DCS GUIDE
BAE HAWK T.1A

LAST UPDATED: 01/08/2018

By Chuck

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

The BAE Hawk first entered service with the RAF in 1976, both as an advanced flying-training aircraft and a weapons-training aircraft. The Hawk T1 version is currently used at RAF Valley for fast-jet pilot advanced flying training with No 208(R) Squadron, and at RAF Scampton by the RAF Aerobatic Team: the Red Arrows. The T1A is used for weapons and tactical training on No 19(R) Squadron at RAF Valley, and by No 100 Squadron at RAF Leeming for advanced fast-jet weapons systems officer training and operational support flying. In its weapons and tactical training role, the Hawk is used to teach air combat, air-to-air firing, air-to-ground firing and low-flying techniques and operational procedures.

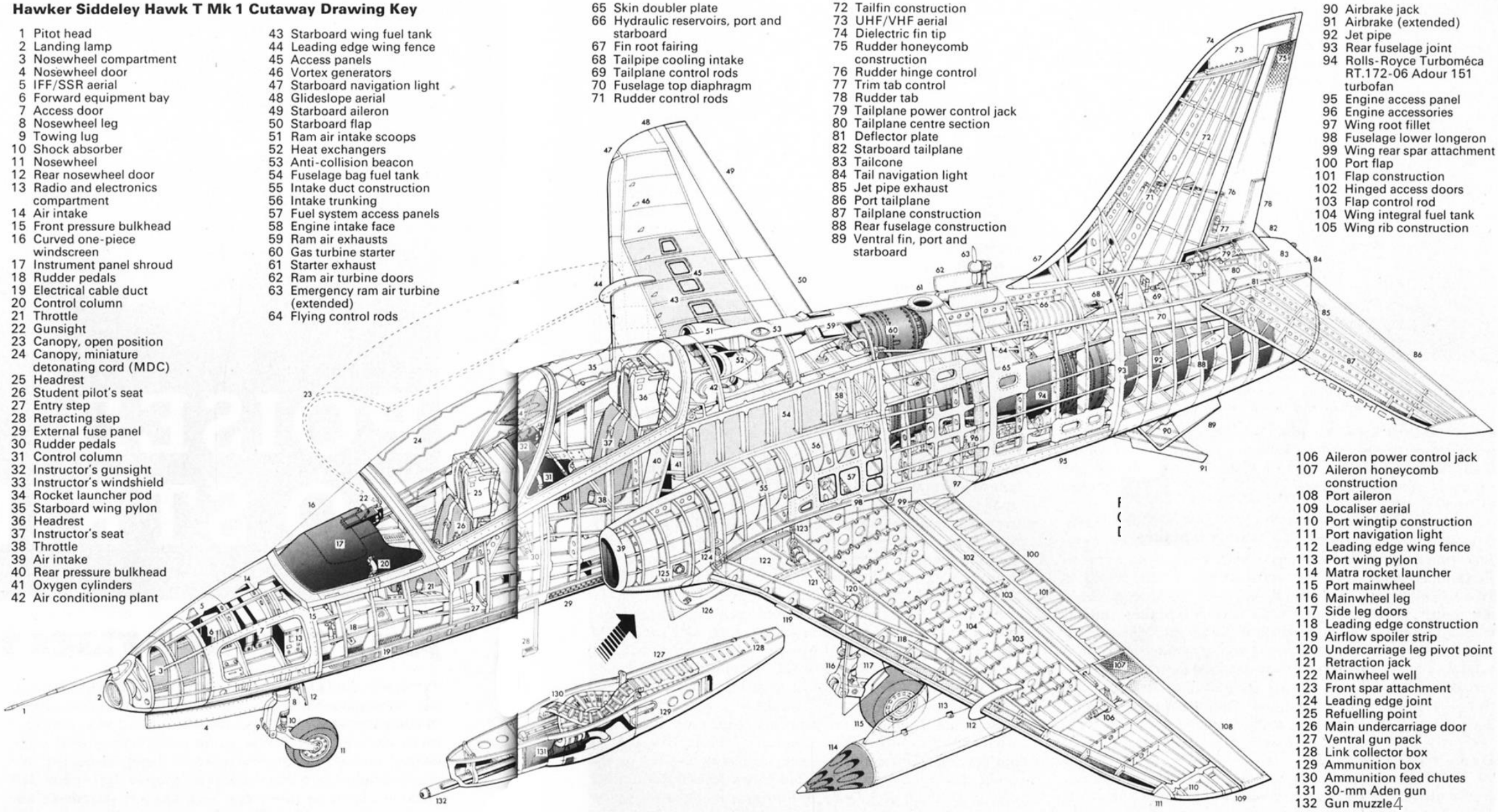
The Hawk is powered by a Rolls-Royce Turbomeca Adour Mk 151 turbofan engine, which is an un-reheated version of the engine powering the SEPECAT Jaguar GR3 aircraft. While the Hawk T1 is used solely in the advanced flying-training role, the Hawk T1A is equipped to an operational standard and is capable of undertaking a number of war roles. The T1A has four under-wing pylons cleared to carry Sidewinder AIM-9M air-to-air missiles, rocket pods, practice bombs and bombs, and can carry a 30mm Aden cannon in a pod underneath the fuselage centre-line.

The Hawk does not have the firepower of the A-10, the speed of the F-15 or the advanced avionics of the F-14. Yet, this little jet has a rich history and eventually grew on me as I learned more about it and began pushing it to its limits, testing VEAO's new advanced "EFM" (flight model) in the process, which was even signed off by real Hawk pilots consulted in the process.

Watch a couple of videos of the Red Arrows performing their incredible aerobatic manoeuvers over the skies of Britain… there is no way you won't feel like flying this feisty trainer jet afterwards!

Hawker Siddeley Hawk T Mk 1 Cutaway Drawing Key

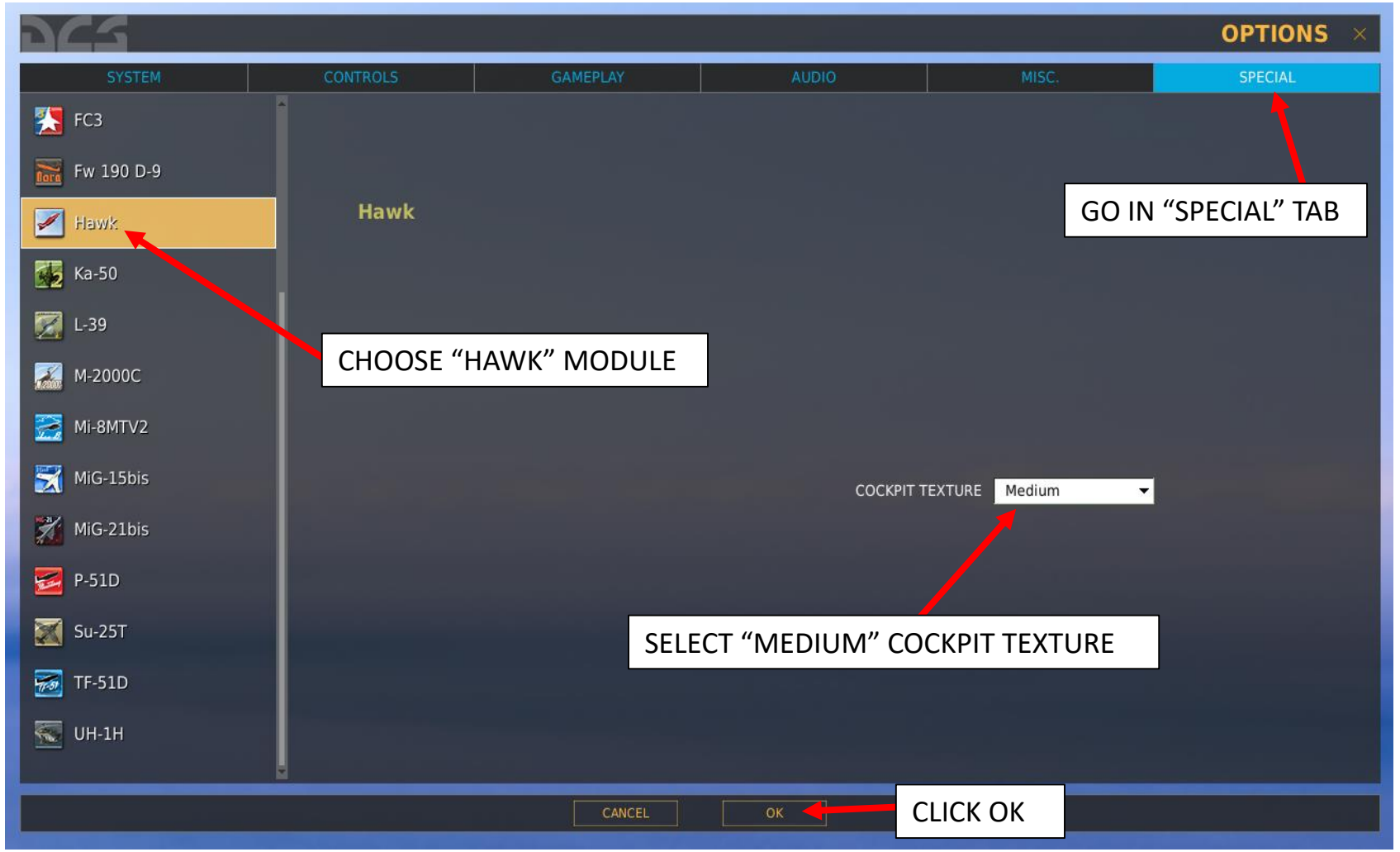
1 Pitot head
2 Landing lamp
3 Nosewheel compartment
4 Nosewheel door
5 IFF/SSR aerial
6 Forward equipment bay
7 Access door
8 Nosewheel leg
9 Towing lug
10 Shock absorber
11 Nosewheel
12 Rear nosewheel door
13 Radio and electronics compartment
14 Air intake
15 Front pressure bulkhead
16 Curved one-piece windscreen
17 Instrument panel shroud
18 Rudder pedals
19 Electrical cable duct
20 Control column
21 Throttle
22 Gunsight
23 Canopy, open position
24 Canopy, miniature detonating cord (MDC)
25 Headrest
26 Student pilot's seat
27 Entry step
28 Retracting step
29 External fuse panel
30 Rudder pedals
31 Control column
32 Instructor's gunsight
33 Instructor's windshield
34 Rocket launcher pod
35 Starboard wing pylon
36 Headrest
37 Instructor's seat
38 Throttle
39 Air intake
40 Rear pressure bulkhead
41 Oxygen cylinders
42 Air conditioning plant
43 Starboard wing fuel tank
44 Leading edge wing fence
45 Access panels
46 Vortex generators
47 Starboard navigation light
48 Glideslope aerial
49 Starboard aileron
50 Starboard flap
51 Ram air intake scoops
52 Heat exchangers
53 Anti-collision beacon
54 Fuselage bag fuel tank
55 Intake duct construction
56 Intake trunking
57 Fuel system access panels
58 Engine intake face
59 Ram air exhausts
60 Gas turbine starter
61 Starter exhaust
62 Ram air turbine doors
63 Emergency ram air turbine (extended)
64 Flying control rods
65 Skin doubler plate
66 Hydraulic reservoirs, port and starboard
67 Fin root fairing
68 Tailpipe cooling intake
69 Tailplane control rods
70 Fuselage top diaphragm
71 Rudder control rods
72 Tailfin construction
73 UHF/VHF aerial
74 Dielectric fin tip
75 Rudder honeycomb construction
76 Rudder hinge control
77 Trim tab control
78 Rudder tab
79 Tailplane power control jack
80 Tailplane centre section
81 Deflector plate
82 Starboard tailplane
83 Tailcone
84 Tail navigation light
85 Jet pipe exhaust
86 Port tailplane
87 Tailplane construction
88 Rear fuselage construction
89 Ventral fin, port and starboard
90 Airbrake jack
91 Airbrake (extended)
92 Jet pipe
93 Rear fuselage joint
94 Rolls-Royce Turboméca RT.172-06 Adour 151 turbofan
95 Engine access panel
96 Engine accessories
97 Wing root fillet
98 Fuselage lower longeron
99 Wing rear spar attachment
100 Port flap
101 Flap construction
102 Hinged access doors
103 Flap control rod
104 Wing integral fuel tank
105 Wing rib construction
106 Aileron power control jack
107 Aileron honeycomb construction
108 Port aileron
109 Localiser aerial
110 Port wingtip construction
111 Port navigation light
112 Leading edge wing fence
113 Port wing pylon
114 Matra rocket launcher
115 Port mainwheel
116 Mainwheel leg
117 Side leg doors
118 Leading edge construction
119 Airflow spoiler strip
120 Undercarriage leg pivot point
121 Retraction jack
122 Mainwheel well
123 Front spar attachment
124 Leading edge joint
125 Refuelling point
126 Main undercarriage door
127 Ventral gun pack
128 Link collector box
129 Ammunition box
130 Ammunition feed chutes
131 30-mm Aden gun
132 Gun muzzle



SPECIAL OPTIONS SETUP

The Hawk has three optional cockpit texture resolutions: *High – 4096, Medium – 2048 and Low – 1024*. What the majority of DCS modules have is a resolution of 2048.

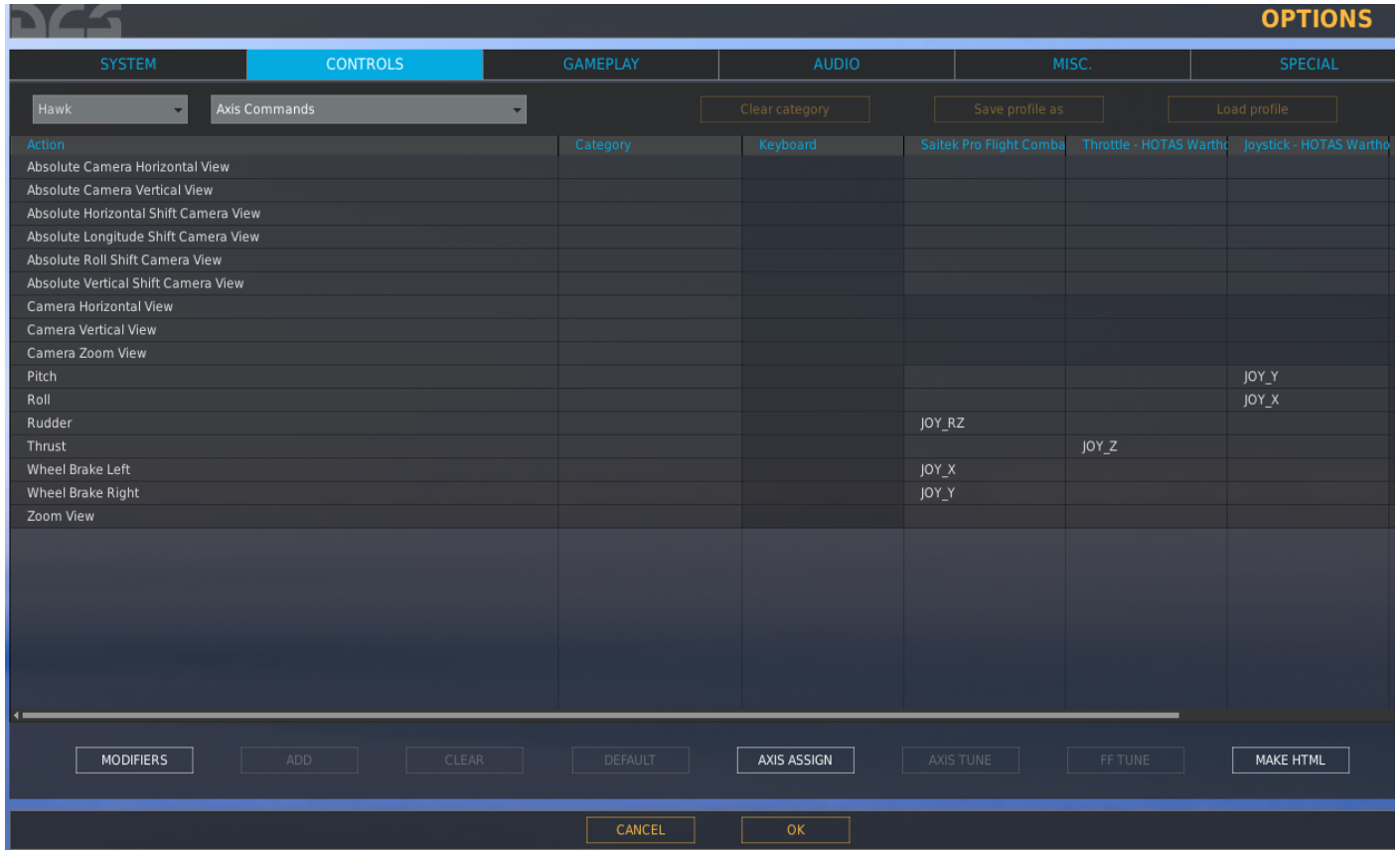
I recommend that you take the **MEDIUM** cockpit textures (since 2048 is the standard resolution in all DCS modules) in order to keep a good framerate. If you have a very high-end graphics card (Nvidia GTX Titan), you may want to try the High setting but for cards like my Nvidia GTX 970, the Medium setting is a perfect balance between framerate performance and eye candy. I barely noticed the difference.



