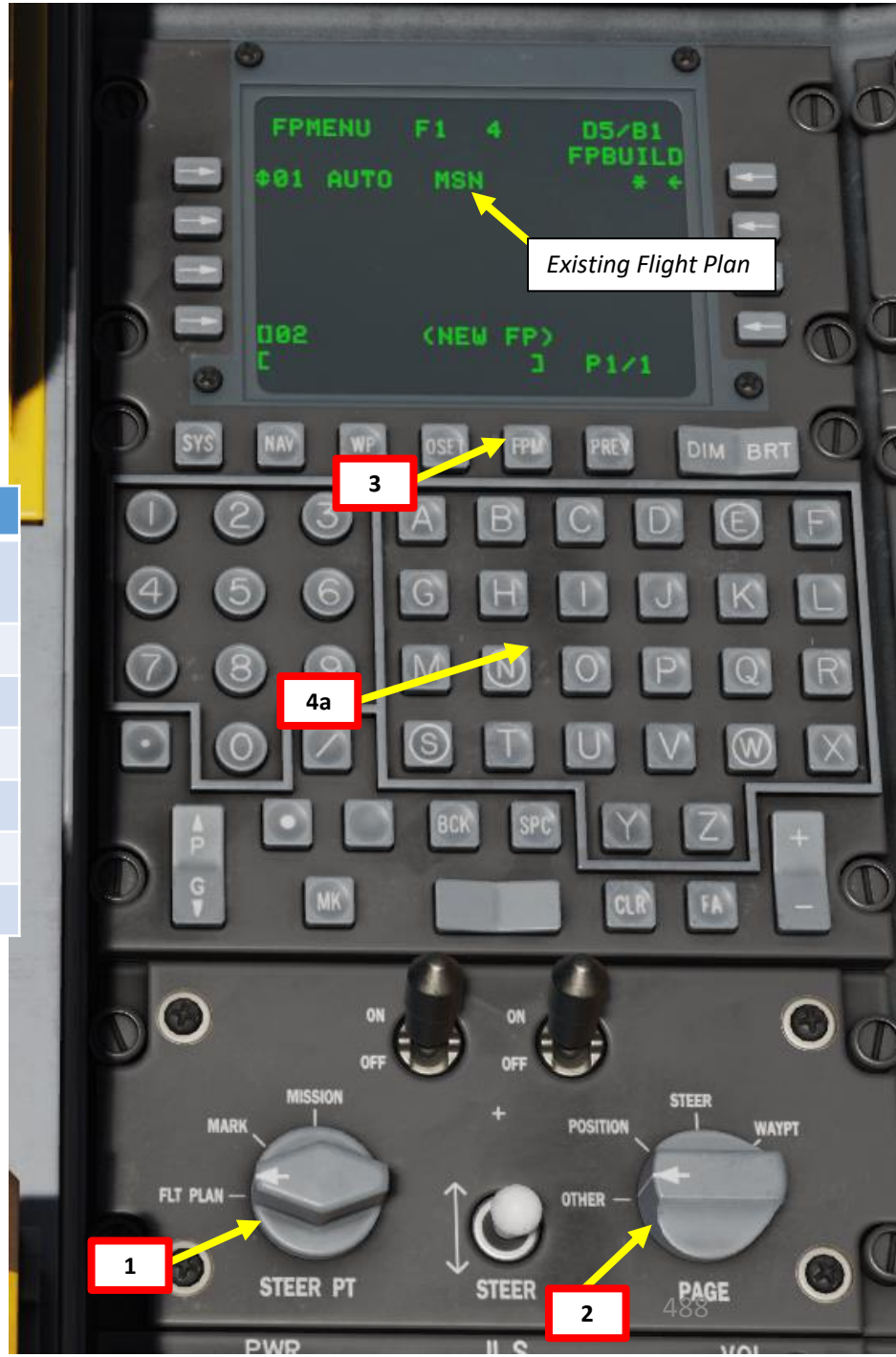
8.1 – CREATING A FLIGHT PLAN

1. Set Auxiliary Avionics Panel (AAP) Steerpoint Selector Knob to FLT PLAN. FLT PLAN must be selected to display the flight plan route on the Tactical Awareness Display (TAD).
2. Set Auxiliary Avionics Panel (AAP) CDU (Control Display Unit) Selector Knob to OTHER. This will allow you to use the F*unction Select Keys (FSK)*.
3. Press the FPM (Flight Plan Menu) FSK.
4. On the CDU keyboard, type the name of the new flight plan you want to create (i.e. *FLTPLN2*).
5. Press the LSK (Line Select Key) next to the NEW FP field to create the new FLTPLN2 flight plan.
6. Press the LSK next to FPBUILD FLTPLN2 to enter the Flight Plan Build page.
7. The FPBUILD page lists all waypoints selected to make the Flight Plan.



Flight Plan FLTPLN2 Composition		
Waypoint Number	**Waypoint Name**	**Flight Plan Sequence Index**
00	INIT POSIT	01
01	MSN000	02
02	MSN1	03
03	MSN2	04
04	MSN3	05
05	MSN4	06

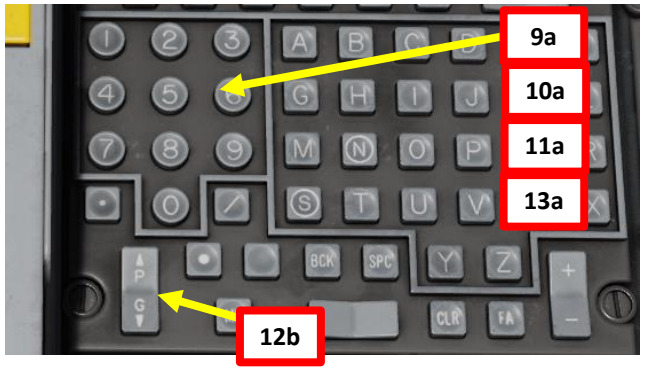


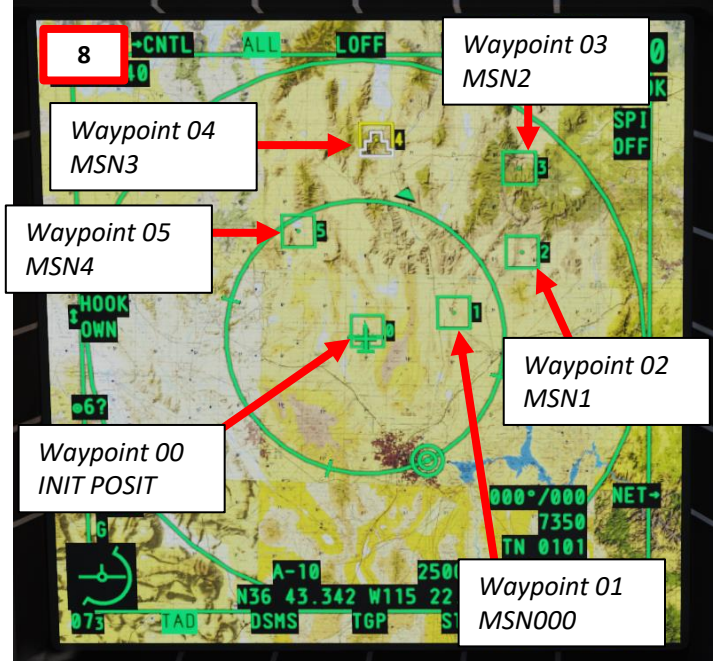


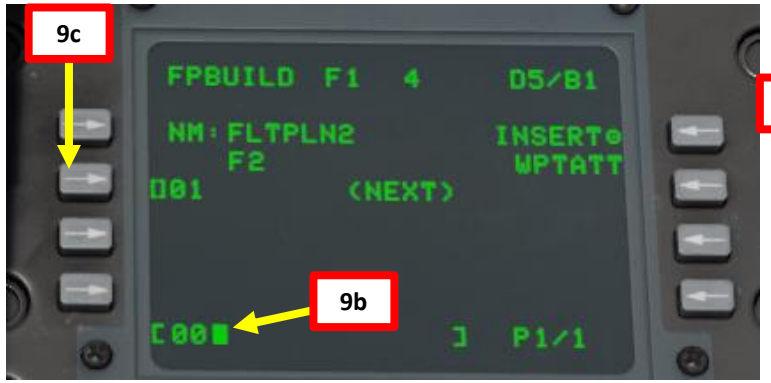
8 – FLIGHT PLANS

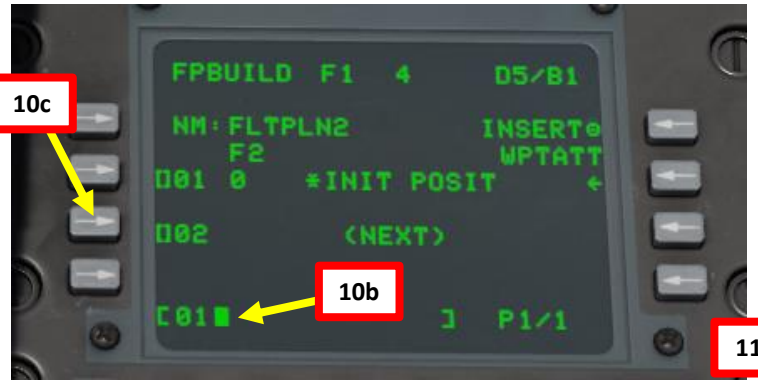
8.1 – CREATING A FLIGHT PLAN

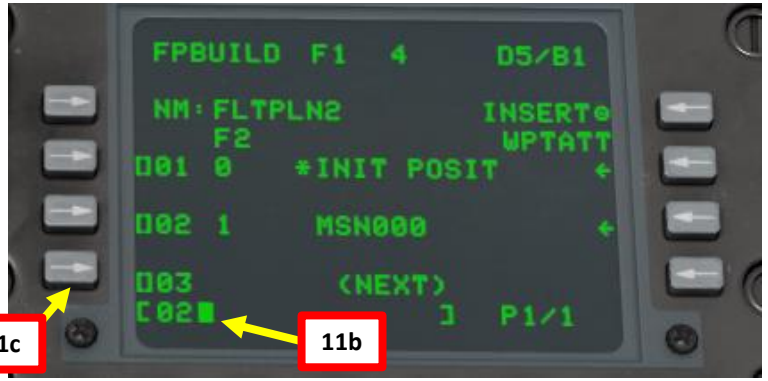
8. We want to select Waypoints 0 (INIT POSIT, initial aircraft position), 1, 2, 3, 4 and 5 to build our flight plan with.
9. Enter Waypoint Number **00** (Init Posit Waypoint) on the CDU keyboard, then press LSK next to "01" to assign the first waypoint.
10. Enter Waypoint Number **01** (MSN000 Waypoint) on the CDU keyboard, then press LSK next to "02" to assign second waypoint.
11. Enter Waypoint Number **02** (MSN1 Waypoint) on the CDU keyboard, then press LSK next to "03" to assign third waypoint.
12. Press Page Selector Rocker Switch to go to Page 2.
13. Enter Waypoint Number **03** (MSN2 Waypoint) on the CDU keyboard, then press LSK next to "04" to assign fourth waypoint.
14. Repeat for Waypoint Number **04** (fifth waypoint) and Waypoint Number **05** (sixth waypoint).

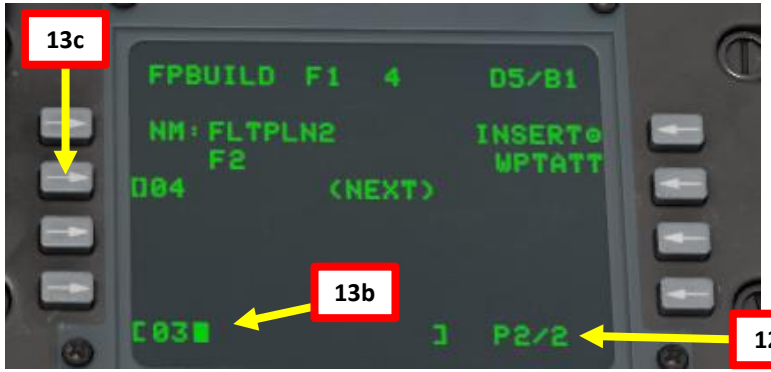


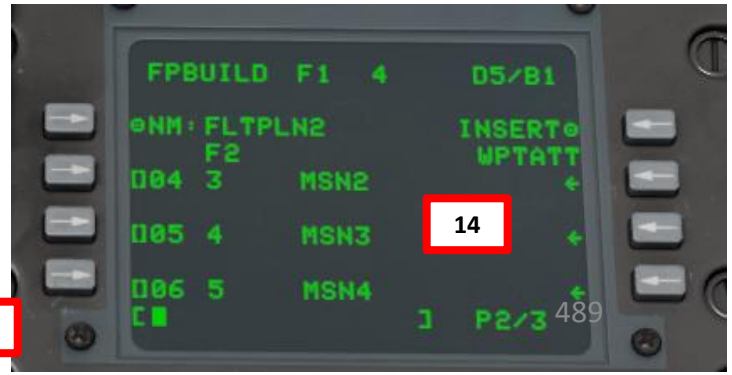








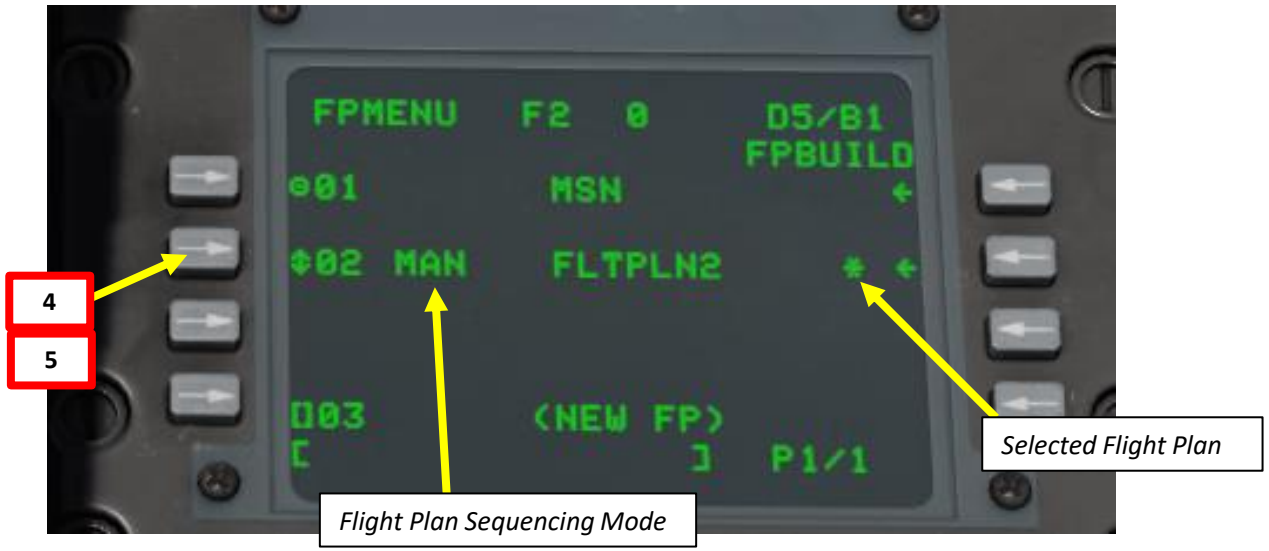




8 – FLIGHT PLANS
8.2 – USING A FLIGHT PLAN

To select a flight plan from the list of available flight plans:

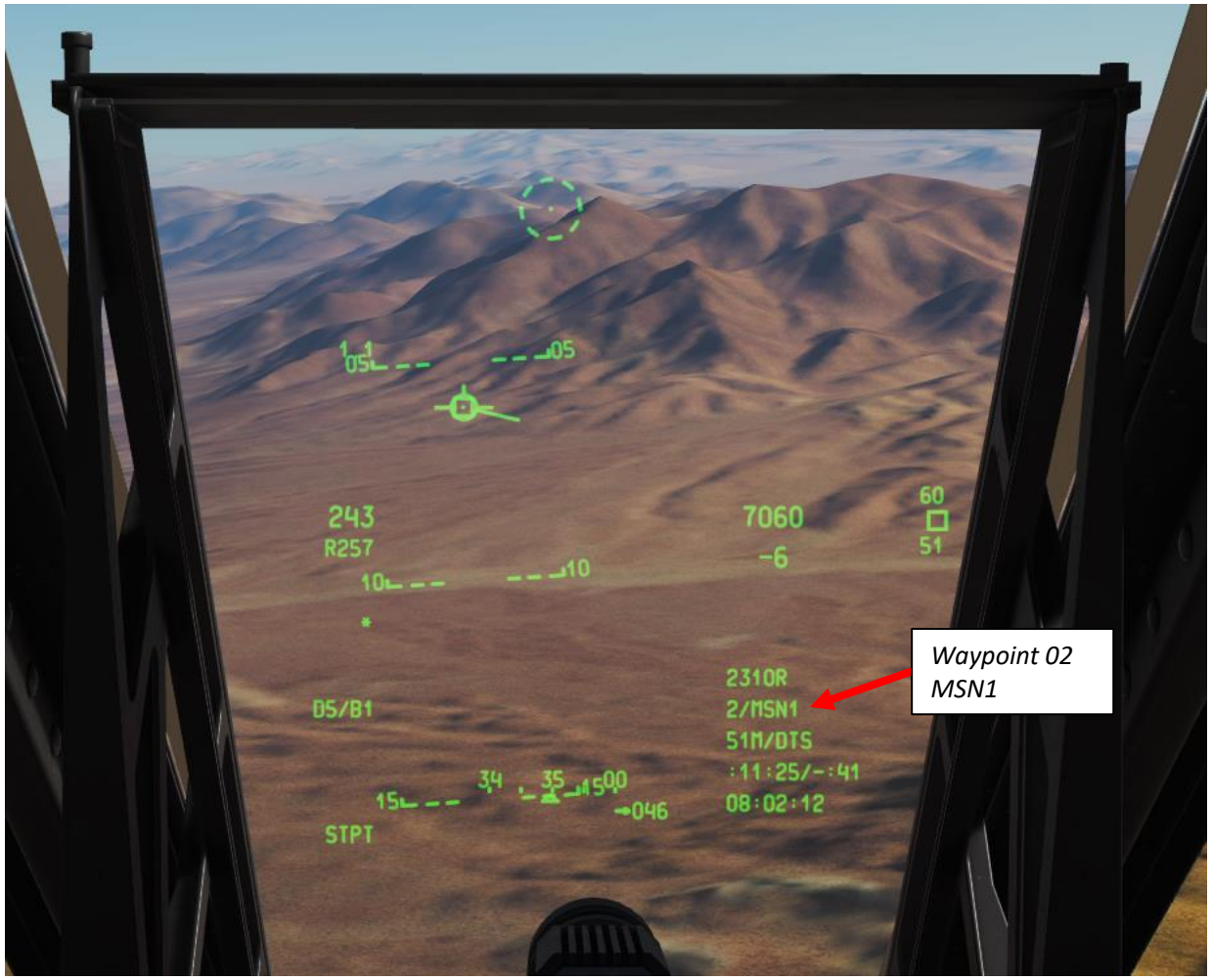
1. Set Auxiliary Avionics Panel (AAP) Steerpoint Selector Knob to FLT PLAN. FLT PLAN must be selected to display the flight plan route on the Tactical Awareness Display (TAD).
2. Set Auxiliary Avionics Panel (AAP) CDU (Control Display Unit) Selector Knob to OTHER. This will allow you to use the F*unction Select Keys (FSK)*.
3. Press the FPM (Flight Plan Menu) FSK.
4. Press on the LSK next to the flight plan you want to select (FLTPLN2 in our case). The asterisk will indicator the active flight plan.
5. To select either “Automatic” or “Manual” waypoint sequencing, you can press on the LSK next to your active flight plan to toggle the AUTO or MAN mode. “Automatic Waypoint Sequencing” is a fancy way of saying that when you are close enough to the selected steerpoint/waypoint, the navigation system will select the next waypoint in the flight plan sequence automatically.

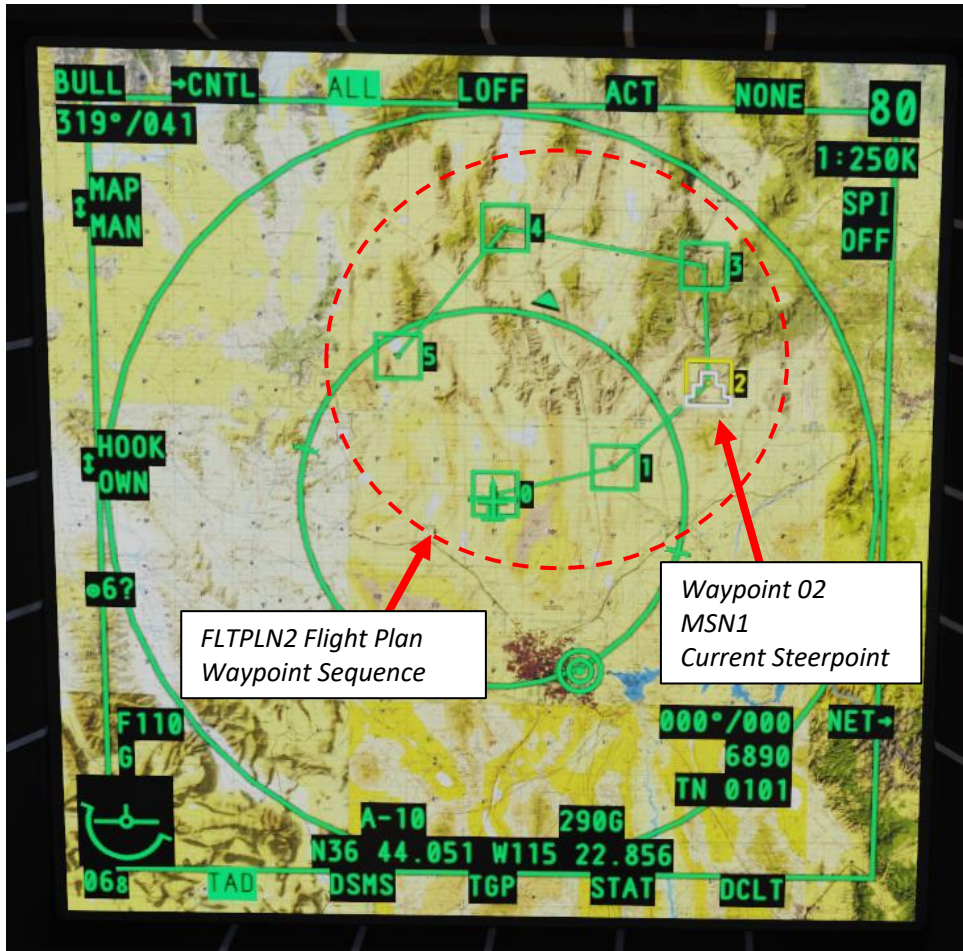


8 – FLIGHT PLANS
8.2 – USING A FLIGHT PLAN

6. On the TAD (Tactical Awareness Display), you will now see that waypoints in the flight plan sequence are now linked with green lines.

Flight Plan FLTPLN2 Composition		
Waypoint Number	Waypoint Name	Flight Plan Sequence Index
00	INIT POSIT	01
01	MSN000	02
02	MSN1	03
03	MSN2	04
04	MSN3	05
05	MSN4	06

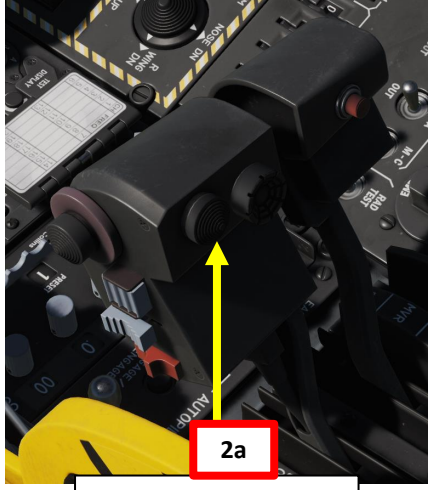


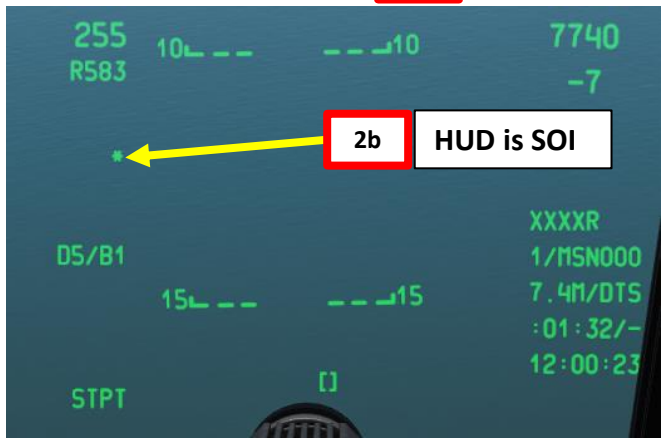


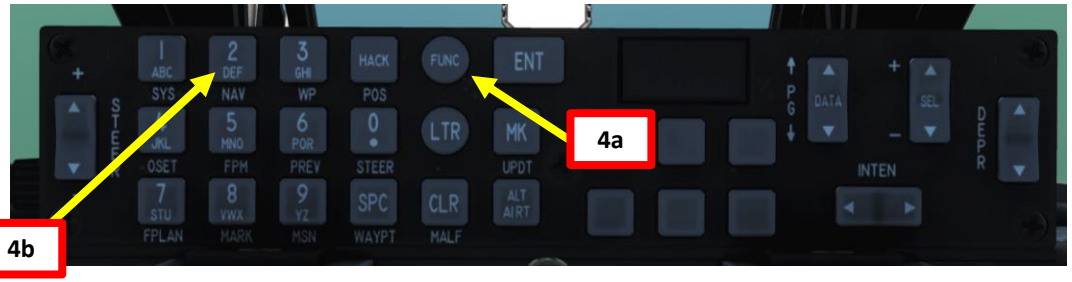
9 – DIVERT FUNCTION

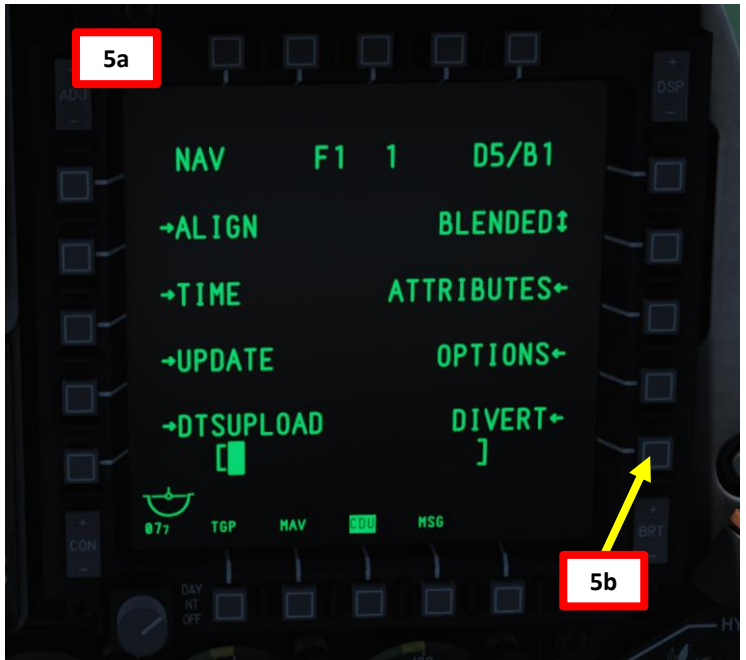
If you are lost, you can use the CDU (Control Display Unit) to help you find a place to land. The "DIVERT" function offers you information on the closest airfields available.

1. Set Auxiliary Avionics Panel (AAP) CDU (Control Display Unit) Selector Knob to OTHER. This will allow you to use the F*unction Select Keys (FSK)*.
2. Make your HUD SOI by pressing COOLIE HAT UP SHORT.
3. Select CDU (Control Display Unit) page.
4. On the UFC, press "FUNC" (function) and "2" (NAV functions)
5. On the CDU page, a new NAV menu will appear. Press the OSB to select the "DIVERT" menu.