CONTROLS SETUP

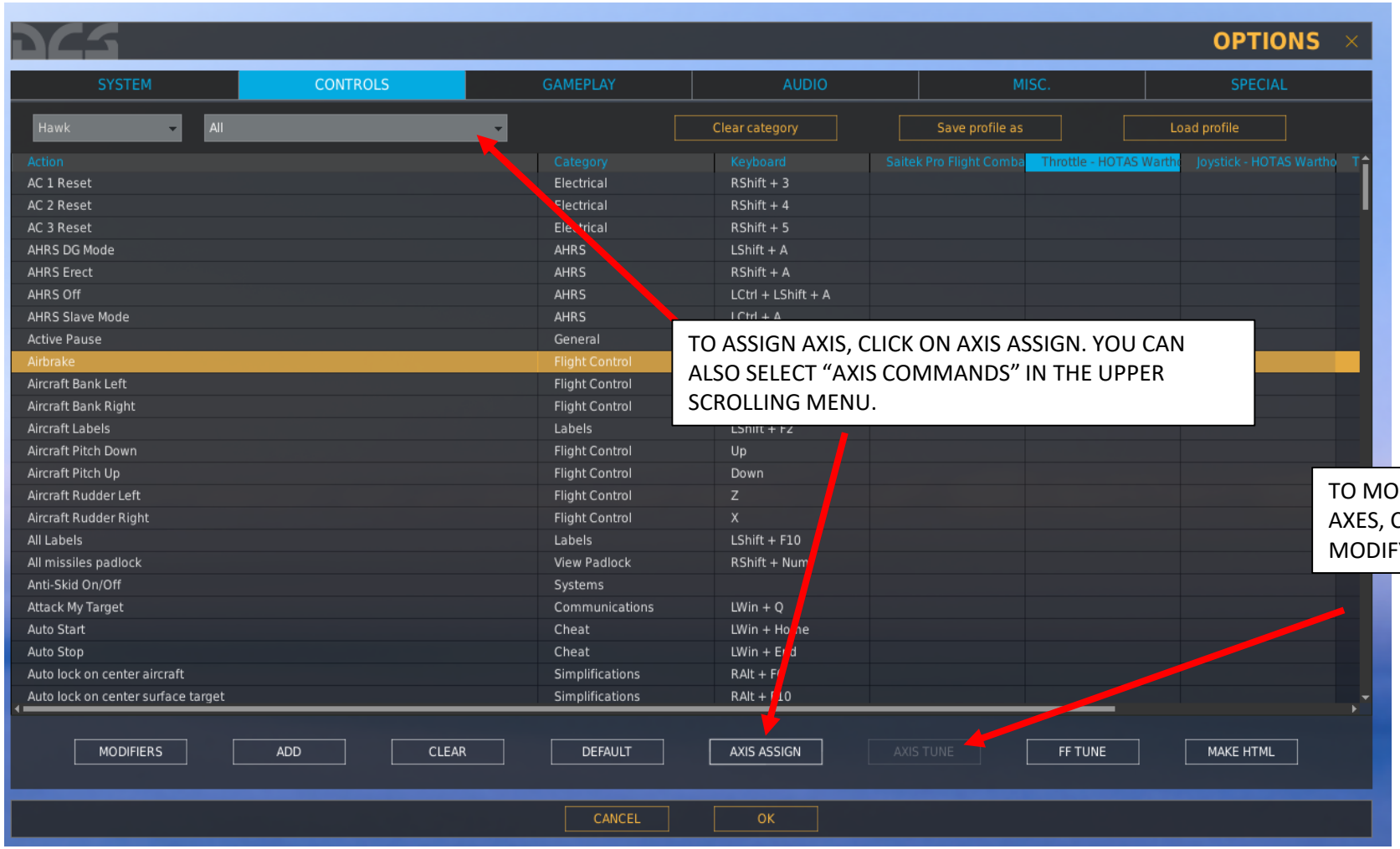
BIND THE FOLLOWING AXES:

- 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)
- THRUST – THROTTLE CONTROLS ENGINE RPM
- WHEEL BRAKE LEFT / RIGHT



CONTROLS SETUP

ASSIGNING PROPER AXIS IS IMPORTANT. HERE ARE A COUPLE OF TIPS.



TO ASSIGN AXIS, CLICK ON AXIS ASSIGN. YOU CAN ALSO SELECT “AXIS COMMANDS” IN THE UPPER SCROLLING MENU.

TO MODIFY CURVES AND SENSITIVITIES OF AXES, CLICK ON THE AXIS YOU WANT TO MODIFY AND THEN CLICK AXIS TUNE

WHAT YOU NEED MAPPED

SMOKE (T)

WEAPON RELEASE (SPACE)

GUN TRIGGER (ENTER)

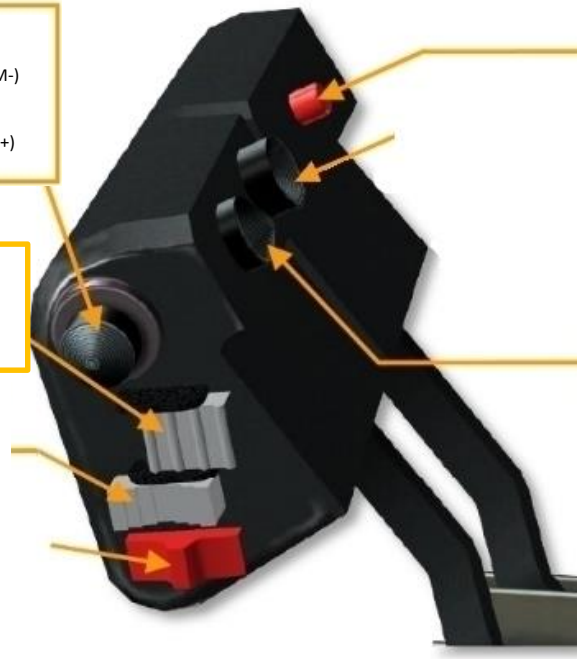
↑
→
↓
←
P

↑ TRIM : NOSE DOWN
→ TRIM : RUDDER LEFT
↓ TRIM : NOSE UP
← TRIM : RUDDER RIGHT

↑ ZOOM IN SLOW
→
↓ ZOOM OUT SLOW
←

↑
→ MIC Switch Transmit UHF (LALT+NUM-)
↓
← MIC Switch Transmit AM (LALT+NUM+)

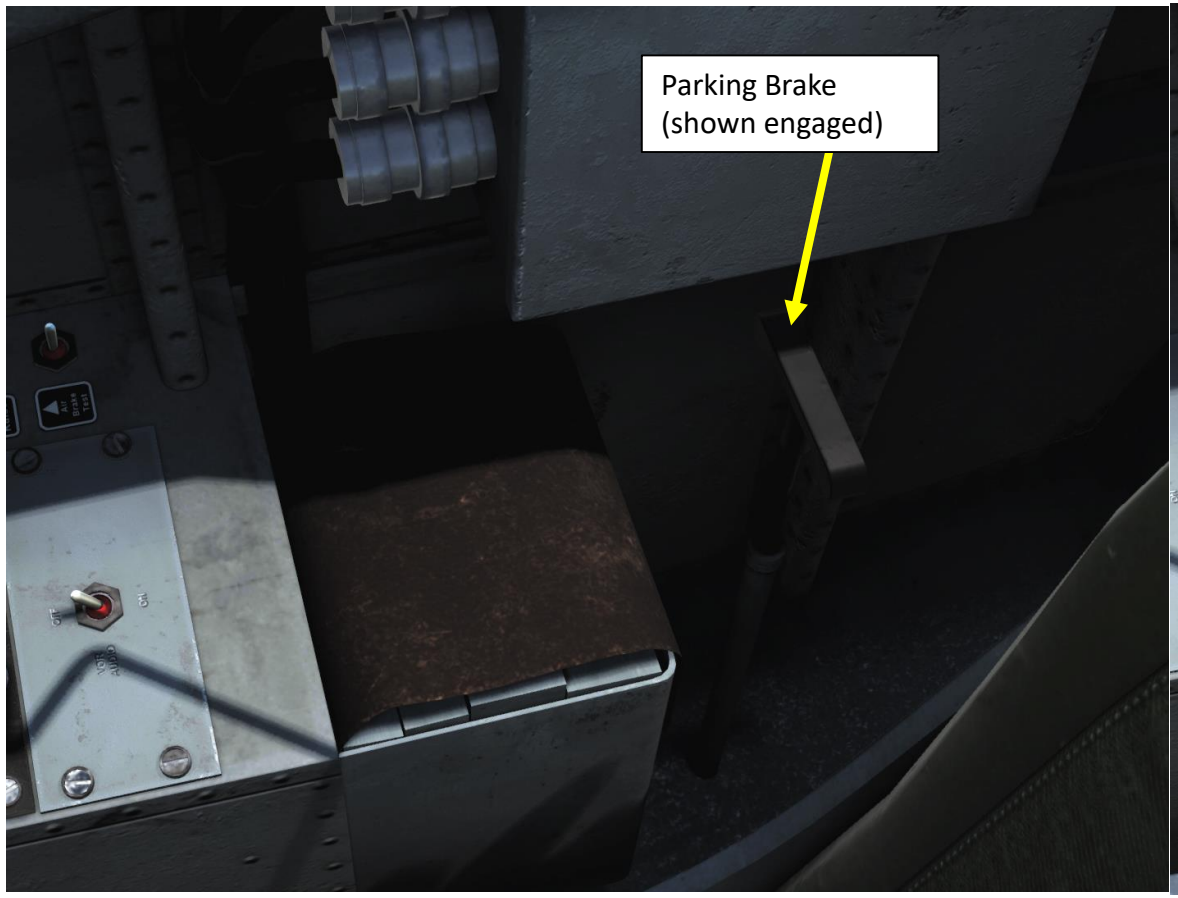
←
→AIRBRAKE (B)