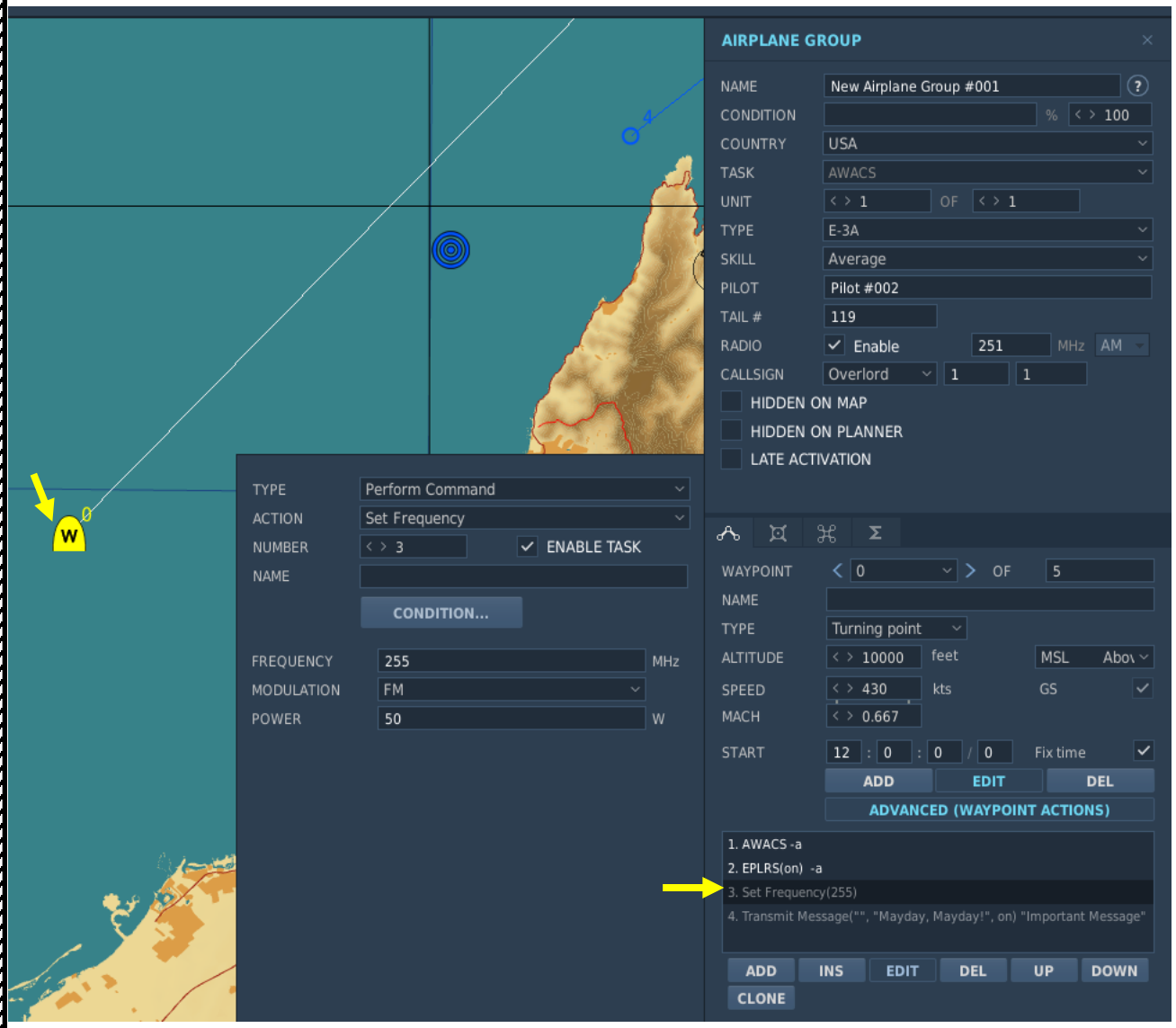
9 – DIVERT FUNCTION

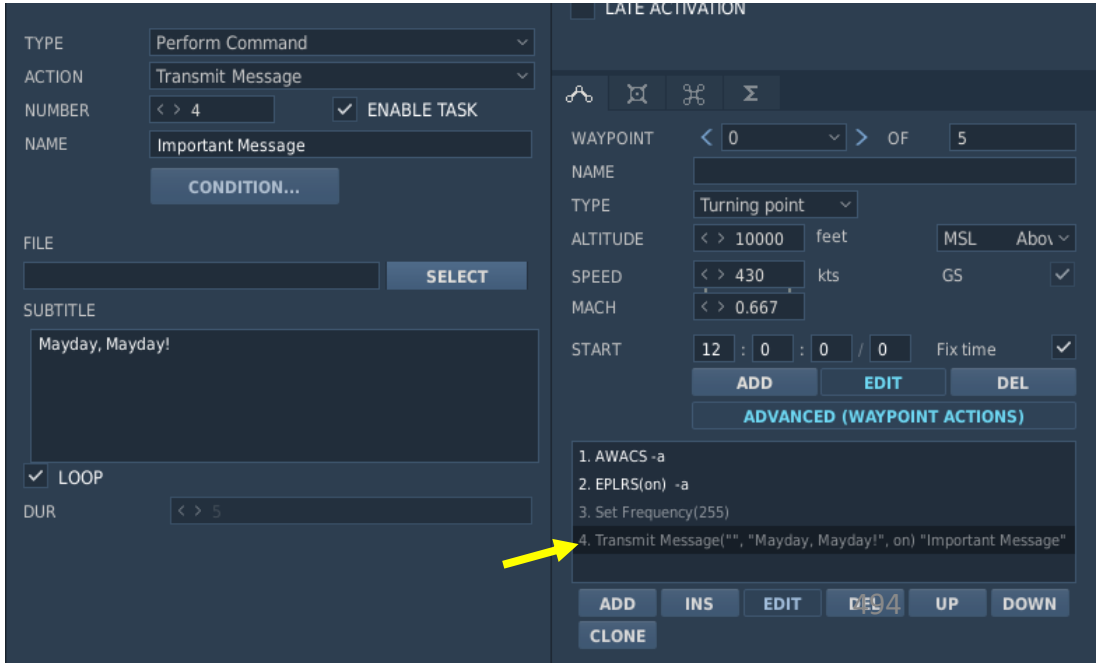
6. The divert menu will display the closest airfields to you. If we want to go to Khasab, just by having a quick look at it, we know that Khasab is already stocked in our computer in WAYPOINT 60. We also know that we need to go to a heading of 125 for 14.5 nautical miles, with a TTG (time to go) of about 2 minutes 58 seconds.
7. If we select the Khasab OSB, we can have even more details in the FLDINFO (Field Information) page.
8. The FLDINFO menu for Khasab shows us that there is one runway oriented at 190 with an elevation of 48 ft and a length of 7513 ft, that there is an ILS system in place set at frequency 110.30, that there is a TACAN station set to 84 and that the radio frequency to communicate with the control tower is 124.350.
9. Even better: if you look at your HUD you will now see that Khasab is your current steerpoint and that the HUD is showing you where to go to find it.
10. If you want to find another airfield or follow another waypoint, since your HUD is already SOI you can simply use DMS UP SHORT or DMS DOWN SHORT to cycle through more waypoints.

DMS (Data Management Switch)

10 – ADF (AUTOMATIC DIRECTION FINDER) NAVIGATION

The Automatic Direction Finder of the A-10C can only track radio transmissions sent on either UHF FM or VHF FM frequency bands. This means that it cannot track NDBs in the KHz frequency range.





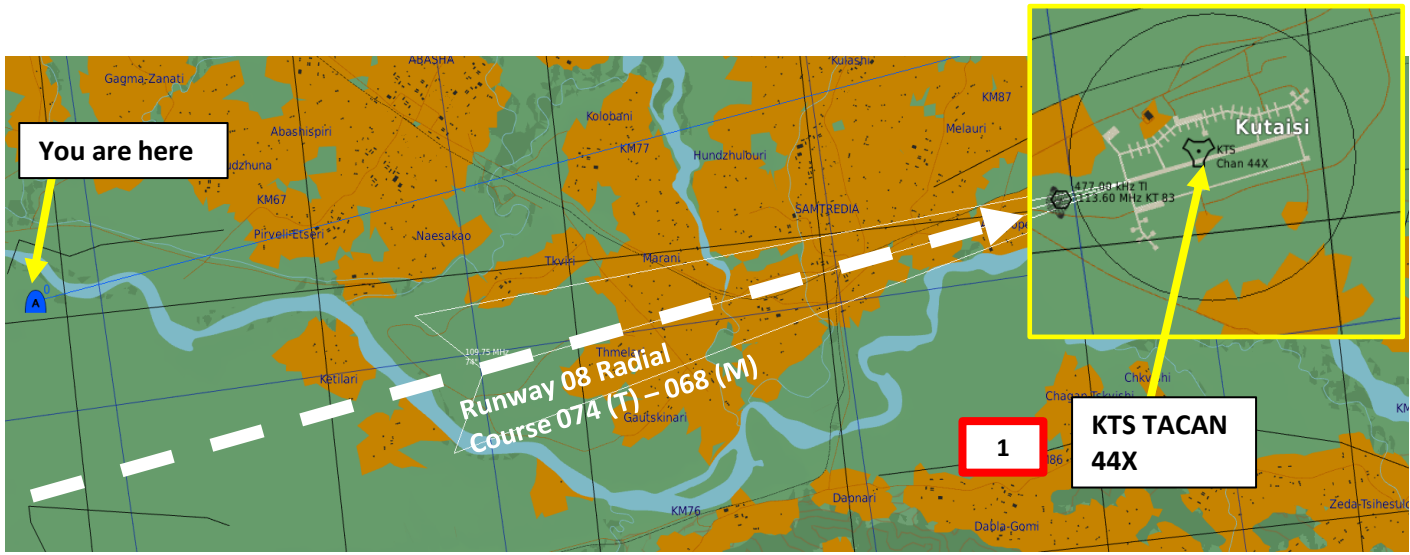
10 – ADF (AUTOMATIC DIRECTION FINDER) NAVIGATION

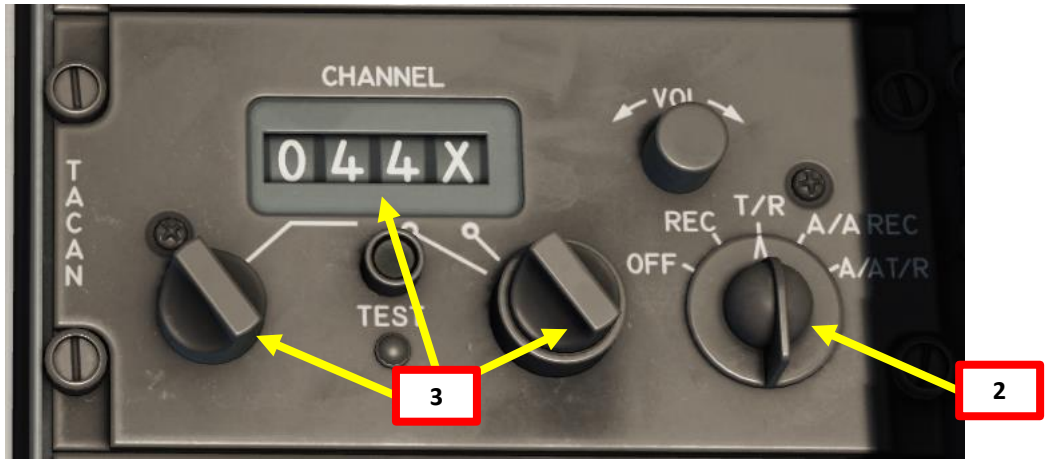
1. On Navigation Mode Select Panel, make sure ILS and TCN buttons are not selected
2. Set UHF Mode to ADF
3. Set UHF Frequency to MNL (Manual) Mode.
4. Set UHF manual frequency to 255.000 MHz.
5. Confirm UHF signal is received with the UHF HOMING light illuminated.
6. On HSI (Horizontal Situation Indicator), follow Bearing Pointer 1. Keep in mind that no range information is available.

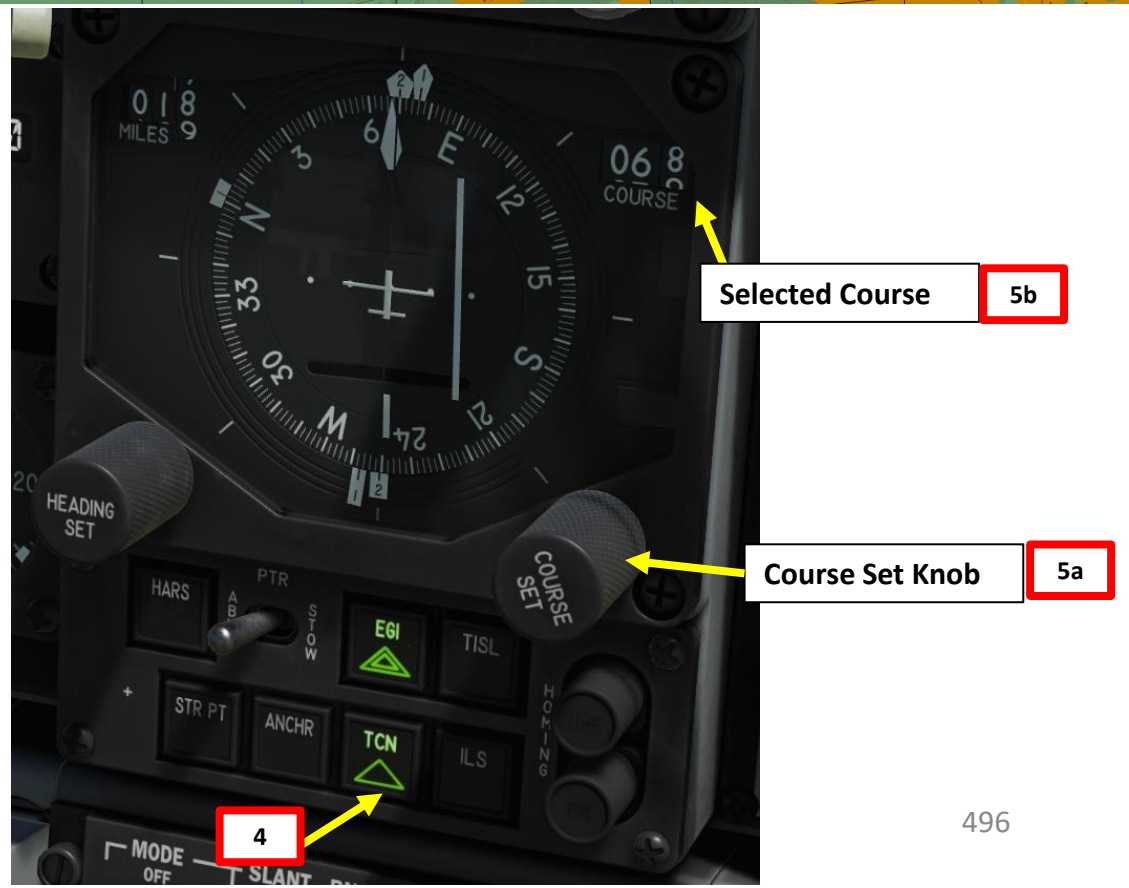
11 – TACAN NAVIGATION

TACAN (Tactical Air Navigation) stations are navigation aids typically used by the military and provide you directional and distance guidance. They can be installed on airdromes, air refueling tankers or even aircraft carriers.