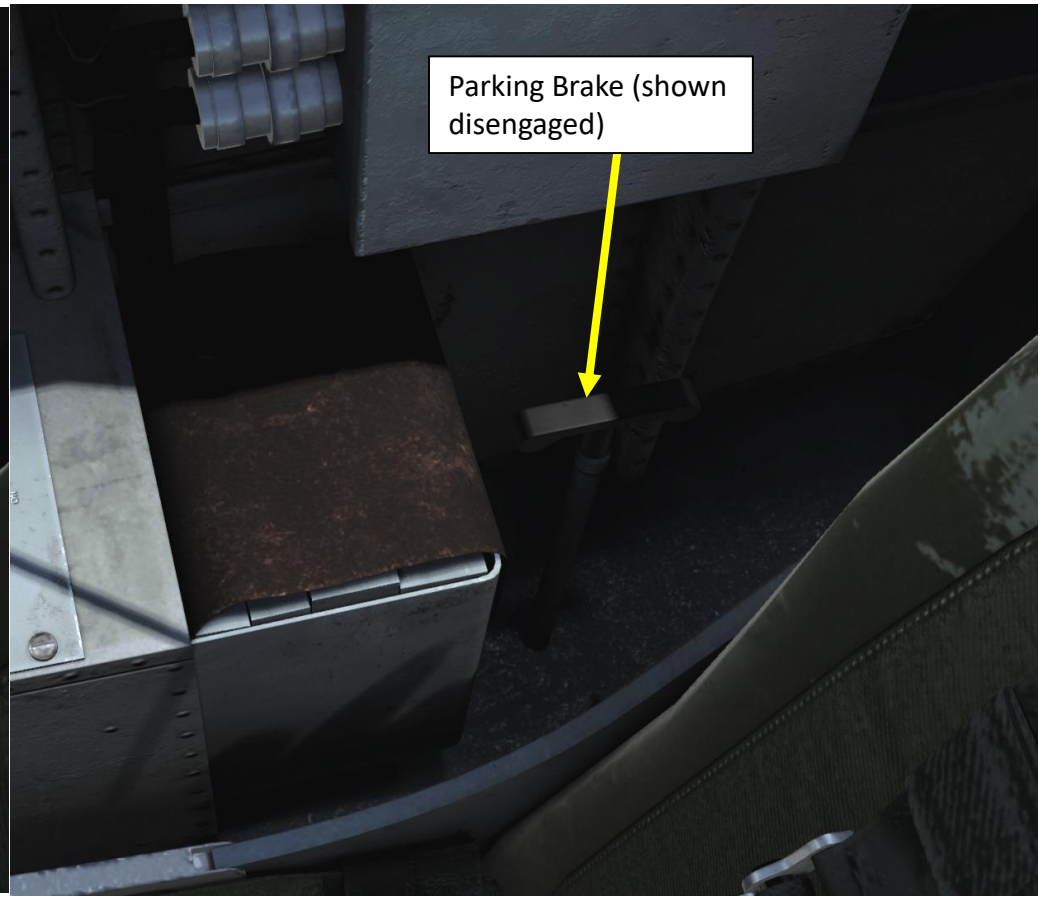


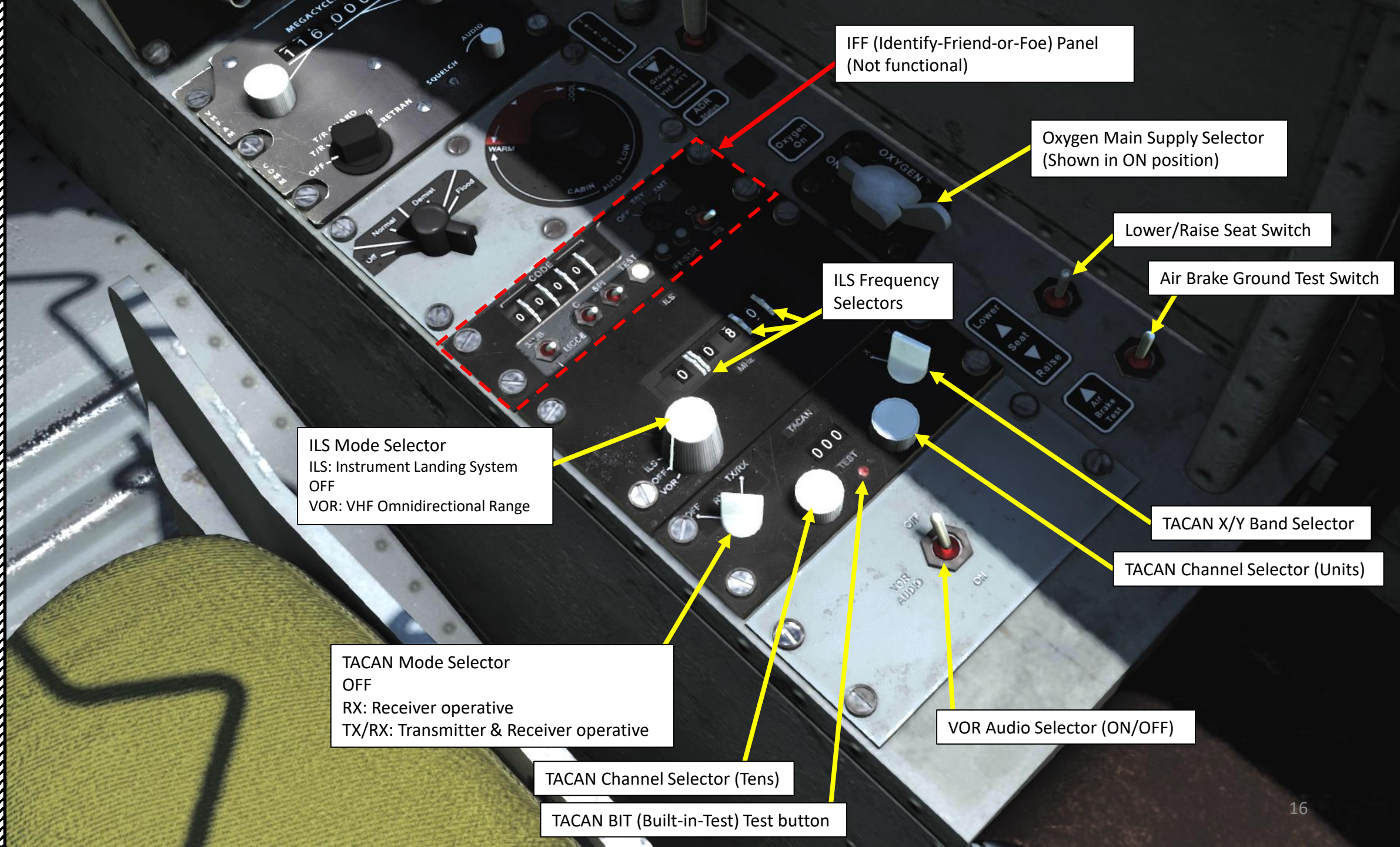
+ TOE BRAKES (MAPPED ON PEDALS)

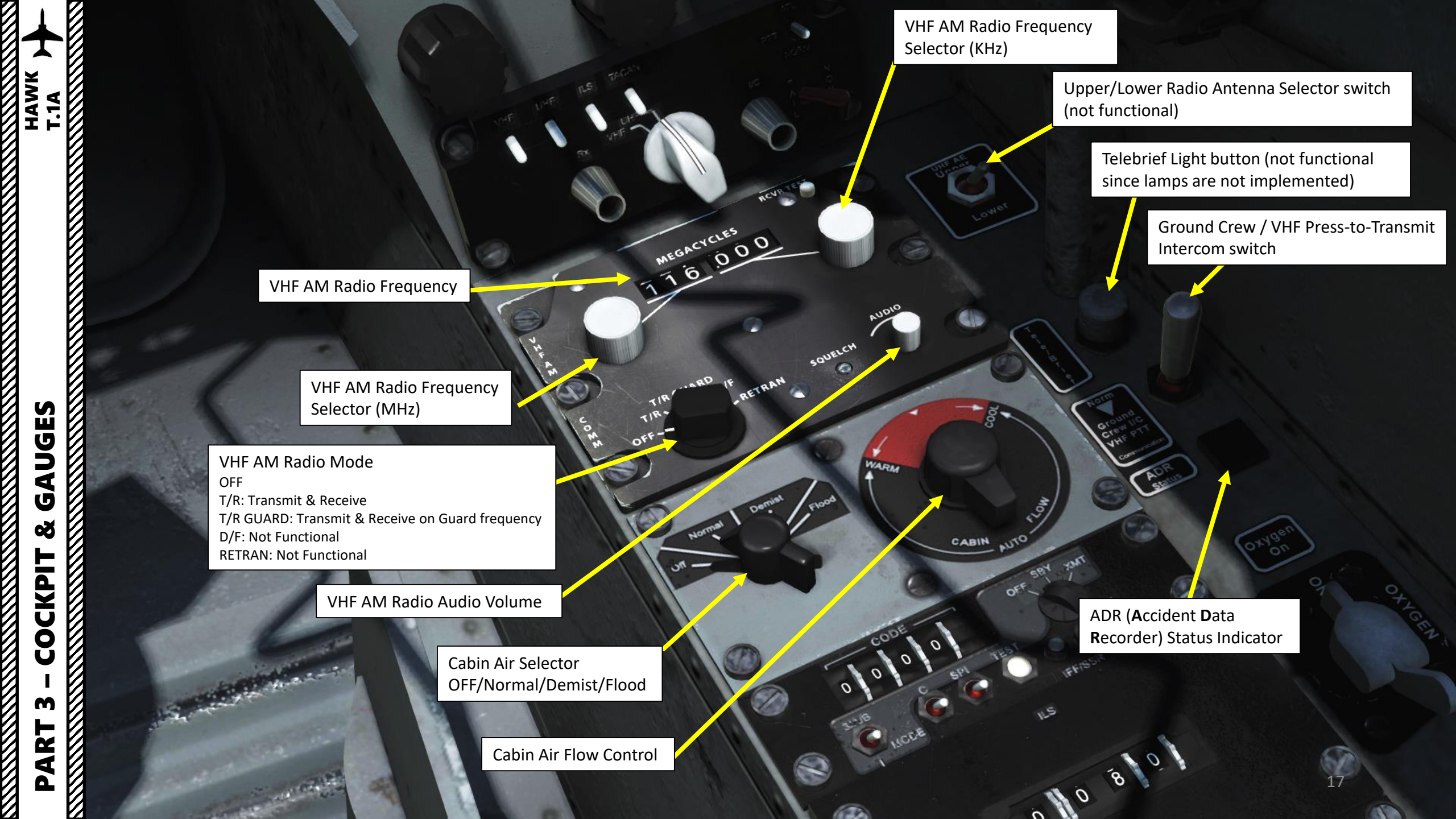

Nav
Anti-Collision
Panel
Engine
Fuel Lights
Cockpit

PART 3 – COCKPIT & GAUGES

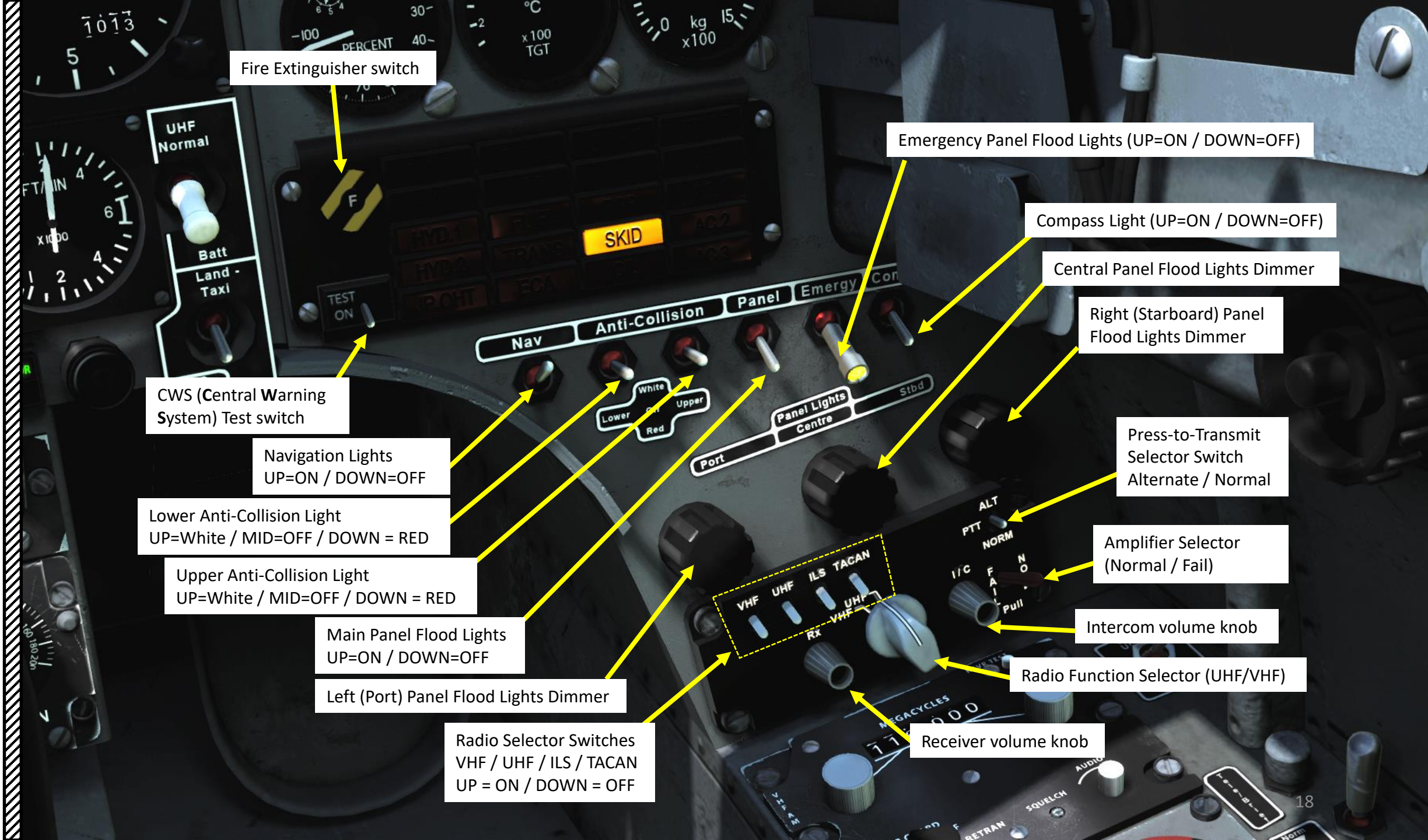

Parking Brake
(shown engaged)

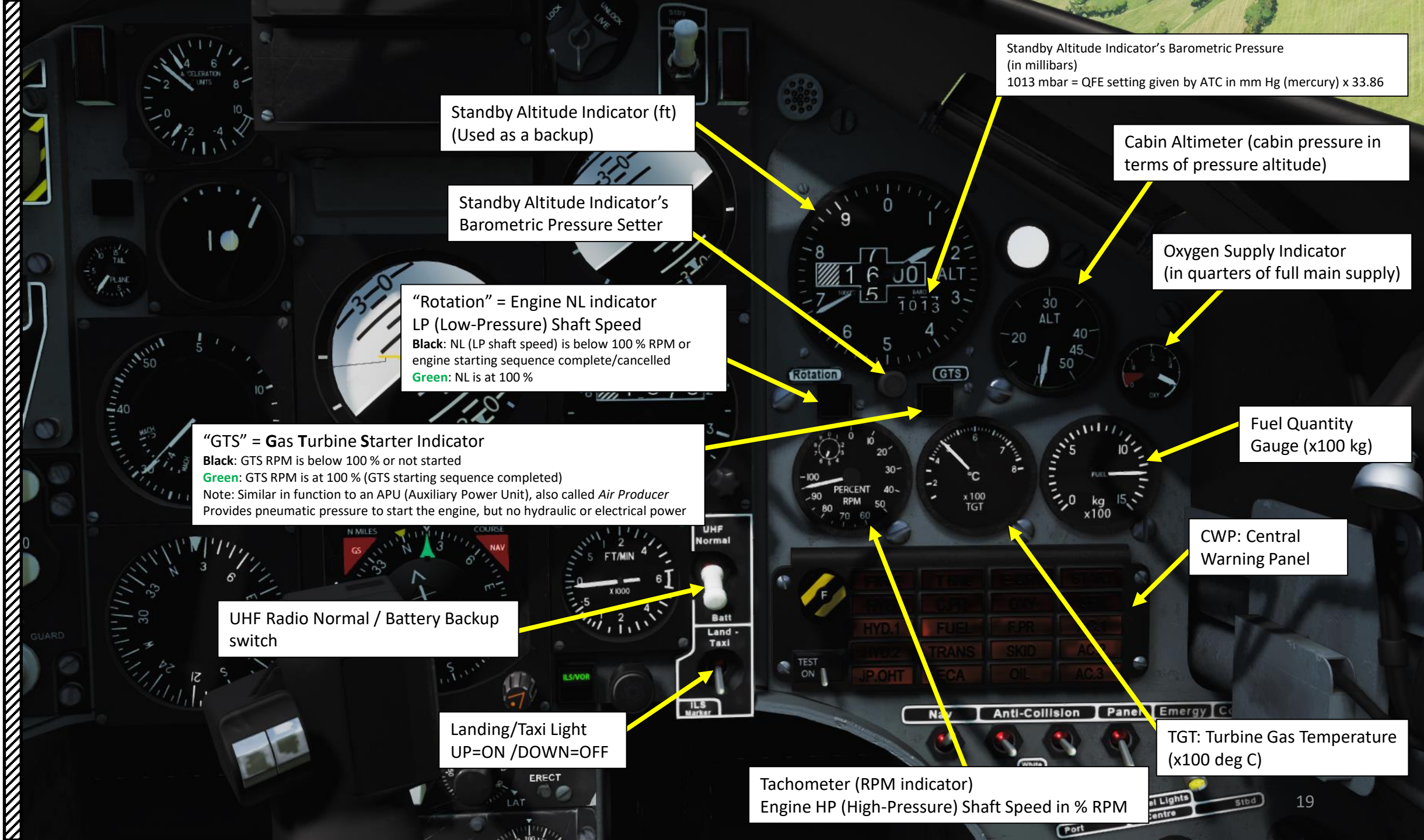

Parking Brake (shown
disengaged)


IFF (Identify-Friend-or-Foe) Panel
(Not functional)
Oxygen Main Supply Selector
(Shown in ON position)
Lower/Raise Seat Switch
Air Brake Ground Test Switch
ILS Frequency
Selectors
ILS Mode Selector
ILS: Instrument Landing System
OFF
VOR: VHF Omnidirectional Range
TACAN X/Y Band Selector
TACAN Channel Selector (Units)
TACAN Mode Selector
OFF
RX: Receiver operative
TX/RX: Transmitter & Receiver operative
VOR Audio Selector (ON/OFF)
TACAN Channel Selector (Tens)
TACAN BIT (Built-in-Test) Test button


VHF AM Radio Frequency Selector (KHz)
Upper/Lower Radio Antenna Selector switch (not functional)
Telebrief Light button (not functional since lamps are not implemented)
Ground Crew / VHF Press-to-Transmit Intercom switch
VHF AM Radio Frequency
VHF AM Radio Frequency Selector (MHz)
VHF AM Radio Mode
OFF
T/R: Transmit & Receive
T/R GUARD: Transmit & Receive on Guard frequency
D/F: Not Functional
RETRAN: Not Functional
VHF AM Radio Audio Volume
Cabin Air Selector OFF/Normal/Demist/Flood
Cabin Air Flow Control
ADR (Accident Data Recorder) Status Indicator
MEGACYCLES
116 000
SQUELCH
AUDIO
RETRAN
OFF
Normal
Demist
Flood
WARM
COOL
CABIN
AUTO
FLOW
CODE
Oxygen On
OXYGEN

PART 3 – COCKPIT & GAUGES





Standby Altitude Indicator (ft)
(Used as a backup)

Standby Altitude Indicator's Barometric Pressure
(in millibars)
1013 mbar = QFE setting given by ATC in mm Hg (mercury) x 33.86

Cabin Altimeter (cabin pressure in terms of pressure altitude)

Standby Altitude Indicator's Barometric Pressure Setter

Oxygen Supply Indicator
(in quarters of full main supply)

"Rotation" = Engine NL indicator
LP (Low-Pressure) Shaft Speed
Black: NL (LP shaft speed) is below 100 % RPM or engine starting sequence complete/cancelled
Green: NL is at 100 %

"GTS" = **G**as **T**urbine **S**tarter Indicator
Black: GTS RPM is below 100 % or not started
Green: GTS RPM is at 100 % (GTS starting sequence completed)
Note: Similar in function to an APU (Auxiliary Power Unit), also called *Air Producer*
Provides pneumatic pressure to start the engine, but no hydraulic or electrical power

Fuel Quantity Gauge (x100 kg)

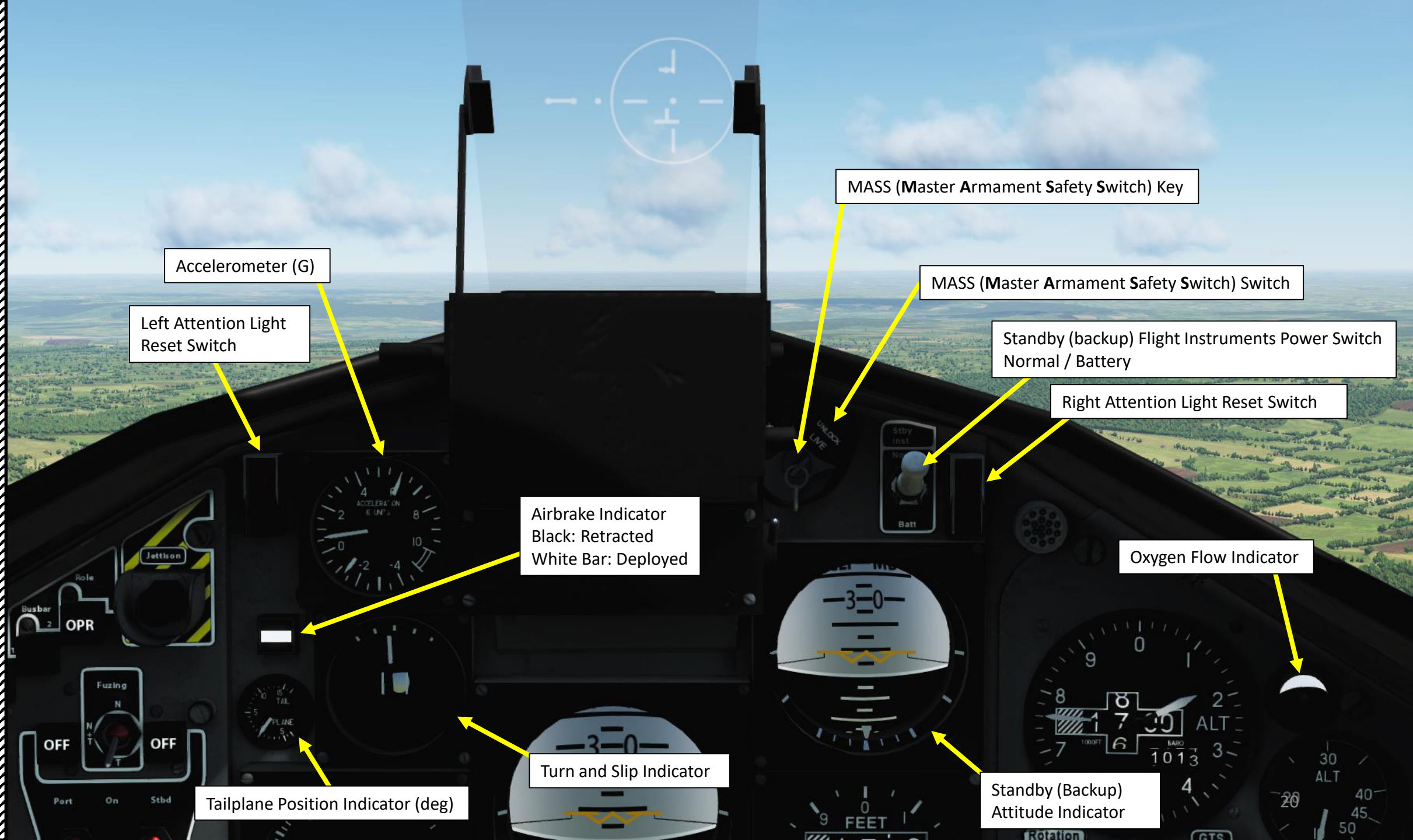
CWP: Central Warning Panel

UHF Radio Normal / Battery Backup switch

Landing/Taxi Light
UP=ON /DOWN=OFF

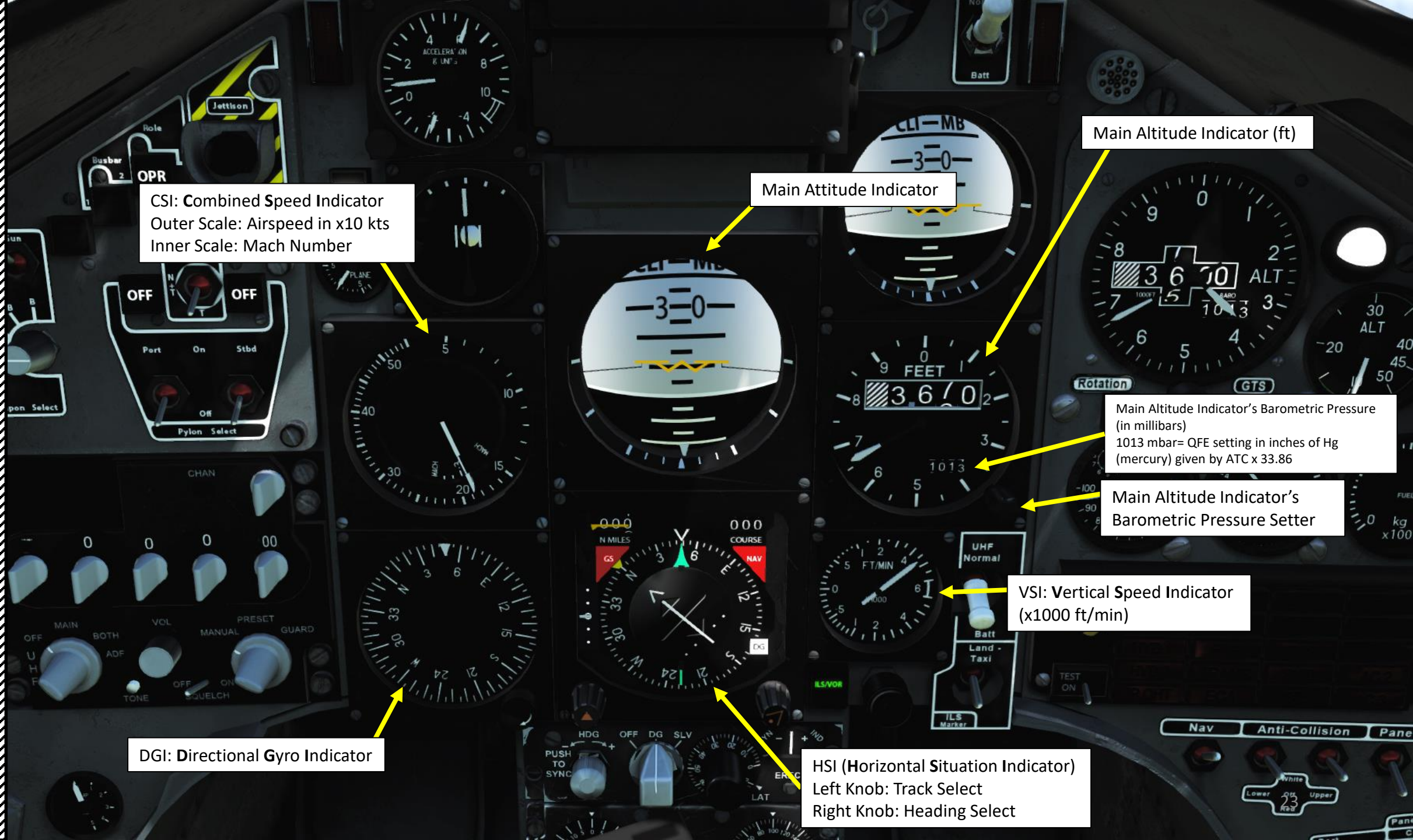
TGT: Turbine Gas Temperature (x100 deg C)

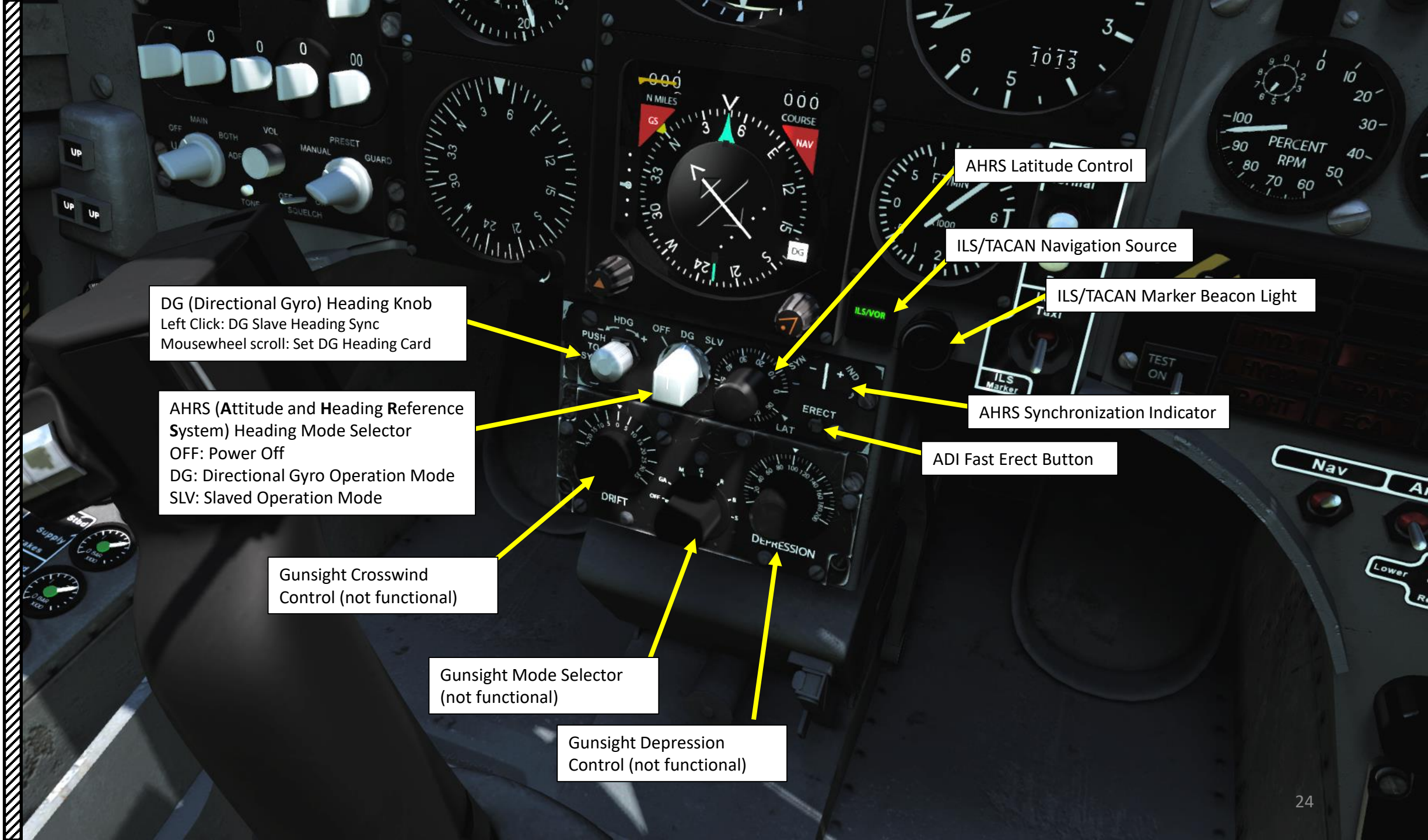
Tachometer (RPM indicator)
Engine HP (High-Pressure) Shaft Speed in % RPM


MASS (Master Armament Safety Switch) Key
Accelerometer (G)
MASS (Master Armament Safety Switch) Switch
Left Attention Light Reset Switch
Standby (backup) Flight Instruments Power Switch Normal / Battery
Right Attention Light Reset Switch
Airbrake Indicator
Black: Retracted
White Bar: Deployed
Oxygen Flow Indicator
Turn and Slip Indicator
Tailplane Position Indicator (deg)
Standby (Backup) Attitude Indicator


E2C Standby Compass
Gunsight

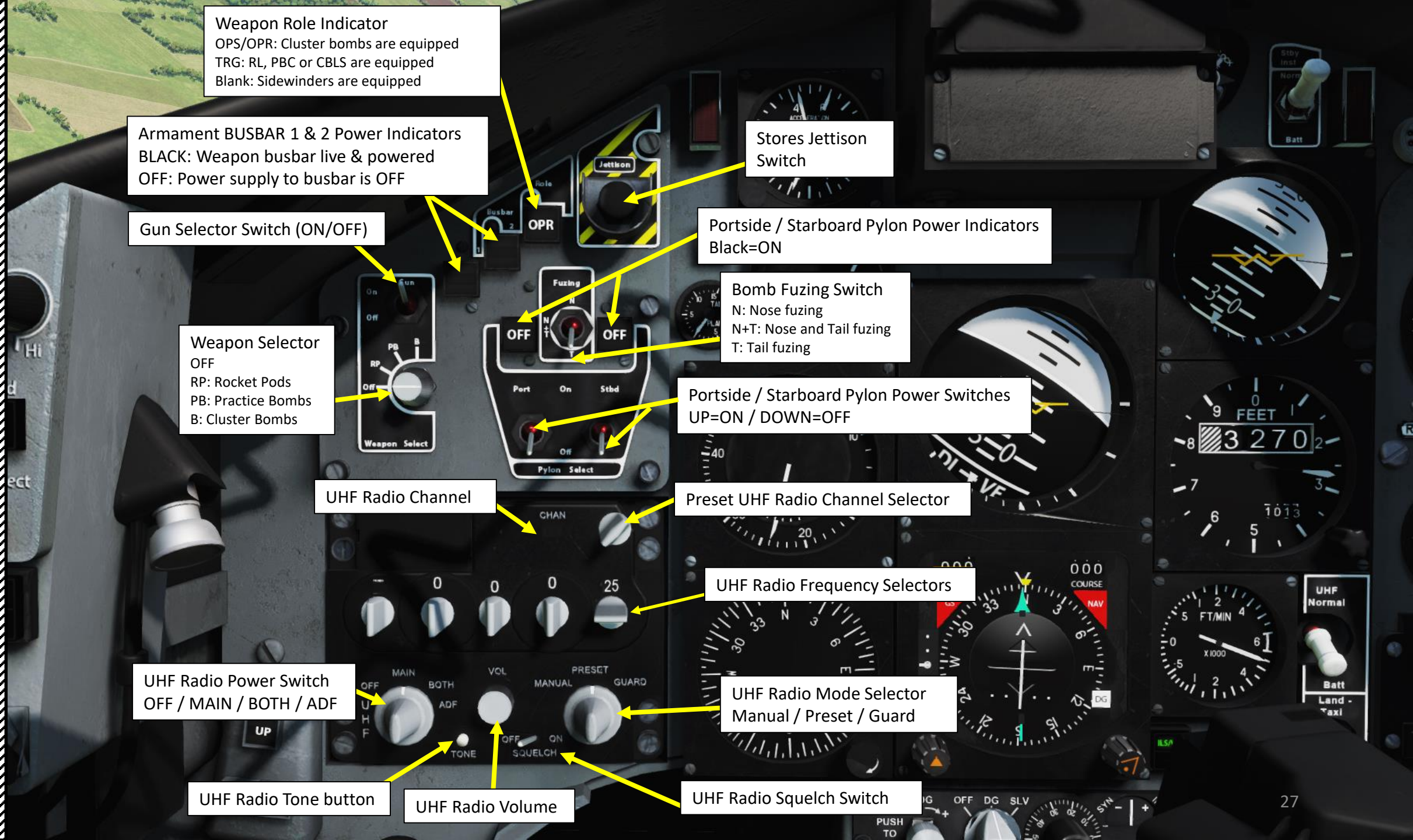

Explosive Cord (used to jettison canopy during ejection sequence)