1. We will track Kutaisi's TACAN 44X.
2. Power up the TACAN control panel by setting the Mode Selector to T/R (Transmit-Receive).
3. Set the KTS TACAN frequency (44X) on the TACAN panel. Clicking on the right knob sets X/Y, while scrolling mousewheel on left and right selector knobs set 44.
4. On the NMSP (Navigation Mode Selection Panel), press "TCN" to slave the HSI to the TACAN beacon
5. Set the desired course to the TACAN using the HSI Course Select knob (068)

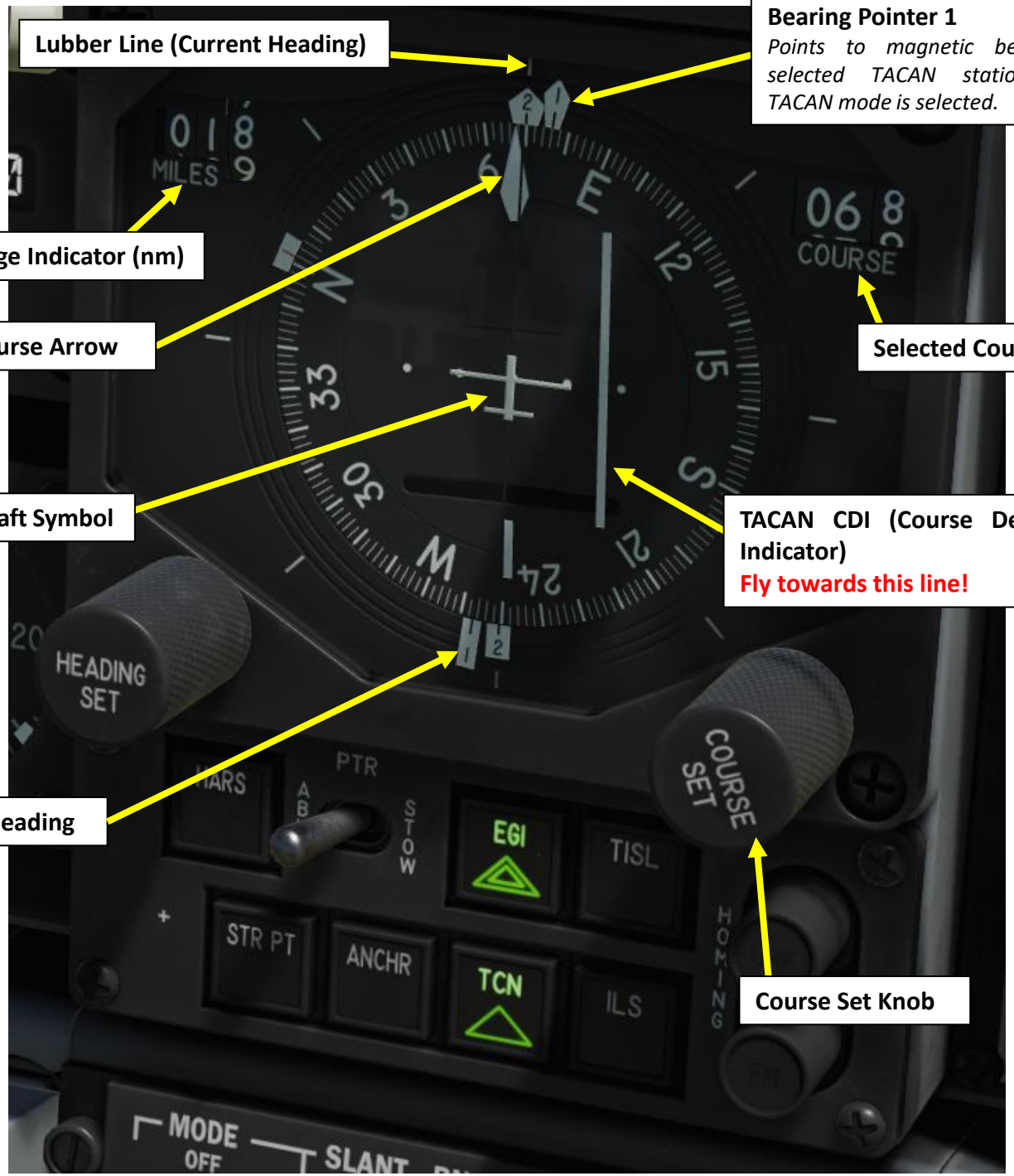




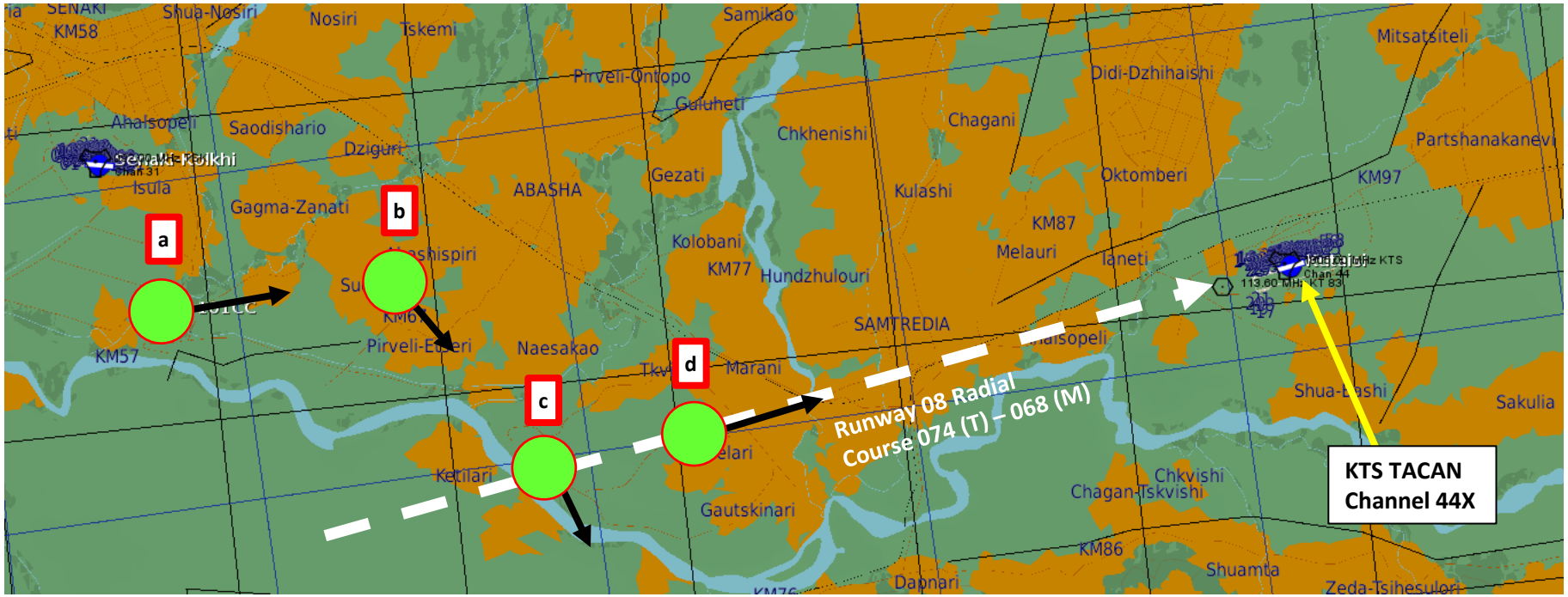


11 – TACAN NAVIGATION

6. After a few seconds, the HSI will display DME (Distance Measuring Equipment) distance to the TACAN in nautical miles.
7. Steer the aircraft towards the TACAN CDI (Course Deviation Indicator) Reference Line. As you approach the radial, the line deviation with the centerline of the HSI will gradually diminish.
8. The direction of the TACAN beacon will be displayed by the pointy end of the Course arrow and Bearing Pointer 1 .
9. CDI (Course Deviation Indicator) will indicate how far off the TACAN radial course (068) you are.
10. When CDI Reference line is centered, this means you are on the 068 radial.
11. Then, turn towards the TACAN Bearing Pointer 1 (or course needle) to follow the radial to the runway.



11 – TACAN NAVIGATION

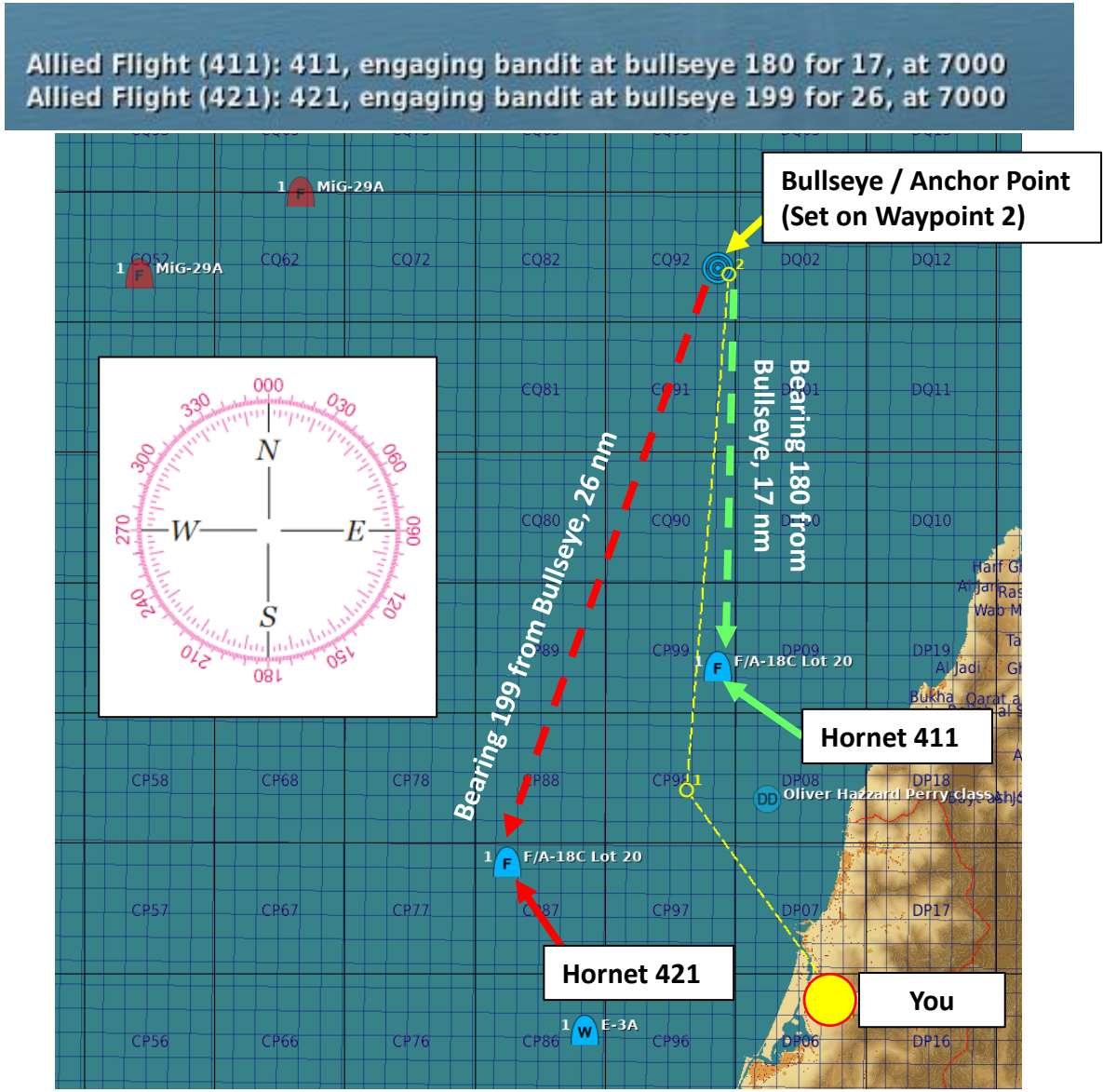


12 – ANCHOR POINT/BULLSEYE

A “Bullseye” or “Anchor Point” is a fictional point in space that serves as a common geographic reference for a mission amongst friendly forces. If you know where the bullseye is and the enemy doesn’t, it gives you a way to communicate positions without the enemy knowing where to look from. Your wingmen and AWACS will often refer to “bulls” or “bullseye” on the radio. A bullseye call, used to communicate your position, is done in the following format:

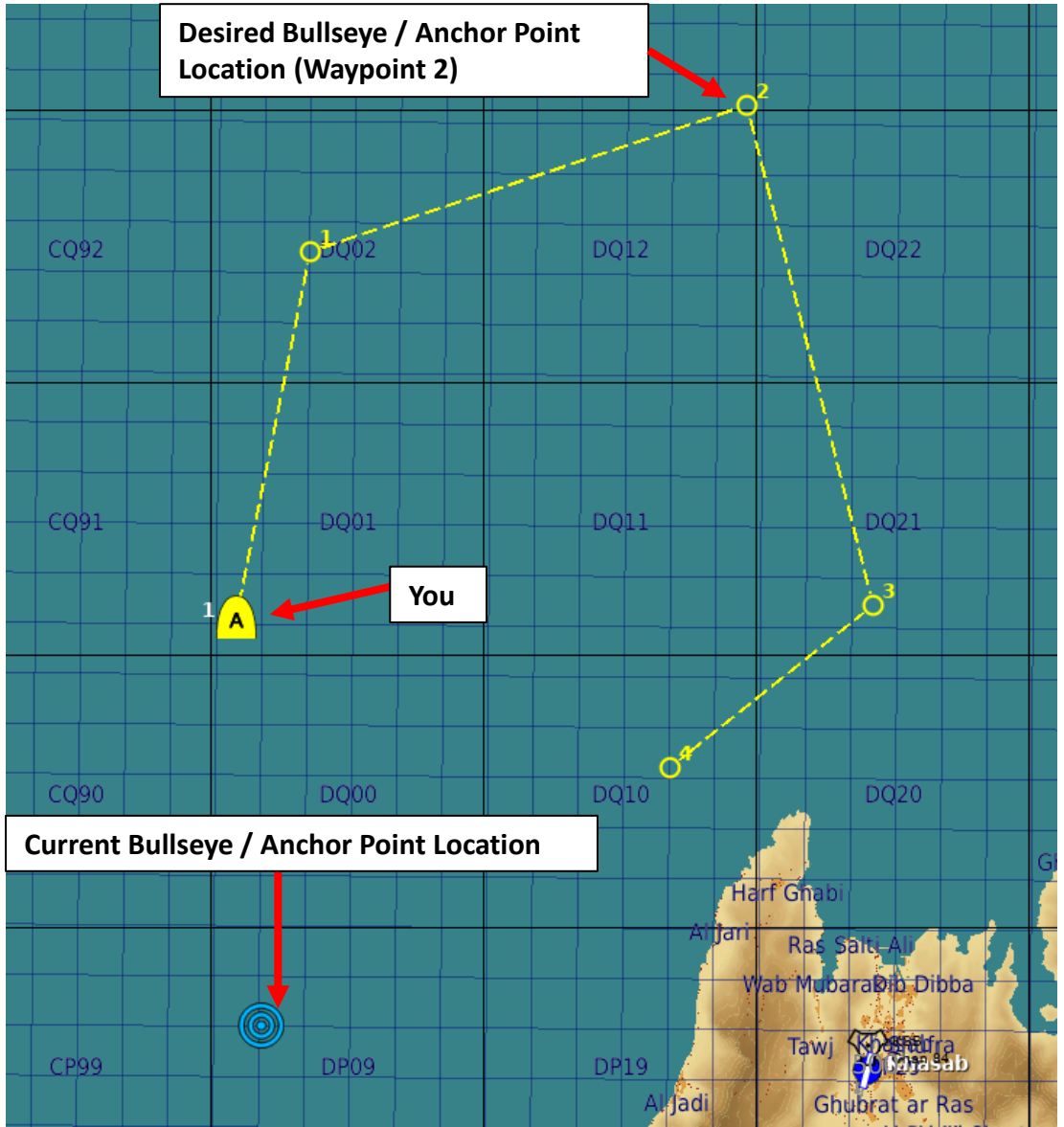
- Bearing from bullseye
- Range from bullseye
- Altitude

Bullseye Explanation by JediLinks: https://youtu.be/vgcXcfeGb2M



12 – ANCHOR POINT/BULLSEYE

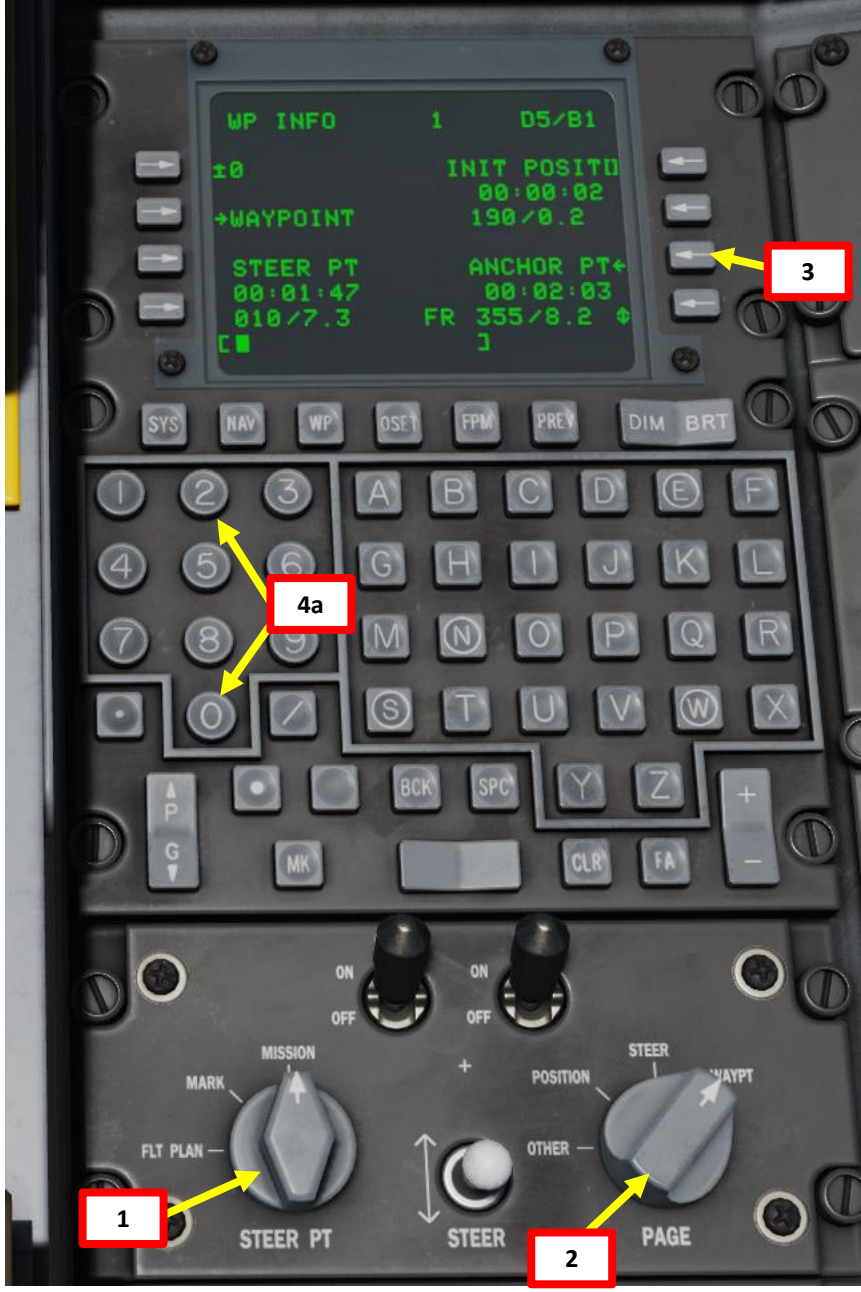
You can set the bullseye on any existing waypoint available in your database. This short tutorial will show you how to create an “Anchor Point” on Waypoint 2 and use it as bullseye reference.

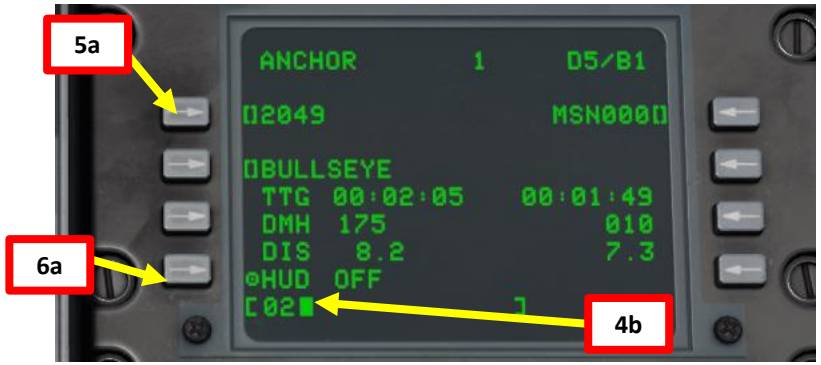


12 – ANCHOR POINT/BULLSEYE

To set an Anchor Point on a Waypoint (i.e. Waypoint 02):

1. Set Auxiliary Avionics Panel (AAP) Steerpoint Selector Knob to MISSION (you access all waypoints available for the current mission)
2. Set Auxiliary Avionics Panel (AAP) CDU (Control Display Unit) Selector Knob to WAYPT. This will display the WP INFO Page.
3. Select ANCHOR PT branch
4. On CDU keypad, enter waypoint number you want to use as the new Bullseye / Anchor Point Reference (02).
5. Press on the LSK next to the Waypoint Number field.
6. Press on the LSK next to HUD OFF to display Anchor Point / Bullseye information on the Heads-Up Display.
7. Select ANCHR mode on Navigation Mode Select Panel





Anchor Point has not been defined yet

12 – ANCHOR POINT/BULLSEYE

8. New Anchor Point is now set on Waypoint 2. Consult CDU, HUD, HSI and TAD for bullseye information.

Note: we took an existing waypoint and set it as the Anchor Point, but we could have also created a new waypoint and called it "Bullseye2".

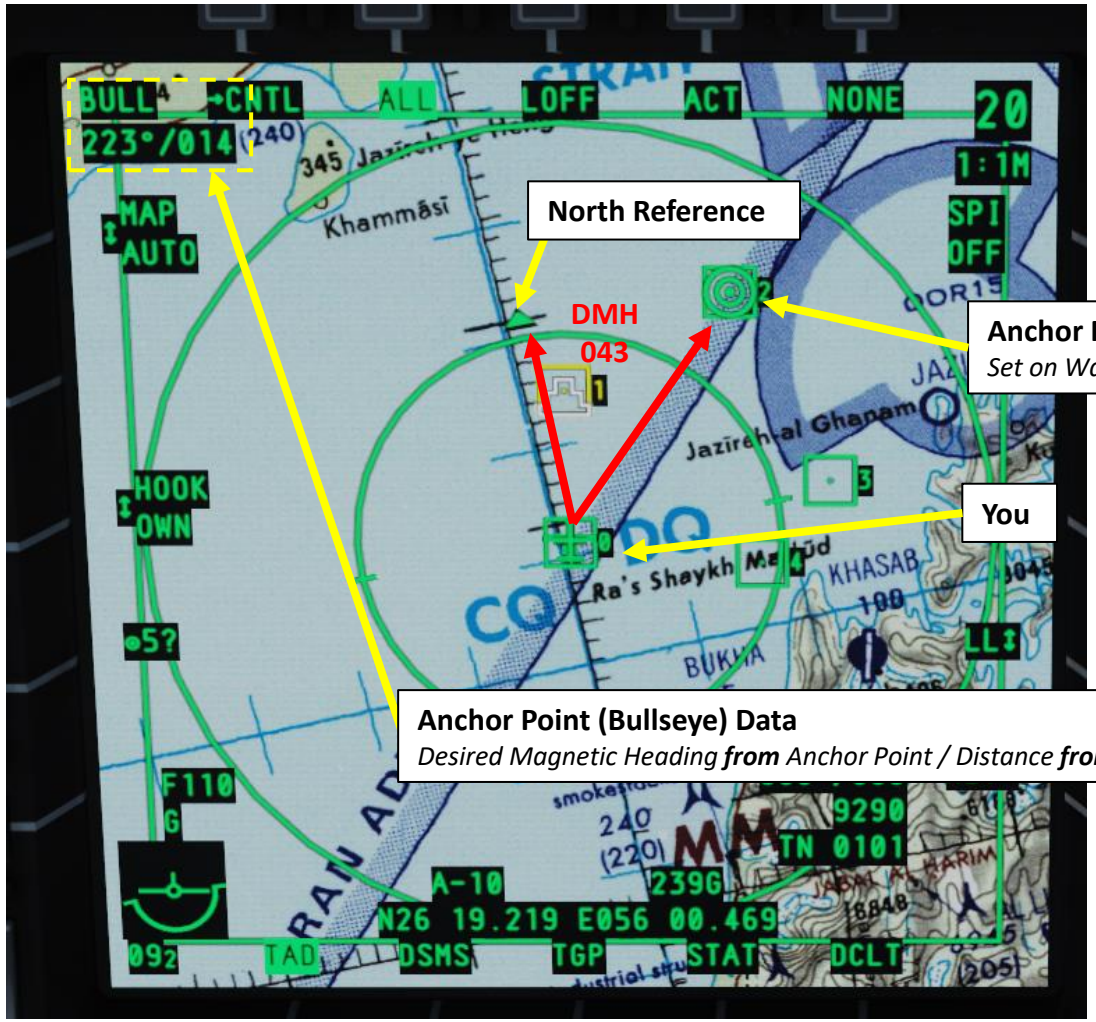
Anchor Point Reference Waypoint Number

Anchor Point Reference Waypoint Name

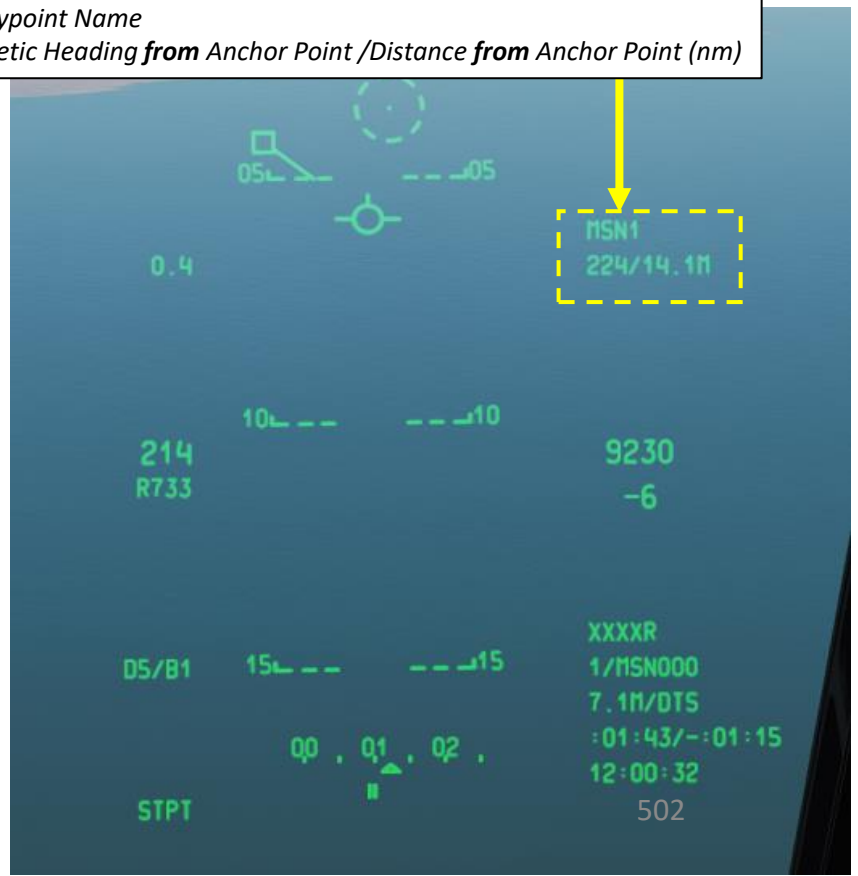
Anchor Point (Bullseye) Data
Time-to-Go to Anchor Point
*Desired Magnetic Heading **to** Anchor Point*
Distance to Anchor Point (nm)