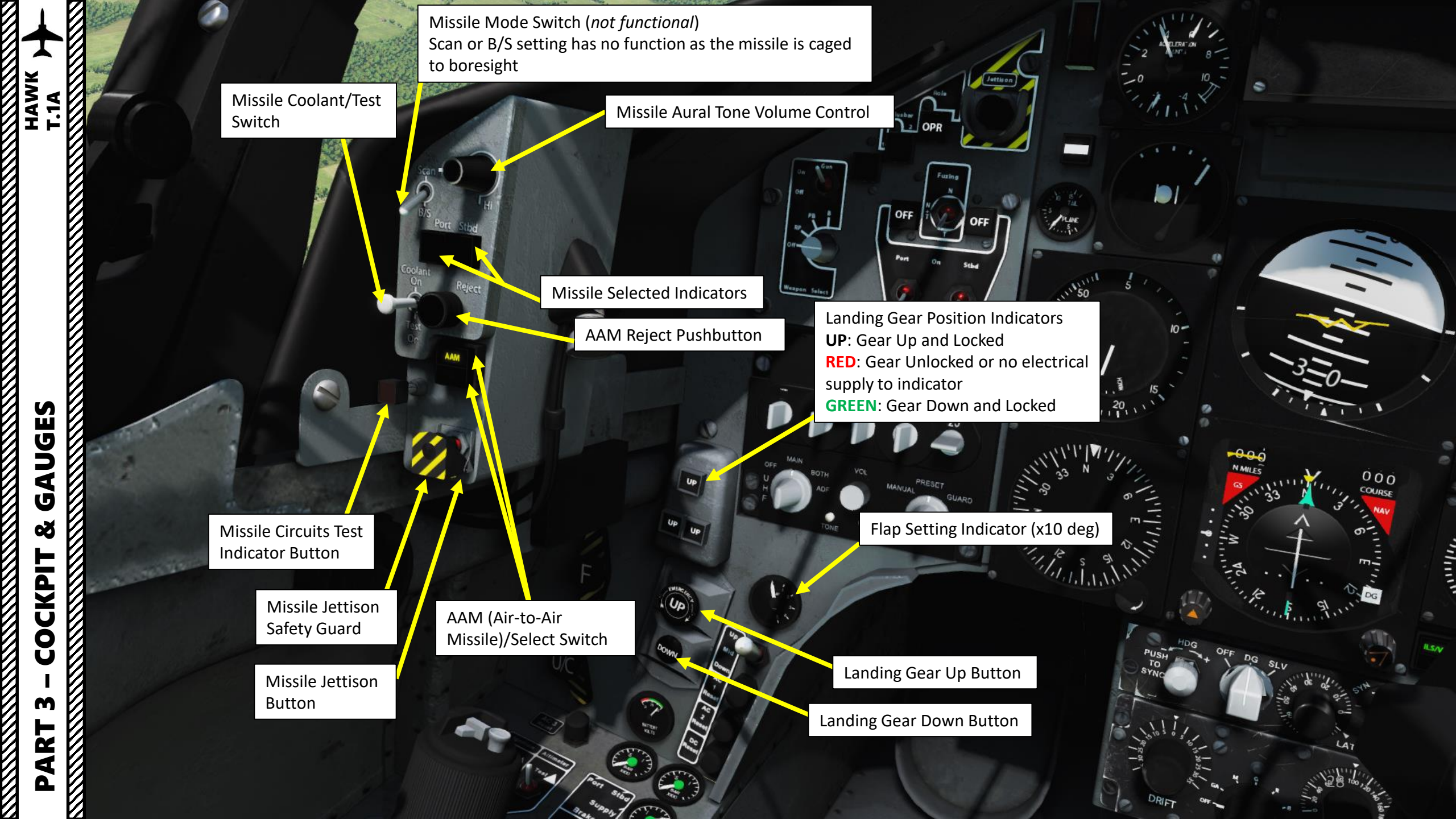

CSI: Combined Speed Indicator
Outer Scale: Airspeed in x10 kts
Inner Scale: Mach Number
Main Attitude Indicator
Main Altitude Indicator (ft)
Main Altitude Indicator's Barometric Pressure (in millibars)
1013 mbar= QFE setting in inches of Hg (mercury) given by ATC x 33.86
Main Altitude Indicator's Barometric Pressure Setter
VSI: Vertical Speed Indicator (x1000 ft/min)
DGI: Directional Gyro Indicator
HSI (Horizontal Situation Indicator)
Left Knob: Track Select
Right Knob: Heading Select


AHRS Latitude Control
ILS/TACAN Navigation Source
ILS/TACAN Marker Beacon Light
DG (Directional Gyro) Heading Knob
Left Click: DG Slave Heading Sync
Mousewheel scroll: Set DG Heading Card
AHRS (Attitude and Heading Reference System) Heading Mode Selector
OFF: Power Off
DG: Directional Gyro Operation Mode
SLV: Slaved Operation Mode
AHRS Synchronization Indicator
ADI Fast Erect Button
Gunsight Crosswind Control (not functional)
Gunsight Mode Selector (not functional)
Gunsight Depression Control (not functional)
HDG
OFF
DG
SLV
ERECT
LAT
DRIFT
DEPRESSION
ILS/VOR
TEST
ON
ILS Marker
N MILES
COURSE
GS
NAV
DG
PERCENT RPM

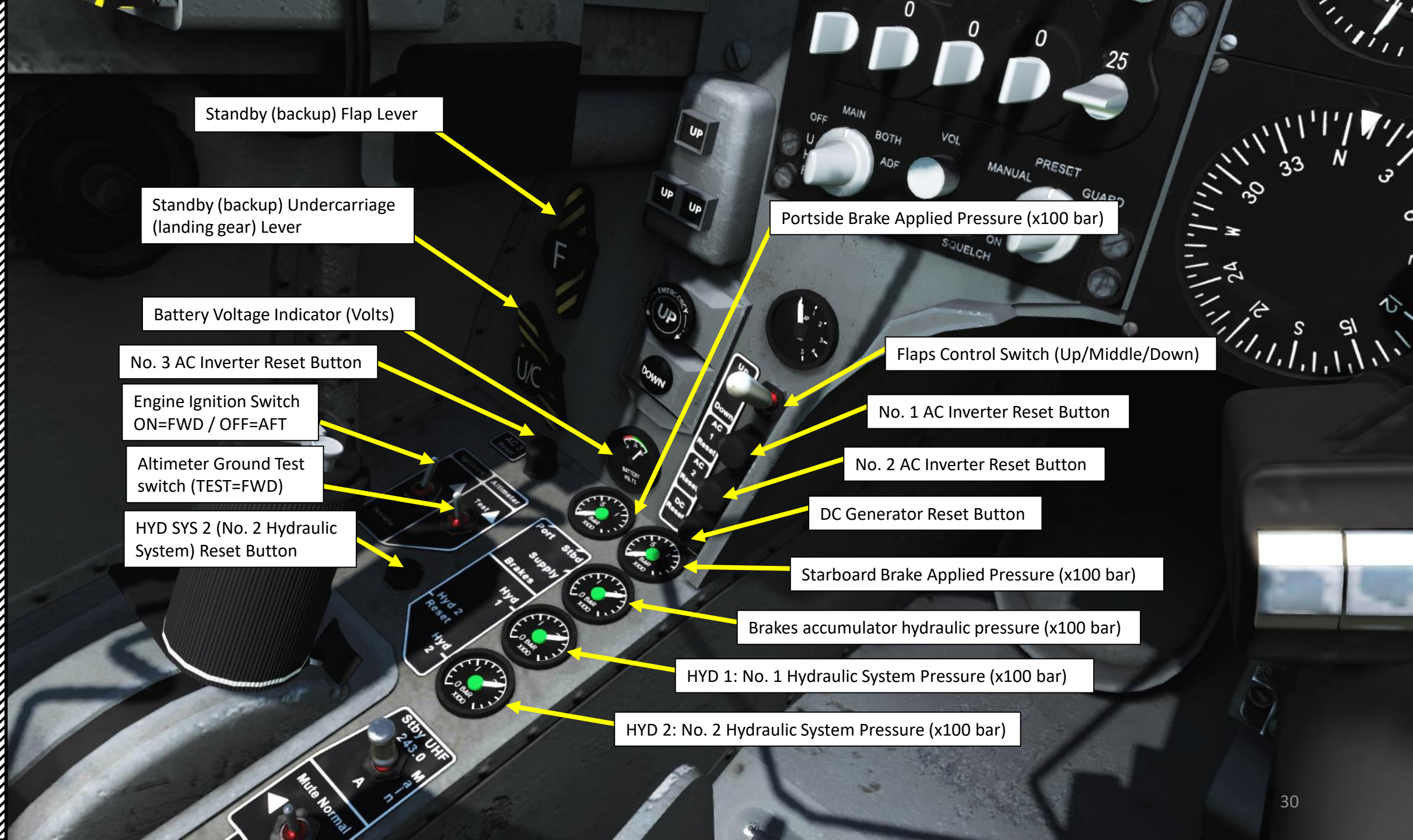

Weapon Release Switch (under cover)
Tailplane/Elevator Trim Controls
Gun Trigger (front, hidden)
Pylon Select
CHAN
PRESET
MANUAL
GUARD
SQUELCH
PUSH TO SYNC
HDG
DRIFT
DEPRESSION
Nav
Anti-Collision
Panel