Current Waypoint Name

Current Waypoint Data
Time-to-Go to Waypoint
Heading to Waypoint
Distance to Waypoint (nm)



Anchor Point (Bullseye) Data
Reference Waypoint Name
*Desired Magnetic Heading **from** Anchor Point /Distance **from** Anchor Point (nm)*



13 – ILS (INSTRUMENT LANDING SYSTEM) TUTORIAL

1. ILS approach
2. Final Approach
3. Outer ILS marker
4. Inner ILS marker
5. Missed Approach

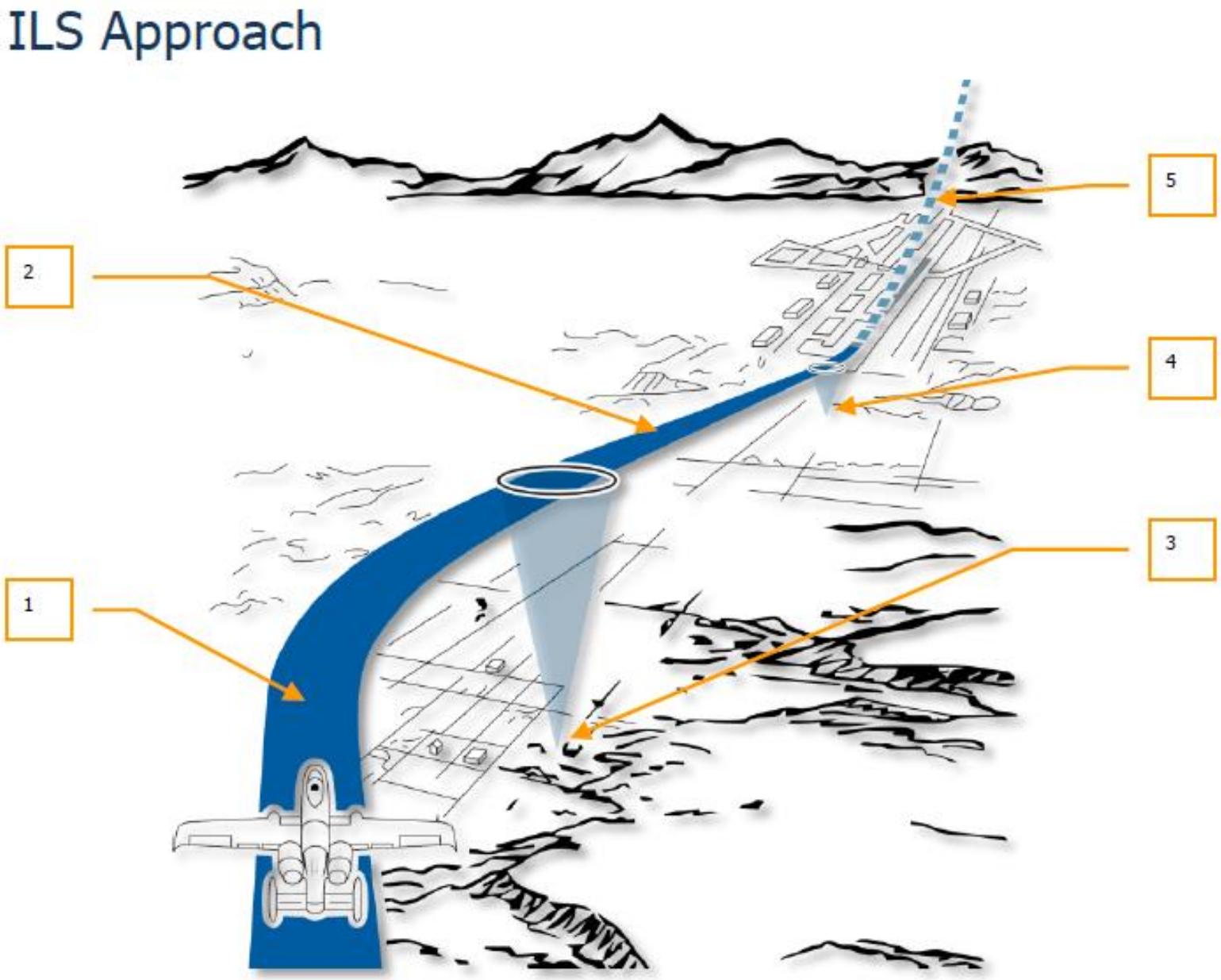
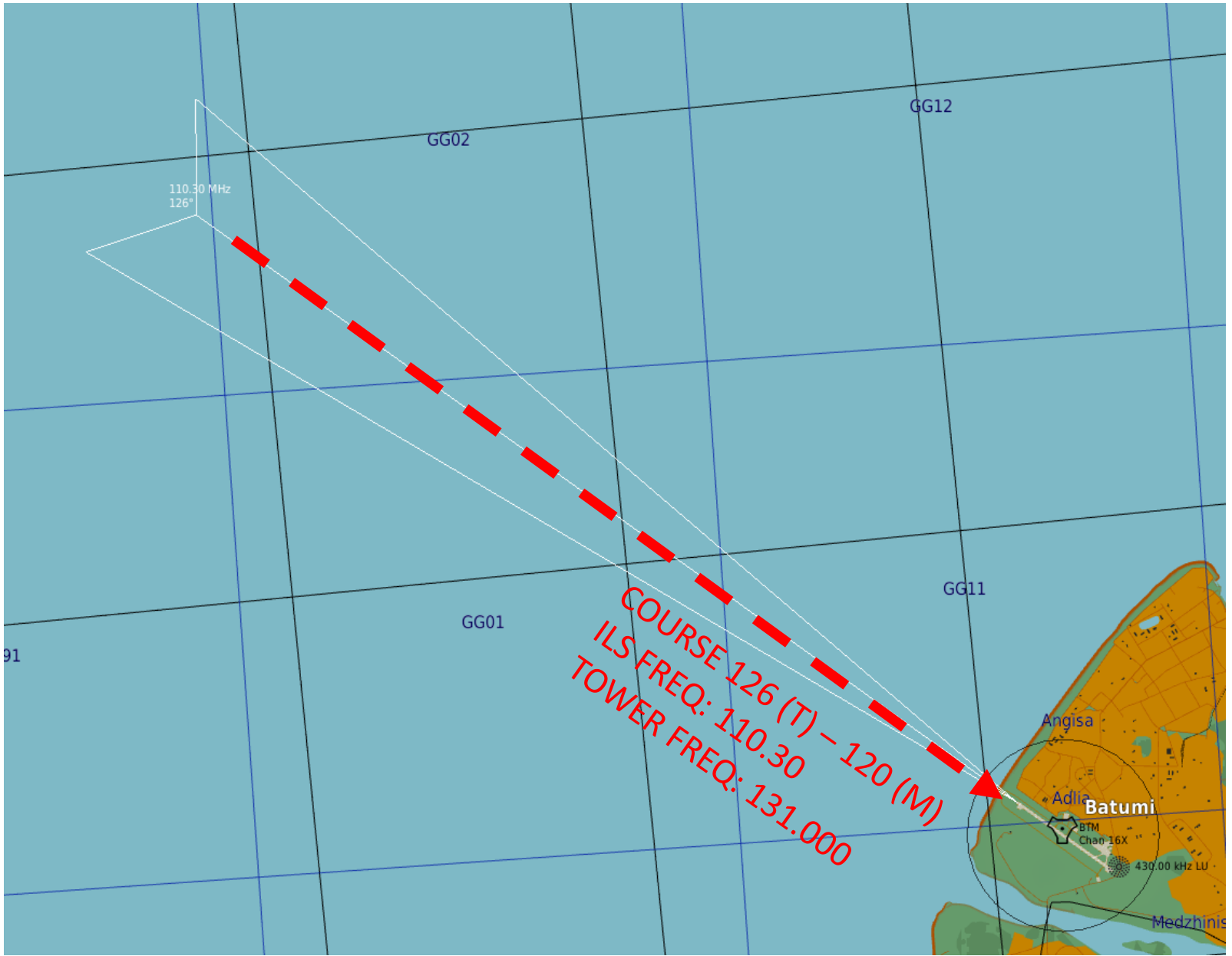


Figure 381. ILS Landing Pattern

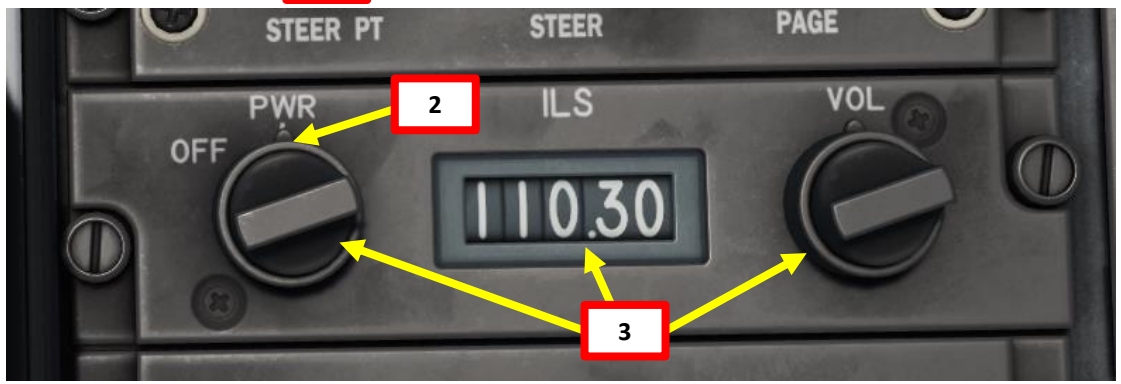
13 – ILS (INSTRUMENT LANDING SYSTEM) TUTORIAL

Our ILS approach will be done to Batumi airfield. Using our CDU trick learned in the “DIVERT” sub-section, we can easily find the ILS frequency (110.30), runway heading (120 Magnetic Heading / 126 True Heading) and radio tower frequency (131.000).



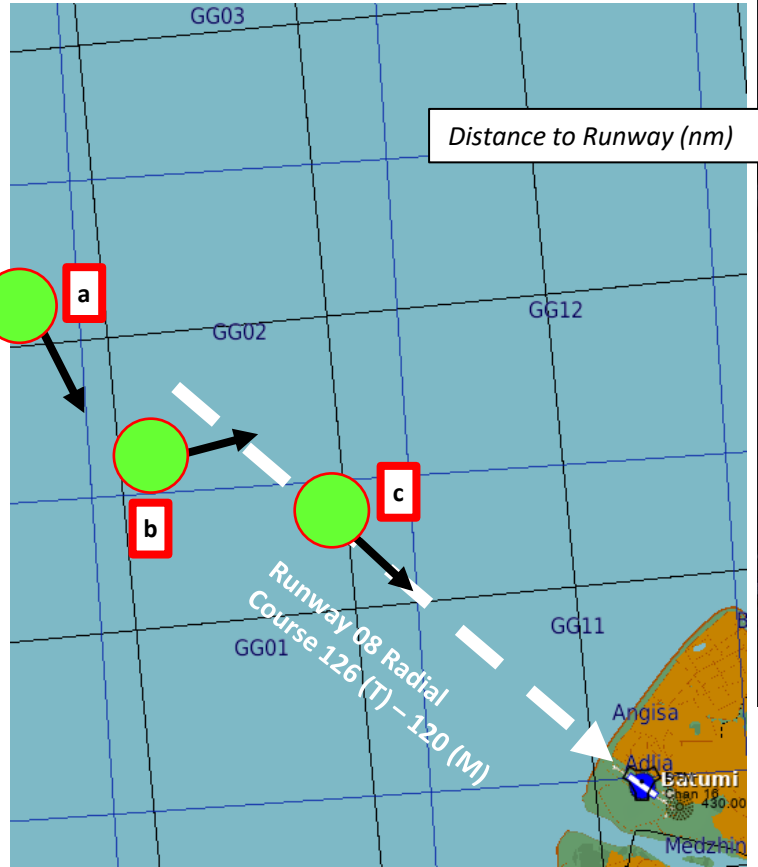
13 – ILS (INSTRUMENT LANDING SYSTEM) TUTORIAL

1. Set your VHF radio to TR (transmit-receive), set frequency mode to MAN and set frequency to 131.000. Then, call the tower for inbound request.
2. Turn ILS (Instrument Landing System) power ON by right clicking on the PWR switch.
3. Enter ILS frequency 110.30 rotating the PWR and VOL knobs with the mousewheel.
4. Set your HSI (Horizontal Situation Indicator) course to 120 (runway magnetic heading) with your mousewheel.
5. On the NMSP (Navigation Mode Selection Panel), set homing mode to ILS and navigate towards runway.