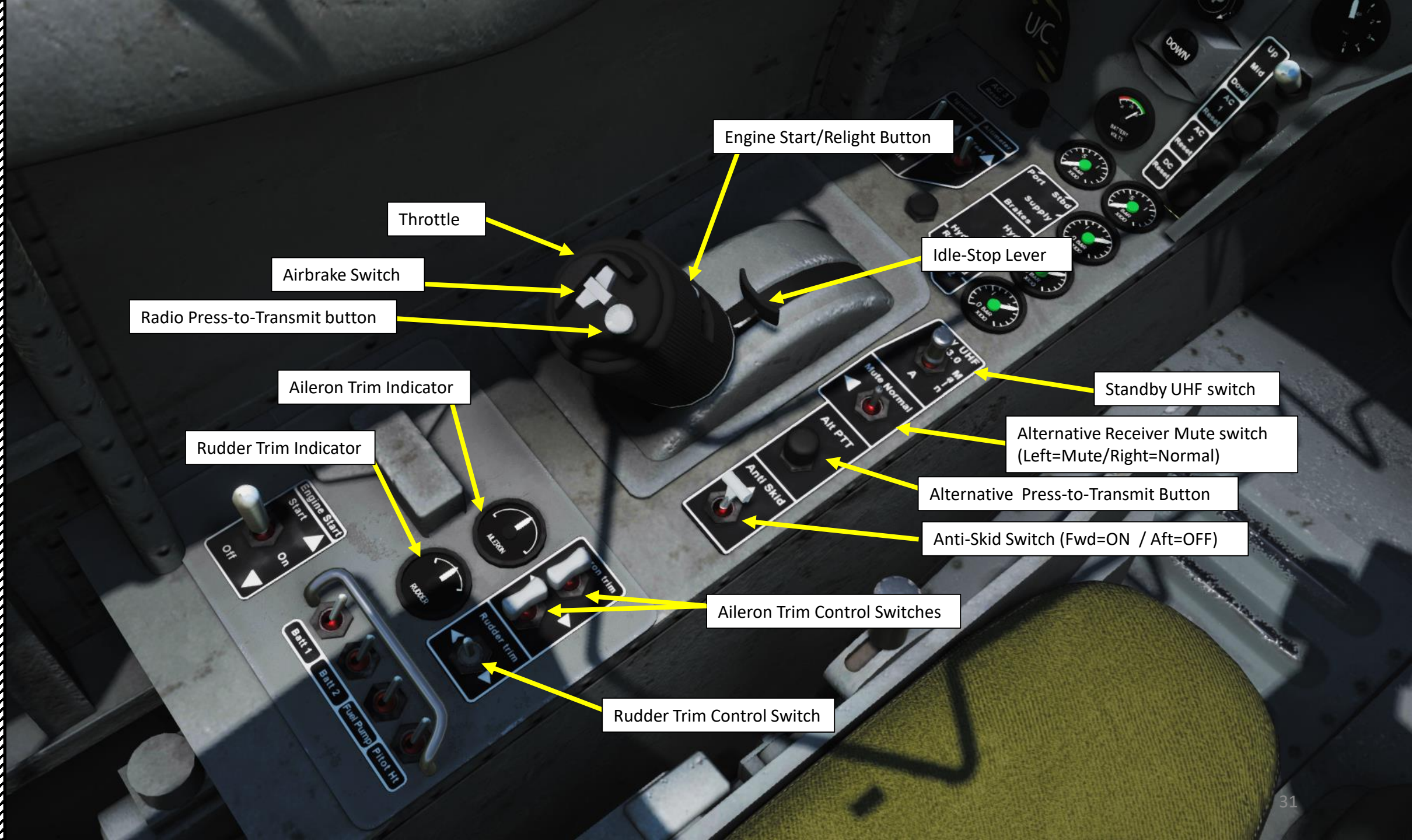

Ejection Seat Handle

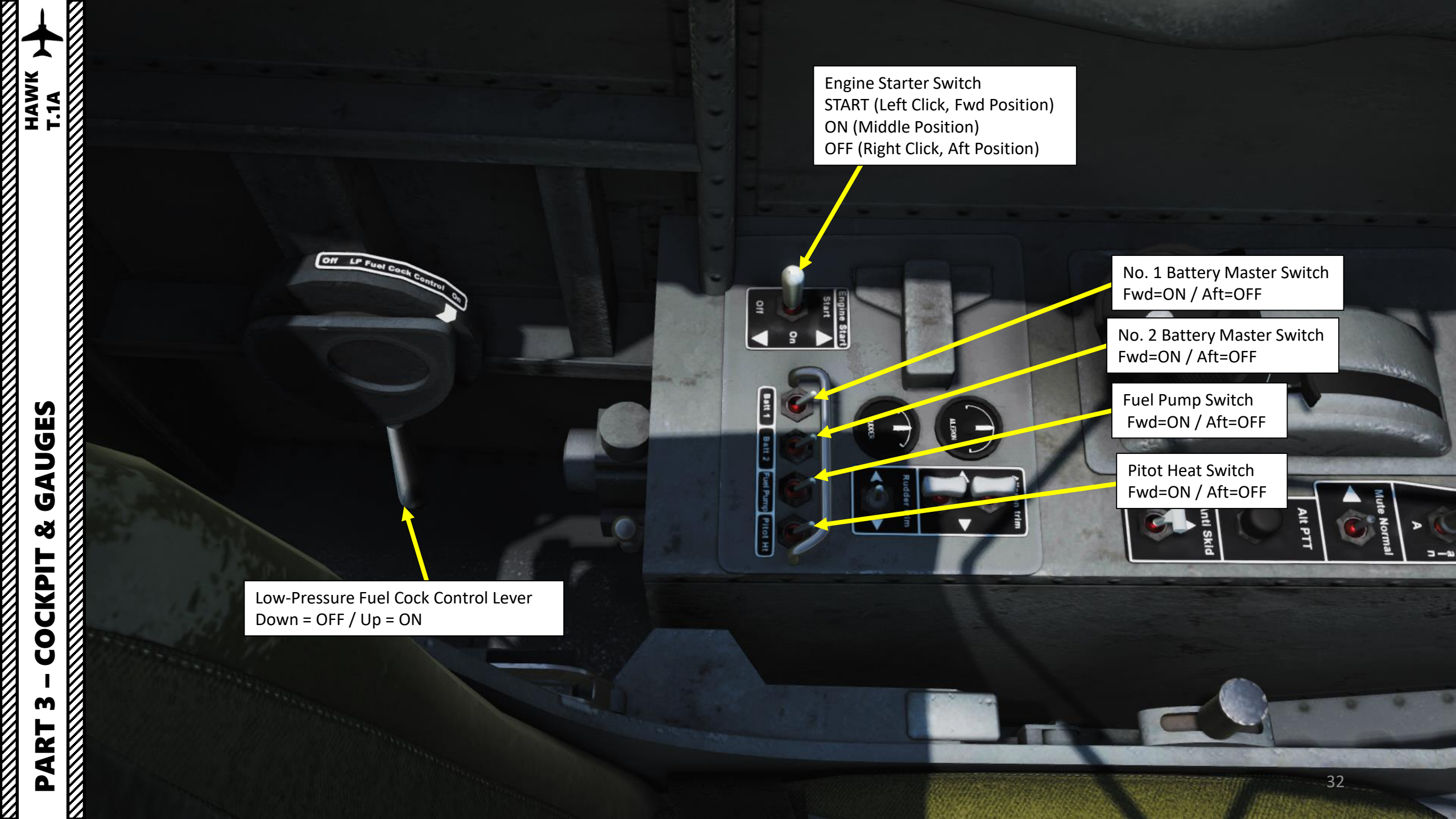

Weapon Role Indicator
OPS/OPR: Cluster bombs are equipped
TRG: RL, PBC or CBLS are equipped
Blank: Sidewinders are equipped
Armament BUSBAR 1 & 2 Power Indicators
BLACK: Weapon busbar live & powered
OFF: Power supply to busbar is OFF
Stores Jettison Switch
Gun Selector Switch (ON/OFF)
Portside / Starboard Pylon Power Indicators
Black=ON
Bomb Fuzing Switch
N: Nose fuzing
N+T: Nose and Tail fuzing
T: Tail fuzing
Weapon Selector
OFF
RP: Rocket Pods
PB: Practice Bombs
B: Cluster Bombs
Portside / Starboard Pylon Power Switches
UP=ON / DOWN=OFF
UHF Radio Channel
Preset UHF Radio Channel Selector
UHF Radio Frequency Selectors
UHF Radio Power Switch
OFF / MAIN / BOTH / ADF
UHF Radio Mode Selector
Manual / Preset / Guard
UHF Radio Tone button
UHF Radio Volume
UHF Radio Squelch Switch
Busbar
Role
OPR
Jettison
Fuzing
OFF
Port
On
Stbd
Pylon Select
Weapon Select
CHAN
MAIN
BOTH
ADF
VOL
PRESET
MANUAL
GUARD
TONE
SQUELCH
UHF Normal
Batt
Land - Taxi
FEET
3 270
COURSE
NAV
FT/MIN
X1000


Missile Mode Switch (*not functional*)
Scan or B/S setting has no function as the missile is caged to boresight
Missile Coolant/Test Switch
Missile Aural Tone Volume Control
Missile Selected Indicators
AAM Reject Pushbutton
Landing Gear Position Indicators
UP: Gear Up and Locked
RED: Gear Unlocked or no electrical supply to indicator
GREEN: Gear Down and Locked
Missile Circuits Test Indicator Button
Flap Setting Indicator (x10 deg)
Missile Jettison Safety Guard
AAM (Air-to-Air Missile)/Select Switch
Missile Jettison Button
Landing Gear Up Button
Landing Gear Down Button

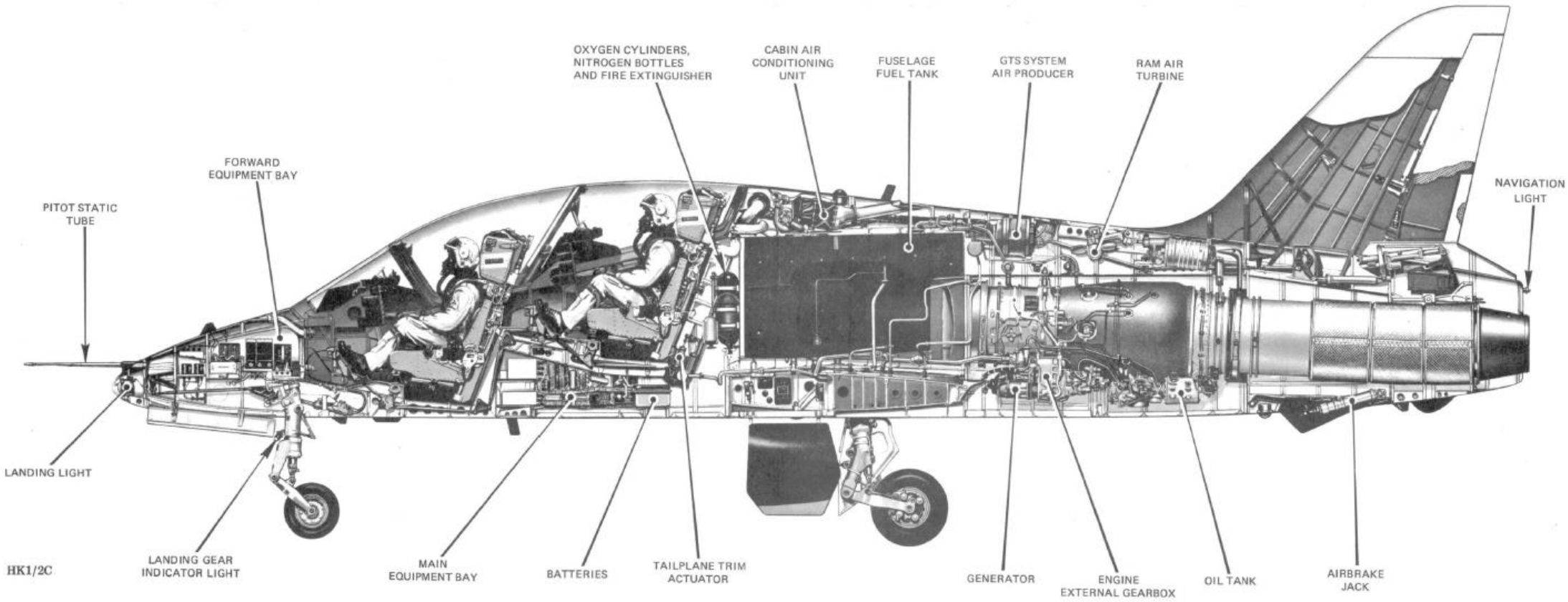

Canopy Locking Lever
Canopy Safety Catch


Standby (backup) Flap Lever
Standby (backup) Undercarriage (landing gear) Lever
Battery Voltage Indicator (Volts)
No. 3 AC Inverter Reset Button
Engine Ignition Switch ON=FWD / OFF=AFT
Altimeter Ground Test switch (TEST=FWD)
HYD SYS 2 (No. 2 Hydraulic System) Reset Button
Portside Brake Applied Pressure (x100 bar)
Flaps Control Switch (Up/Middle/Down)
No. 1 AC Inverter Reset Button
No. 2 AC Inverter Reset Button
DC Generator Reset Button
Starboard Brake Applied Pressure (x100 bar)
Brakes accumulator hydraulic pressure (x100 bar)
HYD 1: No. 1 Hydraulic System Pressure (x100 bar)
HYD 2: No. 2 Hydraulic System Pressure (x100 bar)


Engine Start/Relight Button
Throttle
Airbrake Switch
Radio Press-to-Transmit button
Idle-Stop Lever
Aileron Trim Indicator
Rudder Trim Indicator
Standby UHF switch
Alternative Receiver Mute switch
(Left=Mute/Right=Normal)
Alternative Press-to-Transmit Button
Anti-Skid Switch (Fwd=ON / Aft=OFF)
Aileron Trim Control Switches
Rudder Trim Control Switch

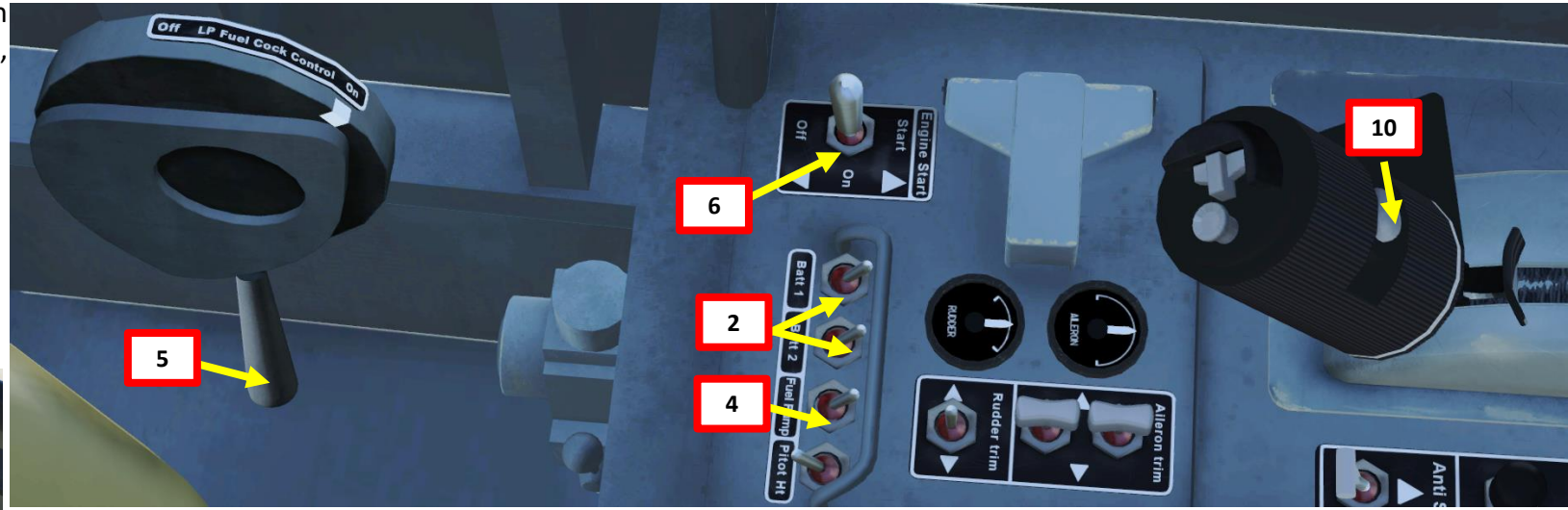

Engine Starter Switch
START (Left Click, Fwd Position)
ON (Middle Position)
OFF (Right Click, Aft Position)
No. 1 Battery Master Switch
Fwd=ON / Aft=OFF
No. 2 Battery Master Switch
Fwd=ON / Aft=OFF
Fuel Pump Switch
Fwd=ON / Aft=OFF
Pitot Heat Switch
Fwd=ON / Aft=OFF
Low-Pressure Fuel Cock Control Lever
Down = OFF / Up = ON
Off
LP Fuel Cock Control
On
Engine Start
Start
Off
On
Batt 1
Batt 2
Fuel Pump
Pitot Ht
Alt PTT
Mute Normal

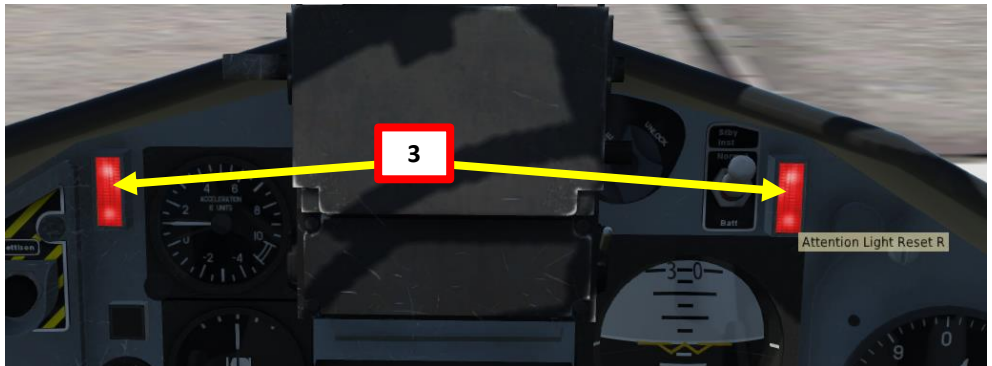

CR
XX189
ROYAL AIR FORCE
Airbrake

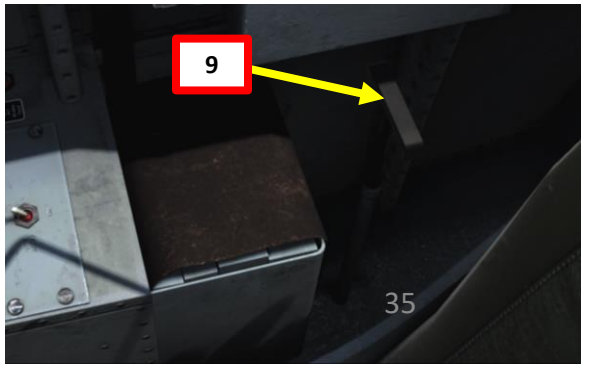

OXYGEN CYLINDERS, NITROGEN BOTTLES AND FIRE EXTINGUISHER
CABIN AIR CONDITIONING UNIT
FUSELAGE FUEL TANK
GTS SYSTEM AIR PRODUCER
RAM AIR TURBINE
NAVIGATION LIGHT
FORWARD EQUIPMENT BAY
PITOT STATIC TUBE
LANDING LIGHT
HK1/2C
LANDING GEAR INDICATOR LIGHT
MAIN EQUIPMENT BAY
BATTERIES
TAILPLANE TRIM ACTUATOR
GENERATOR
ENGINE EXTERNAL GEARBOX
OIL TANK
AIRBRAKE JACK

START-UP PROCEDURE

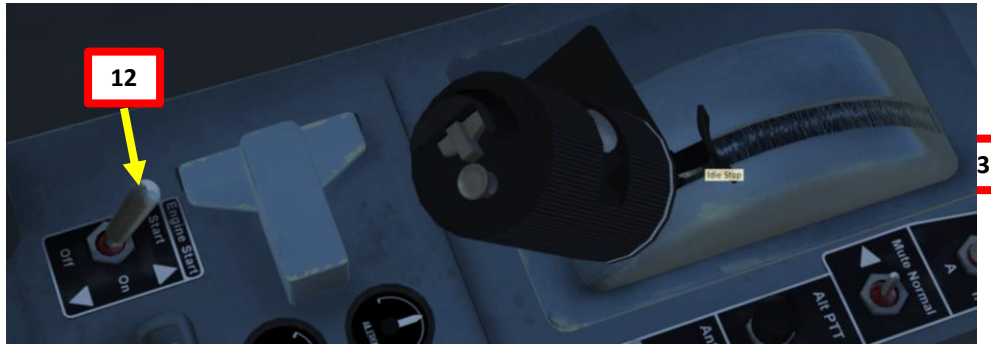
1. Engine Ignition Switch – ON
2. No. 1 & No. 2 Battery Switches – ON (FWD)
3. Reset Attention Lights Left and Right
4. Fuel Pump Switch – ON (FWD)
5. Fuel Cock Lever – ON
6. Engine Master Switch – ON (Left Click **once** to set to Middle Position)
7. Oxygen – ON (Left Click)
8. Air Conditioning Selector – NORMAL (Right Click)
9. Engage Parking Brake
10. Hold Engine Start/Relight Switch for 5 to 10 seconds (switch now clickable in cockpit, you can still use "Start/Re-light Button" control binding, or keyboard shortcut "LCTRL+LSHIFT+S"
11. Wait for GTS (Gas Turbine Starter) RPM to reach 100% (GTS RPM indicator will turn **green** when GTS is spooled up).

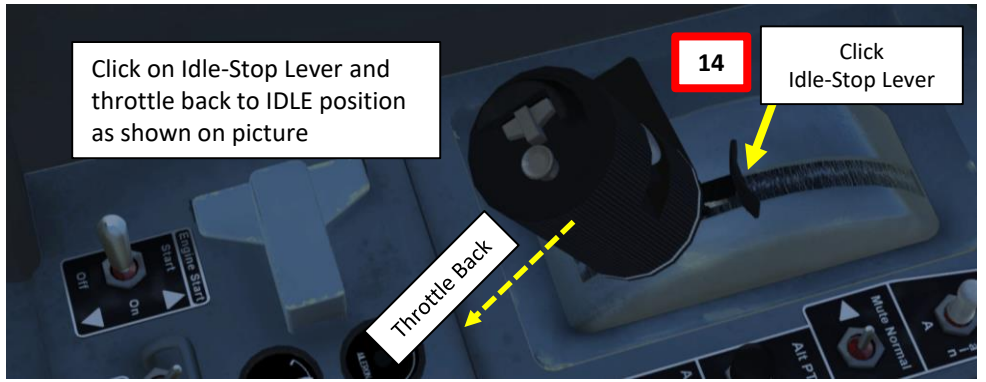


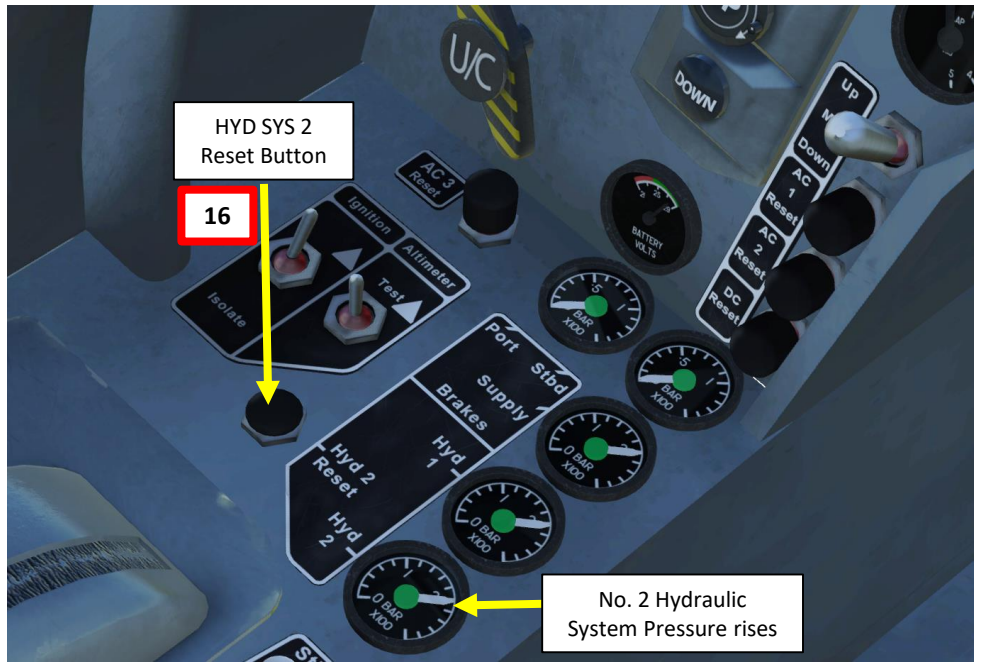


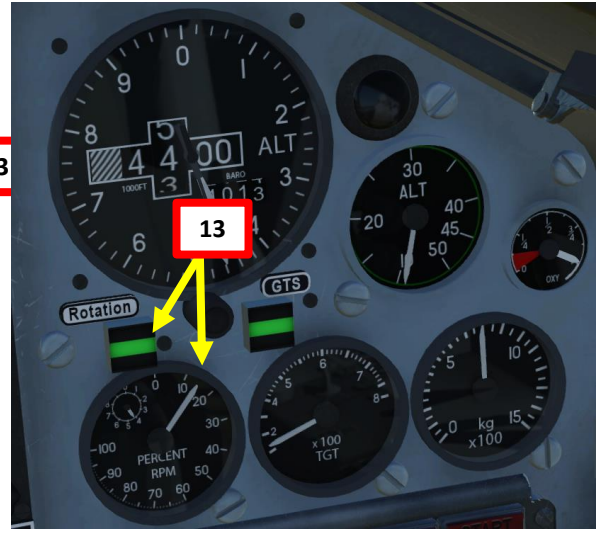


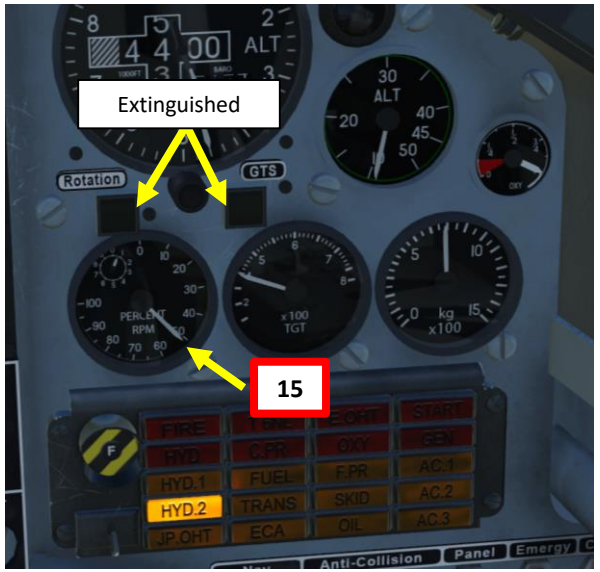
12. Engine Master Switch – START
    (Left Click switch a second time to set to FWD position; switch will automatically spring back to ON).
13. Wait for Engine RPM to reach 15 % (“Rotation” NL indicator will turn **green** when low-pressure turbine is spooled up).
14. Click on the throttle’s “Idle-Stop” lever to set engine power to IDLE.
    Note: You may need to throttle back after you clicked the Idle-Stop lever.
15. Wait for TGT to rise and engine RPM to stabilize to 45 %. “Rotation” and “GTS” indications will revert back to **black** when IDLE power setting is reached and engine start sequence is complete.
16. Press and hold the HYD SYS 2 Reset button until No. 2 Hydraulic System Pressure rises and “HYD2” indication on the CWP (Central Warning Panel) extinguishes.



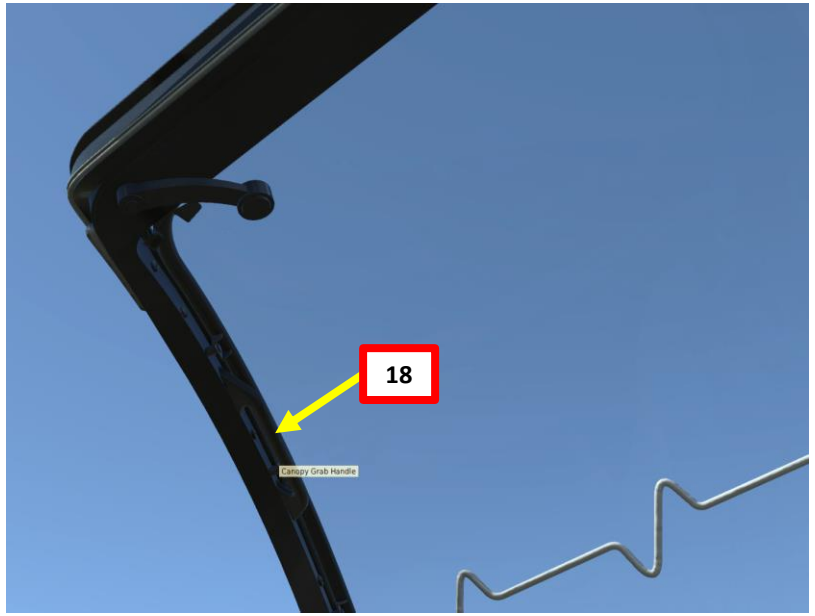






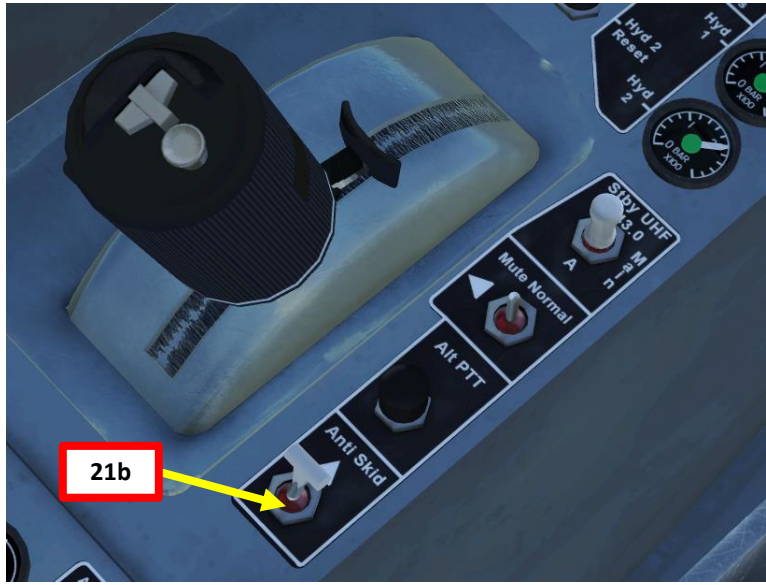


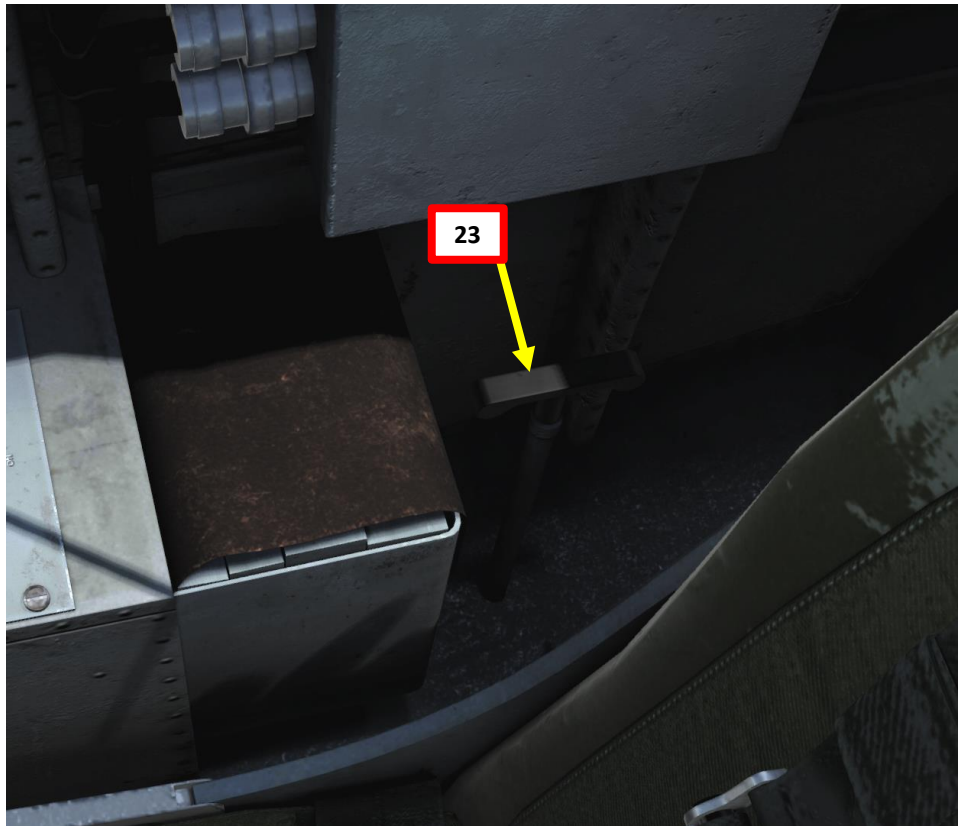
17. Set AHRS (Attitude & Heading Reference System) Power Mode to SLV by right-clicking two times on the knob. **Notes**: AHRS **alignment will take approx. 3 minutes**. AHRS will be aligned when HSI (Horizontal Situation Indicator) stops spinning and flags are removed from the HSI and Attitude Indicator.
18. Grab canopy handle to close the canopy (LCtrl+C)
19. Click on the Canopy Locking Lever
20. Click on the Canopy Safety Catch