13 – ILS (INSTRUMENT LANDING SYSTEM) TUTORIAL

6. Align yourself with the runway using the HSI (Horizontal Situation Indicator), CDI (Course Deviation Indicator) and ADI (Attitude Director Indicator) Localizer Steering Bar



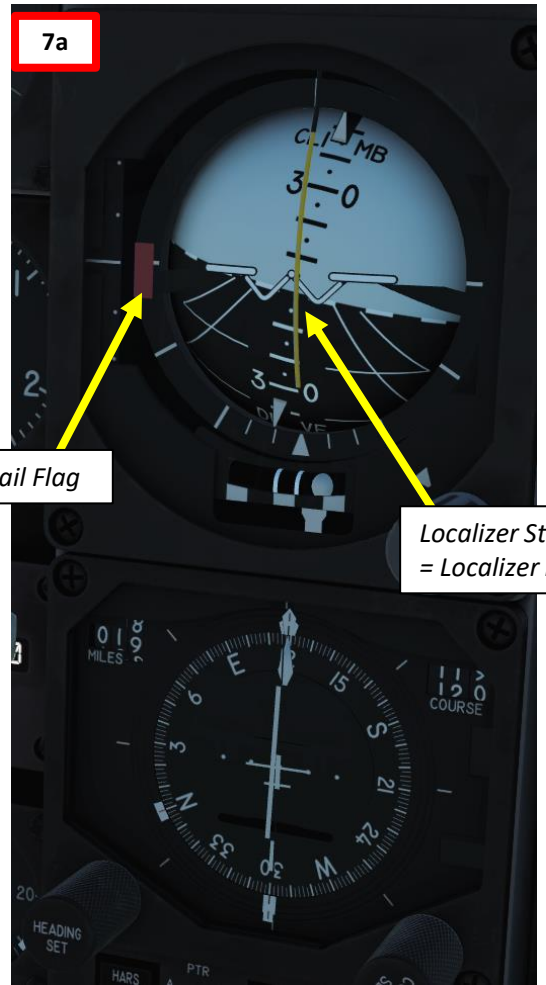
Distance to Runway (nm)

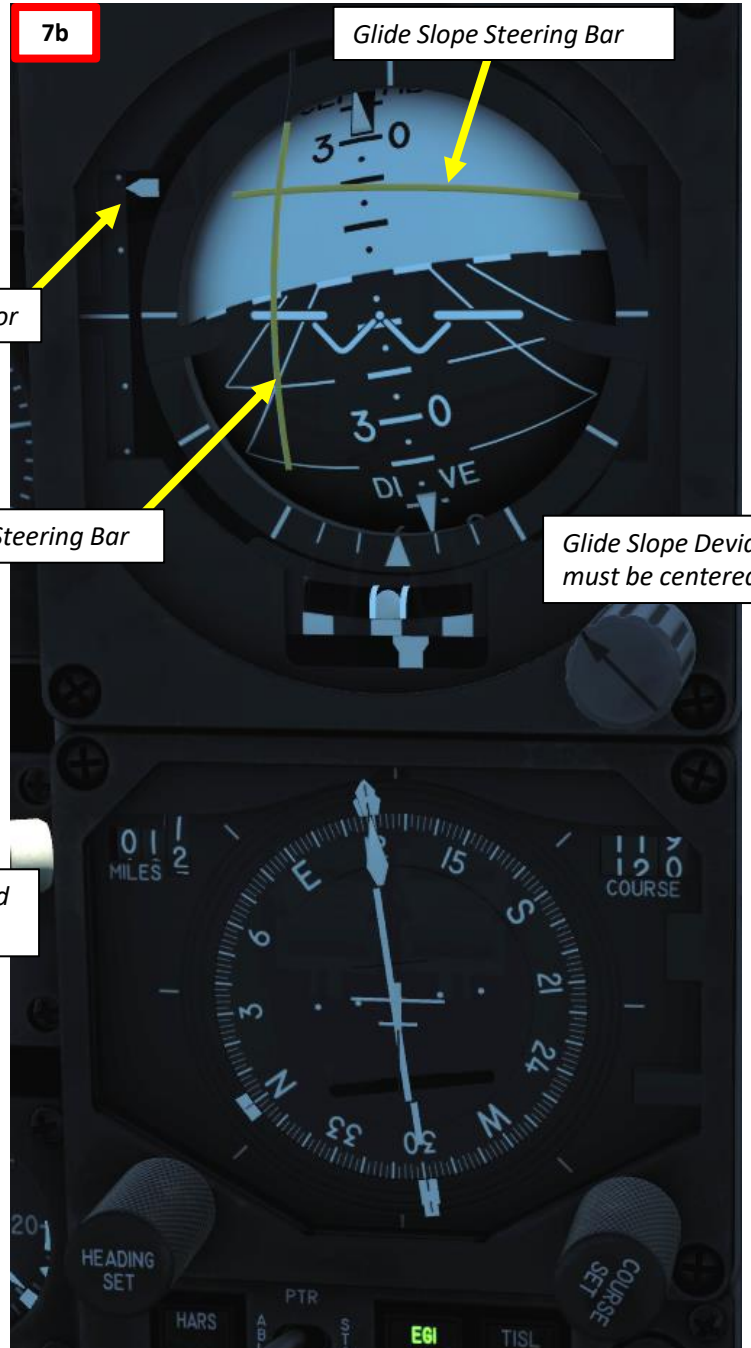
Localizer Steering Bar

CDI (Course Deviation Indicator)

13 – ILS (INSTRUMENT LANDING SYSTEM) TUTORIAL

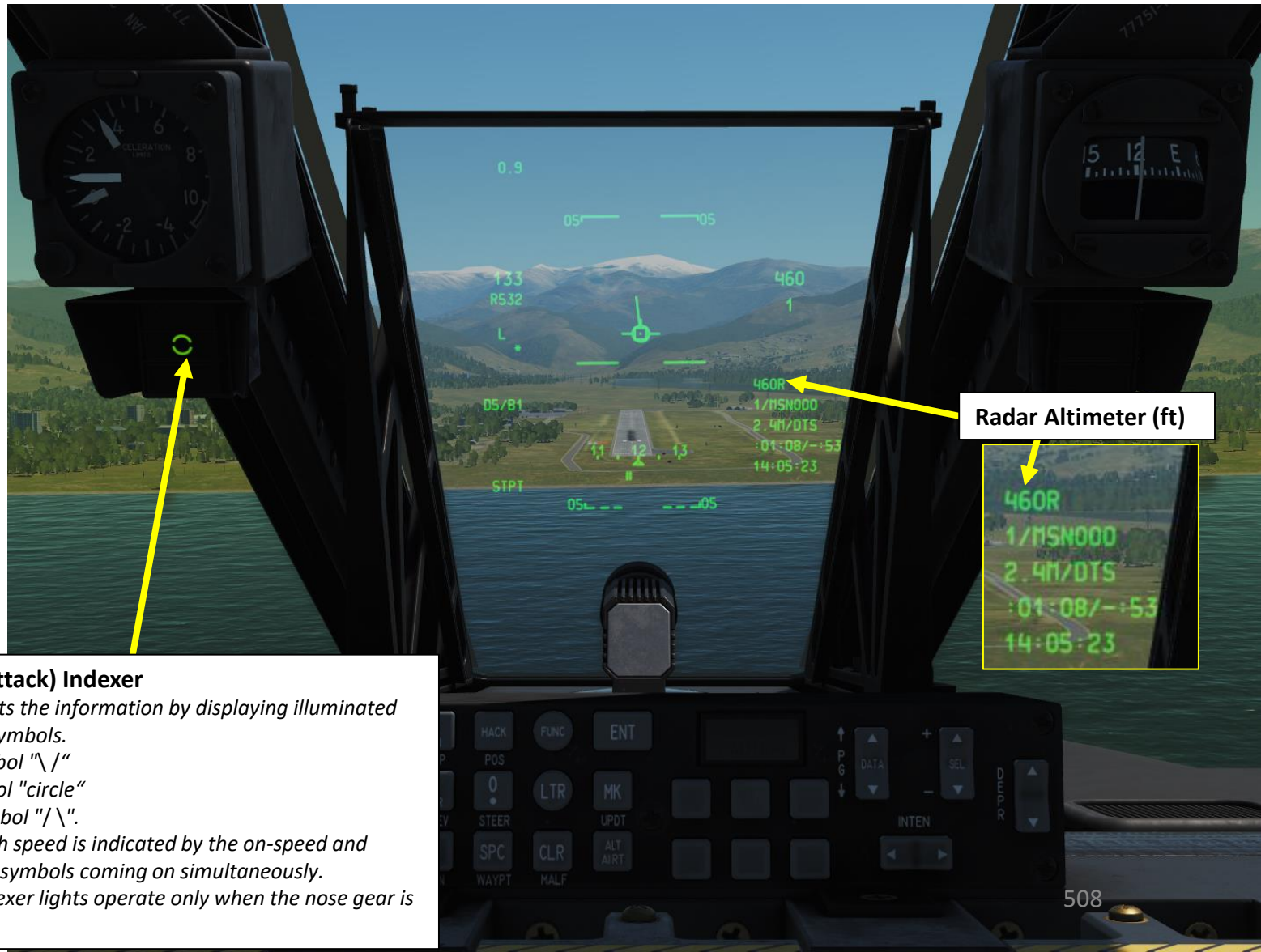
7. Once you are close enough to the ILS (approx. 10 nm), the Glide Slope Fail Flag will disappear and provide you guidance in the vertical plane to perform an approach with 3 degrees of glide slope.
8. Fly the aircraft to the glide slope by using the Glide Slope Steering bar and Glide Slope Deviation Indicator. Both should be centered.





13 – ILS (INSTRUMENT LANDING SYSTEM) TUTORIAL

6. When you have captured the ILS localizer (no lateral deviation from runway axis) and captured the glide slope as well, deploy landing gear.
7. Deploy flaps (fully extended) and airbrakes (40 % extended)
8. Adjust throttle and trim the aircraft to get a good Angle of Attack for landing. The AoA (Angle of Attack) Indexer should display a “circle”, which means that you are “On Speed”. This means that the angle of attack you have will maintain an adequate airspeed for landing.
9. Use Radar Altitude as a reference
10. On Glide Path Final Approach
    - -500 ft/min descent rate
11. Touchdown by letting yourself glide on the runway.
12. No need to flare.



AoA (Angle of Attack) Indexer

The indexer presents the information by displaying illuminated green and yellow symbols.

- *Low-speed symbol "\ /“*
- *On-speed symbol "circle“*
- *High-speed symbol "/ \".*
- *Slightly low/high speed is indicated by the on-speed and low/high speed symbols coming on simultaneously.*

Note: The AOA indexer lights operate only when the nose gear is down.

13 – ILS (INSTRUMENT LANDING SYSTEM) TUTORIAL

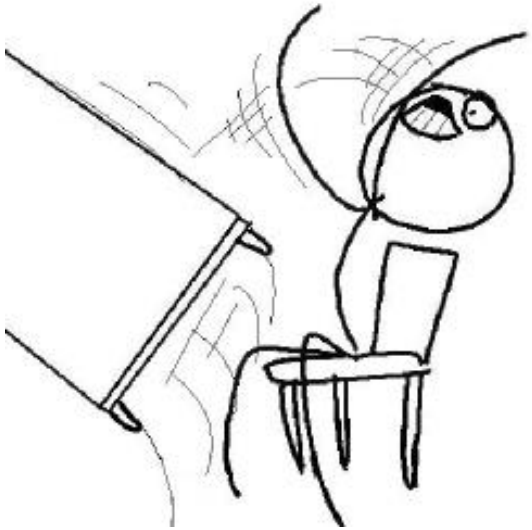
DCS Table of Frequencies

Airfield	ICAO Code	Reference	Runway(s)	Tower	ID	Alt	ILS	TACAN
Anapa	URKA	04°59'36"N, 37°20'19"E	04-22; 2900m	121.0	01	04		
Batumi	UGSB	41°36'58"N, 41°35'31"E	13-31; 2400m	131.0	11	13	**13**, 110.3	16X BTM (135.90 MHz)
Beslan	URMO	43°12'26"N, 44°35'19"E	10-28; 3000m	141.0	21	17		
Gelendzhik	URKG	44°33'54"N, 38°00'25"E	04-22; 1800m	126.0	06	03		
Gudauta	UG23	43°06'09"N, 40°34'01"E	15-33; 2500m	130.0	10	09		
Kobuleti	UG5X	41°55'36"N, 41°51'05"E	07-25; 2400m	133.0	13	12	**07**, 111.5	67X KBL (134.00 MHz)
Kutaisi	UGKO	42°10'30"N, 42°28'05"E	08-26; 2500m	134.0	14	12	**08**, 109.75	44X KTS (110.70 MHz)
Krasnodar C	URKI	45°05'03"N, 38°57'34"E	09-27; 2500m	122.0	02	08		
Krasnodar PKK	URKK	45°01'52"N, 39°08'38"E	05-23R; 3100m 05-23L; 2300m	128.0	08	02		
Krymsk	URKW	44°58'27"N, 38°00'37"E	04-22; 2600m	124.0	04	03		
Maykop	URKH	44°41'22"N, 40°03'08"E	04-22; 3200m	125.0	05	05		
Mineral'nye Vody	URMM	44°12'58"N, 43°06'13"E	12-30; 3900m	135.0	15	16	**12**, 111.7 **30**, 109.3	
Mozdok	XRMF	43°47'26"N, 44°34'44"E	08-27; 3100m	137.0	17	21		
Nalchik	URMN	43°30'29"N, 43°37'30"E	06-24; 2300m	136.0	16	15	**24**, 110.5	
Novoross.	URKN	44°39'36"N, 37°46'25"E	04-22; 1780m	123.0	03	06		
Senaki	UGKS	42°14'31"N, 42°02'08"E	09-27; 2400m	132.0	12	14	**09**, 108.90	31X TSK (109.40 MHz)
Sochi	URSS	43°06'17"N, 40°35'26"E	06-24; 3100m	127.0	07	10	**06**, 111.1	
Soganlug	UG24	41°39'26"N, 44°55'48"E	14-32; 2400m	139.0	19	18		
Sukhumi	UGSS	42°51'21"N ,41°09'17"E	12-30, 2500m	129.0	09	10		
Tblisi	UGTB	41°40'37"N, 44°56'37"E	13-31L; 3000m 13-31R; 2500m	138.0	18	20	**13**, 110.3 **31**, 108.9	
Vaziani	UG27	41°37'09"N, 45°02'10"E	14-32; 2500m	140.0	20	19	**14**, 108.75	22X VAS (108.50 MHz)

Runway = runway designations, west to east; runway length in meters
Alt = nearest alternate airfield ID
ILS = **runway designation**, ILS frequency
Credits: Shu77; HiJack; vJaBoG32

AIR-TO-AIR REFUELING – WHY WE ALL HATE IT

Air-to-air refueling is one of the hardest, most hated, and most frustrating tasks in DCS. Ever. Of all time.



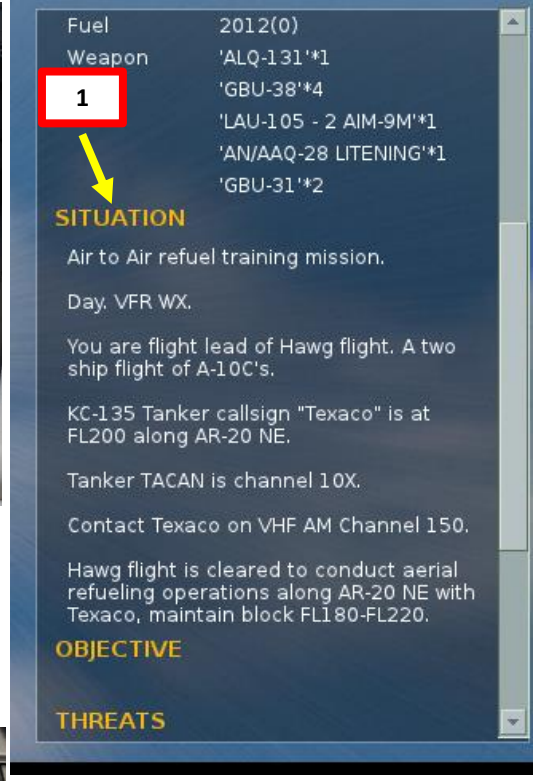
Why? Well, one of the main reasons for the difficulty behind refueling is the skill required to do formation flying. Flying in formation with another aircraft requires much more practice than you would initially think. Another reason is pure physics: there is this thing called “wake turbulence”. An aircraft flies through a fluid: air. Just like with any fluid, if you have something that displaces itself through it at a certain speed, the fluid will become disrupted (turbulence). Wingtip vortices and jetwash are both effects of this simple concept. Wake turbulence is the reason why airliners need to wait a minimum time between takeoffs: flying through disrupted air will destabilize the aircraft and it is unsafe, especially during critical phases of flight like takeoff and landing.

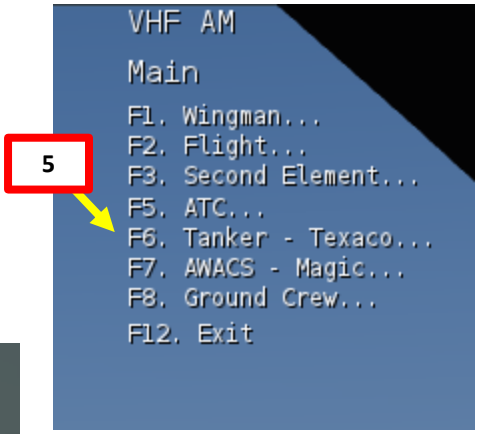
Unfortunately, wake turbulence is something a pilot **has** to deal with during air-to-air refueling. This is why the aircraft will fly just fine when approaching the tanker, but start wobbling around when flying in close proximity of the refueling boom and tanker engines.

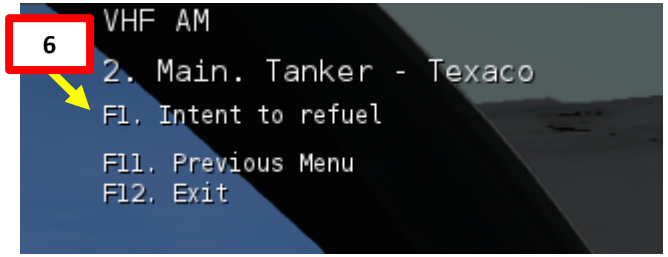
NOTE:
Some pilots prefer to set their joystick to pitch and roll axes curvatures set with a curve of 15 and a deadzone of 5. Control curves are up to your personal preference.

AIR-TO-AIR REFUELING – HOW TO

1. Read your mission briefing to know the TACAN station channel of your KC-135 Tanker (10X) and the VHF AM channel frequency you can communicate with it (150.000).
2. Set your TACAN to "A/A T/R" and to tanker TACAN frequency (10X) by scrolling the mousewheel.
3. On the NMSP (Navigation Mode Select Panel), press "TCN" to slave the HSI to the TACAN beacon.
4. Set your VHF AM radio to T/R and channel 150.000.
5. Press Mic Switch FWD and contact tanker (F6).
6. Select "Intent to refuel" in the tanker menu. The tanker will give you an altitude (usually 20,000 ft or 10,000 ft) to rendezvous at.
7. Use the HSI (Horizontal Situation Indicator) to line up with the KC-135 tanker. Needle with a "1" on it points towards the tanker. Distance to tanker is displayed on the HSI.

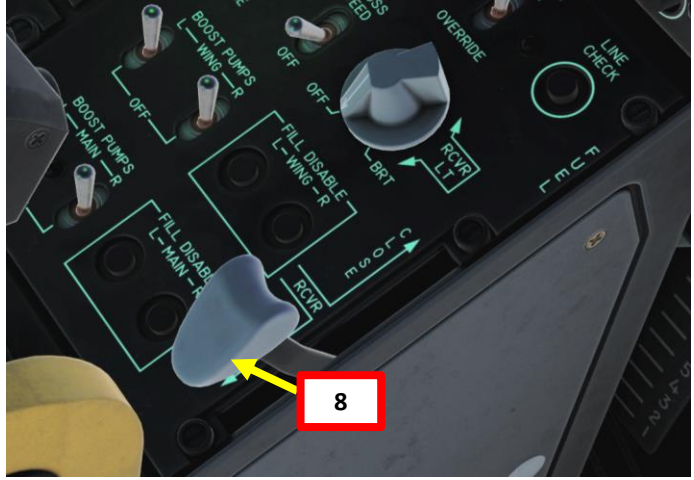






AIR-TO-AIR REFUELING – HOW TO

8. Open fuel trap door.
9. Once you are close enough, call the tanker to begin pre-contact. If you are not lined up properly, he will tell you “Return”. If you are lined up properly, he will grant you permission to approach.
10. Make sure you are perfectly trimmed before beginning your approach.
11. Set all your weapon systems to SAFE.
12. Fly formation with the tanker, not the boom.
13. Make sure the “READY” light is lit.



AIR-TO-AIR REFUELING – HOW TO

AIR-TO-AIR REFUELING – HOW TO

14. Once contact with the boom is done, you will have a “LATCHED” notice. Use the tanker’s engines as a reference to maintain contact.
15. If you disconnect the boom prematurely (and it WILL happen, trust me), make sure that you press your “Nosewheel Steering” pinky switch on your HOTAS joystick (or “INSERT” key binding) to reset your fuel trap door. If you fail to reset it, the boom operator will not be able to make contact with your trap door again (refueling light will display “READY” again).

AIR-TO-AIR REFUELING – HOW TO

16. Refueling procedure will be done when you have the “DISCONNECT” warning light.
17. Close fuel trap door and resume flight.

Here is a nice Air-to-Air refueling example: https://www.youtube.com/watch?v=2qFrmfNEilM
Special thanks to Derbysieger for creating a helpful written tutorial as well http://steamcommunity.com/sharedfiles/filedetails/?id=170423297

RESOURCES

Bunyap's Youtube Channel
https://www.youtube.com/user/4023446/playlists

Gerry Abbott's Youtube Channel
https://www.youtube.com/playlist?list=PL8E198A311F28EA74

Ralfidude's Idiot Guide to the A-10C: Quick Tips
https://www.youtube.com/watch?v=9M8yiAjQ7ps

476th Virtual Fighter Group Database
http://www.476vfightergroup.com/downloads.php

476th Virtual Fighter Group Guides
http://www.476vfightergroup.com/downloads.php?do=cat&id=43

476th Virtual Fighter Group Youtube Channel
https://www.youtube.com/user/476vFG/videos

Rob10's Weapon List
http://forums.eagle.ru/showthread.php?t=73752

ACRONYM TABLE (1/2)

A-A	Air-to-Air	**ASL**	Azimuth Steering Line	**CMSP**	Countermeasure Set Panel	**EGT**	Exhaust Gas Temperature	**GS**	Ground Speed
A-G	Air-to-Ground	**ATC**	Air Traffic Control	**CR**	Coordinate Ranging	**EHE**	Expected Horizontal Error	**IAM**	Inertially Aided Munition
AAP	Auxiliary Avionics Panel	**BATA**	Bullets at Target Altitude	**CR**	Consent to Release	**EMI**	Engine Monitoring Instruments	**IAS**	Indicated Airspeed
AAS	Air-to-Air Submenu	**BHOT**	Black Hot	**DLZ**	Dynamic Launch Zone	**EO**	Electro Optical	**IFF**	Identify Friend or Foe
ACP	Armament Control Panel	**BIT**	Built In Test	**DMS**	Data Management Switch	**ET**	Elapsed Time	**IFFCC**	Integrated Flight and Fire Control Computer
ADF	Automatic Direction Finding	**CADC**	Central Air Data Computer	**DP**	Display Page	**EVE**	Expected Vertical Error	**ILS**	Instrumented Landing System
ADI	Attitude Direction Indicator	**CATM**	Captive Air Training Missile	**DRA**	Dual Rail Adapter	**FA**	Fault Acknowledge	**INS**	Inertial Navigation System
AGL	Above Ground Level	**CBU**	Cluster Bomb Unit	**DRC**	Desired Release Cue	**FEDS**	Firing Evaluation Display System	**ITT**	Interstage Turbine Temperature
AGM	Air-to-Ground Missile	**CCD**	Charged Coupled Device	**DSMS**	Digital Stores Management System	**FLIR**	Forward Looking Infrared	**HARS**	Heading Attitude Reference System
AHCP	Armament HUD Control Panel	**CCIP**	Continuously Computed Impact Point	**DTOT**	Desired Time On Target	**FM**	Frequency Modulation	**HEI**	High Explosive, Incendiary
AIM	Air Intercept Missile	**CCRP**	Continuously Computed Release Point	**DTS**	Data Transfer System	**FOM**	Figure of Merit	**HOF**	Height of Function
AM	Amplitude Modulation	**CDI**	Course Deviation Indicator	**DTSAS**	Digital Terrain System Application Software	**FOV**	Field of View	**HOTAS**	Hands On Throttle and Stick
AMIL	Air Mass Impact Line	**CDU**	Control Display Unit	**DTTG**	Desired Time To Go	**GBL**	Gun Bore Line	**HPU**	Horizontal Position Uncertainty
AOA	Angle of Attack	**CICU**	Central Interface Control Unit	**EAC**	Enhanced Attitude Control	**GBU**	Guided Bomb Unit	**HSI**	Horizontal Situation Indicator
APU	Auxiliary Power Unit	**CM**	Combat Mix	**ECM**	Electronic Countermeasures	**GCAS**	Ground Collision Avoidance System	**HUD**	Heads Up Display
AR	Aerial Refueling	**CMS**	Countermeasure Set	**EFC**	Emergency Flight Control	**GMT**	Greenwich Mean Time	**JDAM**	Joint Directed Attack Munition
ARS	Attitude Reference Symbol	**CMSC**	Countermeasure Set Control	**EGI**	Embedded GPS INS	**GPS**	Global Positioning System	**JTAC**	Joint Terminal Attack Controller

ACRONYM TABLE (2/2)

JTRS	Joint Tactical Radio System	**NMSP**	Navigation Mode Select Panel	**SER**	Single Ejector Rack	**TVV**	Total Velocity Vector
KIAS	Knots Indicated Airspeed	**NWS**	Nosewheel Steering	**SOI**	Sensor of Interest	**UFC**	Up Front Controller
LAAP	Low Altitude Autopilot	**NVIS**	Night Vision Imaging System	**SPI**	Sensor Point of Interest	**UHF**	Ultra High Frequency
LAR	Look Aside Ranging	**ORP**	Optimal Release Point	**SPJ**	Self Protection Jammer	**VHF**	Very High Frequency
LASTE	Low Altitude Safety and Targeting Enhancement	**OSB**	Option Select Button	**SRU**	Shop Replaceable Unit	**VPU**	Vertical Position Uncertainty
LOS	Line Of Sight	**OWC**	Obstacle Warning Cue	**TAD**	Tactical Awareness Display	**VVI**	Vertical Velocity Indicator
LRU	Line Replaceable Unit	**PAC**	Precision Attitude Control	**TAS**	True Airspeed	**WCMD**	Wind Corrected Munition Dispensor
MAP	Missed Approach Point	**PBIL**	Projected Bomb Impact Line	**TDC**	Target Designation Cursor	**WCN**	Warning, Caution, and Notes
MFCD	Multifunction Color Display	**PR**	Passive Ranging	**TER**	Triple Ejector Rack		
MGRS	Military Grid Reference System	**PRF**	Pulse Repetition Frequency	**TGP**	Targeting Pod		
MMCB	Master Mode Control Button	**RGS**	Required Ground Speed	**TISL**	Target Identification Set Laser		
MRC	Minimum Range Cue	**RIAS**	Required Indicated Airspeed	**TMS**	Target Management Switch		
MRFCS	Manual Reversion Flight Control System	**RTAS**	Required True Airspeed	**TOF**	Time of Fall / Time of Flight		
MRGS	Multiple Reference Gunsight	**RWR**	Radar Warning Receiver	**TOT**	Time On Target		
MRS	Minimum Range Staple	**SADL**	Situational Awareness Datalink	**TP**	Target Practice		
MSL	Mean Sea Level	**SAI**	Standby Attitude Indicator	**TTG**	Time To Go		
MWS	Missile Warning System	**SAS**	Stability Augmentation System	**TTRN**	Time to Release Numeric		

digital combat series

A-10C WARTHOG

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- OPTIONS
- LOGBOOK
- MODULE MANAGER
- EXIT

A-10C	Bf 109 K-4	C-101EB	CA	F-86F	FC3	Fw 190 D-9	Hawk	Ka-50	Mi-8MTV2	MiG-15bis	MiG-21Bis	P-51D	Su-25T	TF-51D	UH-1H
1.2.16	1.2.16 beta	1.2.16.1 Beta	1.2.16	1.2.16 beta	1.2.16	1.2.16	1.2.16 Beta	1.2.16	1.2.16 beta	1.2.16 beta	1.2.16	1.2.16	1.2.16	1.2.16	1.2.16

THE FIGHTER COLLECTION

Eagle Dynamics

Version: 1.2.16.39472

THANK YOU TO ALL MY PATRONS

Creating these guides is no easy task, and I would like to take the time to properly thank every single one of my Patreon supporters. The following people have donated a very generous amount to help me keep supporting existing guides and work on new projects as well:

- Ed Wallitt
- Hoggit
- Casey Charles
- ChazFlyz


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