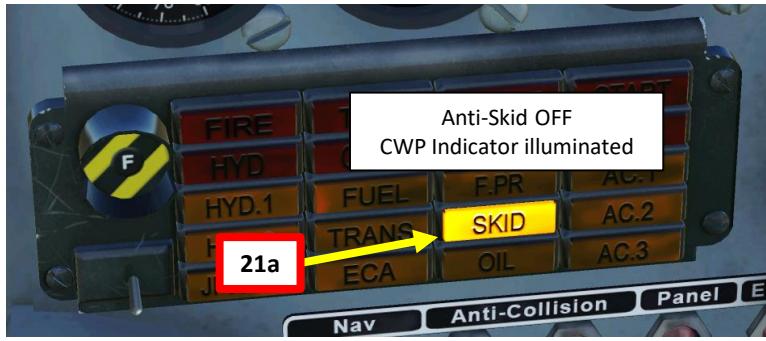


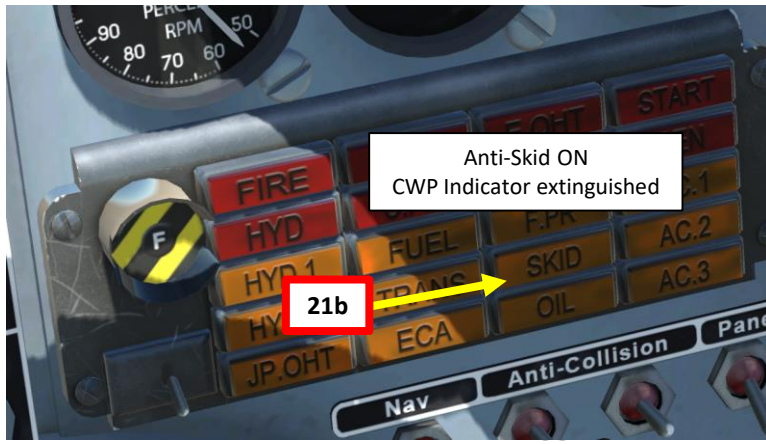
PART 4 – START-UP PROCEDURE

21. Anti-Skid switch – ON (FWD)
    Note: You should see the SKID indicator on the CWP being extinguished once Anti-Skid is ON.
22. Pitot Heat switch – ON (FWD)
23. Disengage Parking Brake (Right-Click) and taxi to runway. Use your toe brakes to steer.
24. Set UHF radio switch to NORMAL (UP)
25. Start taxiing to the runway using your toe brakes to steer the aircraft









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

In comparison to modern aircraft like the A-10C Warthog, the Hawk seems quite primitive. However, there are three key things that I recommend to do before you takeoff:

1. Align your AHRS directly on the ground (see previous chapter). It takes 3 minutes, so you should use this time to plan your flight and set up your radio frequencies.
2. Start your AIM-9M Sidewinder missile cooling on the ground (see WEAPONS chapter). It takes 3 minutes as well and it is an easy step to forget. Nothing is more frustrating than firing “dumb” missiles that were not cooled properly beforehand.
3. Gather intelligence on what enemy opposition you might run into and plan ahead. The Hawk is basically outmatched by most modern jets in the game (F-15, Mirage, Su-27, MiG-29, Su-33, MiG-21, etc.), which means that you should avoid picking up fights you cannot win. You have no countermeasures system, no radar, no jammer, no RWR (radar warning receiver)… so you are basically completely “blind” and will have to rely on your sharp eagle eyes. Engaging every contact or target visually is quite a challenging task, so make sure that you never fly alone and always have a wingman by your side.

TAKEOFF

1. Ensure ANTI-SKID is on.
2. Taxi using toe brakes
3. Make sure your Pitot Heat is ON during cold conditions.
4. Set flaps to MIDDLE position.
5. Hold down brakes, MAX throttle.
6. Release brakes and start rolling.
7. Start gently pulling back on the stick to lift the nosewheel at 90 kts.
8. Rotate at 120 kts. Landing Gear and Flaps UP.

NORMAL 360-DEGREE LANDING APPROACH

1. Initial Approach
   - 2000 ft
   - 250-300 kts
2. Downwind leg
   - 2000 ft
   - 230 kts
   - Flaps and Landing Gear UP
   - 80 % engine RPM
3. Base Leg
   - 1500 ft
   - 150-160 kts
   - Flaps set to MIDDLE
   - Lower Landing Gear
   - 83-85 % engine RPM
4. Before Glide Path Final Approach
   - Flaps DOWN (fully extended)
5. On Glide Path Final Approach
   - 130 kts
   - 83-85 % engine RPM
6. Touchdown by letting yourself glide on the runway. Brake very gently. No need to flare.

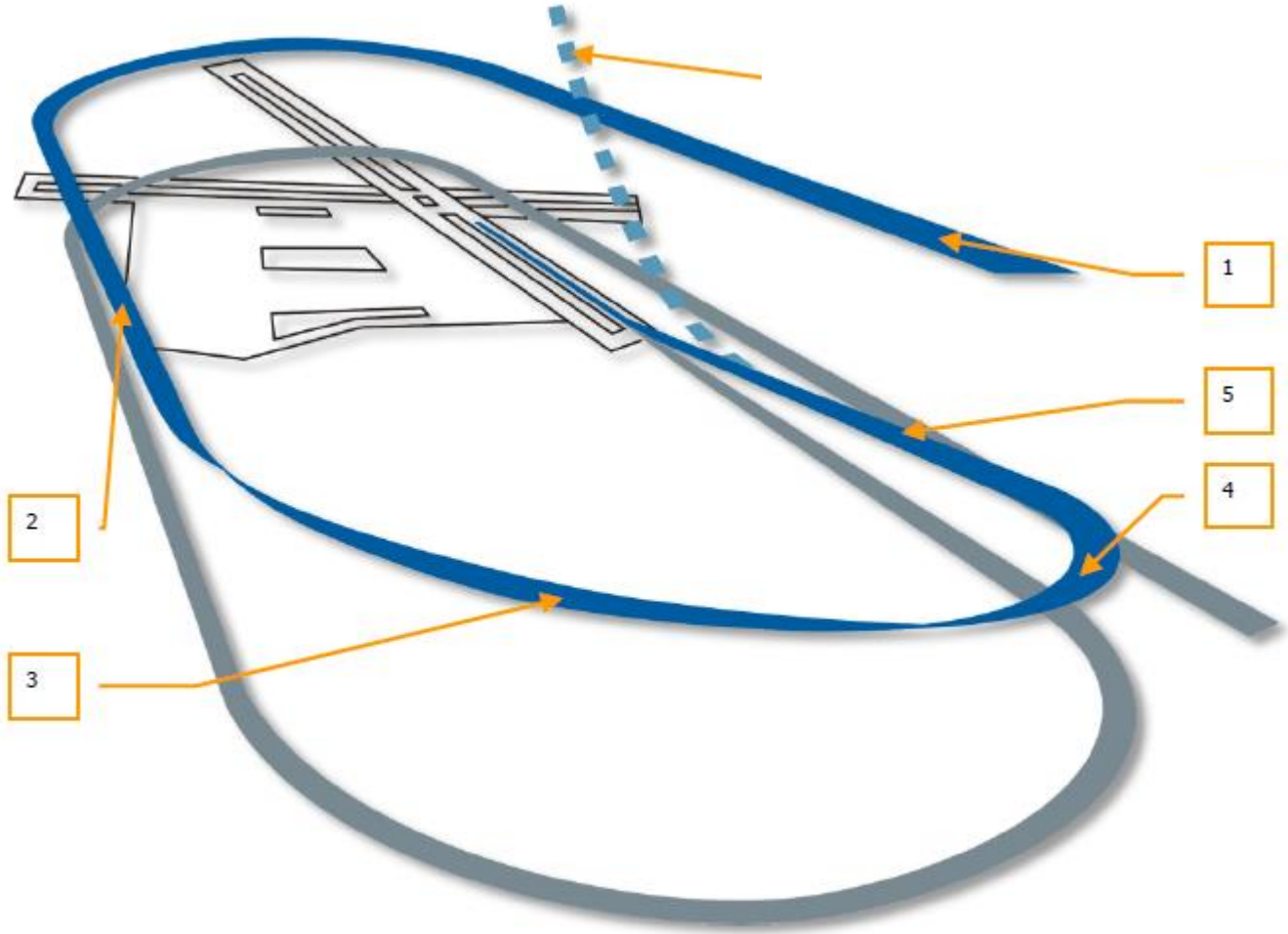
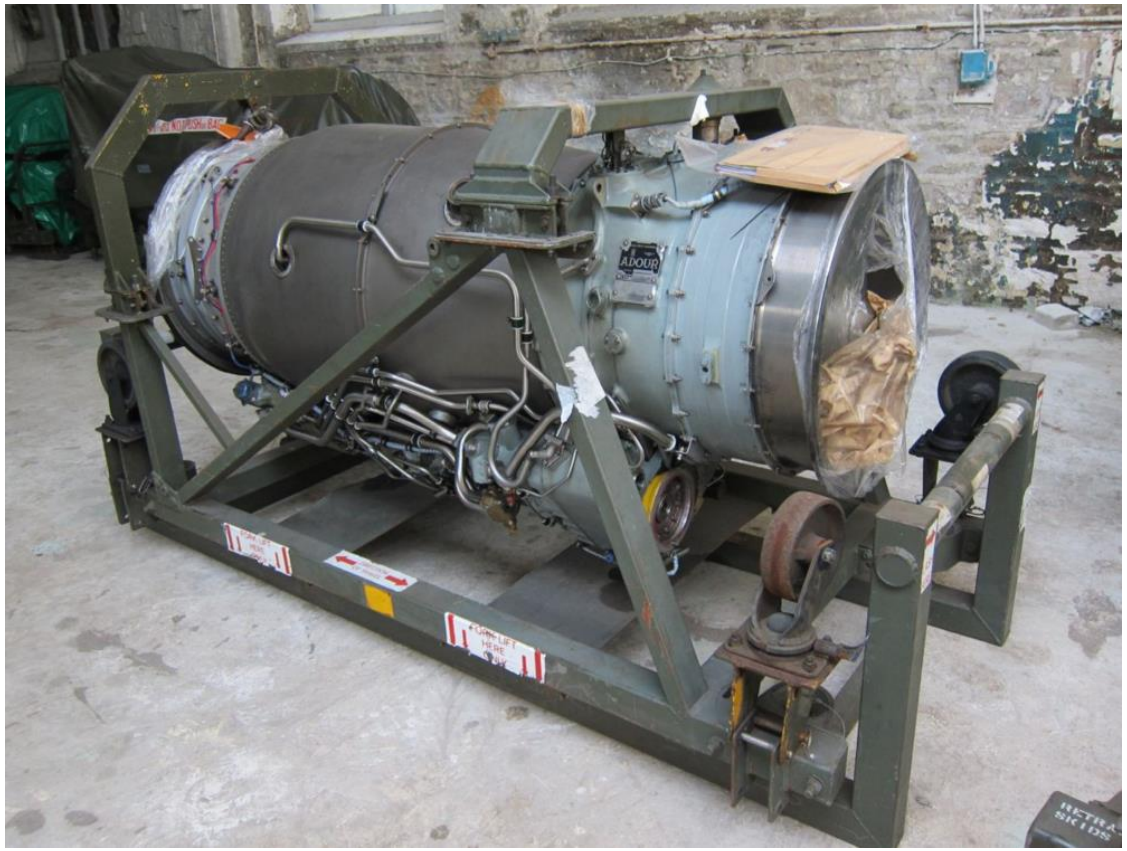


Figure 383. Circling 360-degree Landing Approach

NORMAL 360-DEGREE LANDING APPROACH

The Hawk T.1A is powered by the Adour Mk 151-01 turbofan engine, built by a joint subsidiary of Rolls-Royce and Turbomeca. It has a 2-stage low pressure (LP) compressor driven by a single-stage LP turbine, and a 5-stage high pressure (HP) compressor driven by a single-stage HP turbine. The LP and HP shafts are concentric, but mechanically independent. In sea-level ISA conditions, the Adour develops 5200 lbs static thrust.

The engine is started by a gas turbine starting (GTS) system, in which air from a gas turbine air producer powers a starter motor which drives the HP shaft through the engine external gearbox. In case of an engine flameout, the engine may be relit with or without the use of the GTS system.



ENGINE LIMITATIONS

The Hawk's engine is equipped with a FCU (Fuel Control Unit), which regulates engine parameters such as fuel flow, TGT (Turbine Gas Temperature) or NL (Low-Pressure Shaft Speed).

When engine parameters exceed permitted limits (660 deg C for TGT and 104 % for NL), the ECA (Engine Control Amplifier) will activate a fuel trim valve and maintain it in the position required to hold TGT or NL at the limiting value. However, only one of the reference parameters can be in control at any one time.

In order to know what engine problems you might have, keep an eye on the CWP (Central Warning Panel).

CONDITION	MAX RPM (%)	MAX TGT (deg C)	TIME LIMIT
Max Power	104	665	30 minutes/flight
Max Continuous Power	99.3	615	Unrestricted
Idle (nominal)	55 at ISA	450	Unrestricted
During engine starting and relighting	-	570	10 seconds

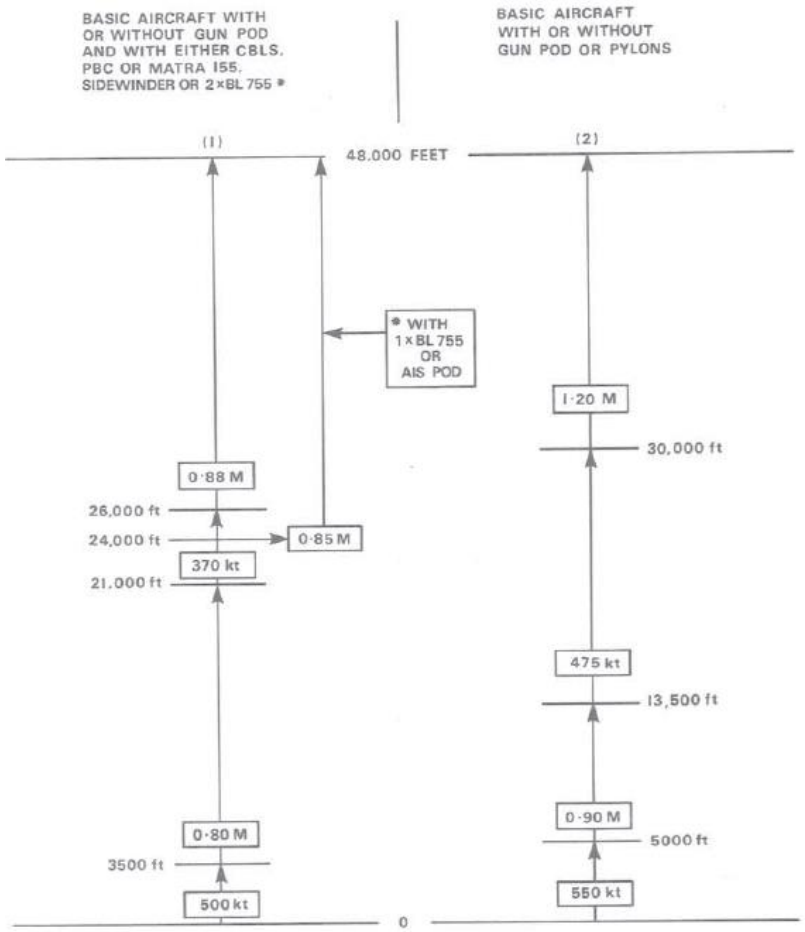
FIRE: Fire in engine bay	**T6NL: TGT or N1. above approximately 685 +5 / -0 C or 108% respectively**	**EOHT: Engine LP cooling air temperature exceeds approximately 400°C**	**START: Fire in air producer bay**
HYD: Total hydraulic failure	**CPR: Cabin altitude exceeds 30,000ft**	**OXY: Low oxygen pressure in associated cockpit (downstream of shut-off valve)**	**GEN: Essential Services busbar 25 volts or less**
HYD1: No.1 hydraulic system pressure 41±4 bar or less	**FUEL: 160 (approx) kg fuel remaining**	**FPR: Low fuel pressure. Pressure rise across booster pump less than 0.27 bar or, pressure at engine filter outlet is less than 2.4 bar**	**AC1: No 1 inverter offline**
HYD2: No2. hydraulic system pressure 113.5±7.5 bar or less. (Remains on with RAT operating)	**TRANS: Low air pressure in fuel tanks; possible loss of fuel transfer**	**SKID: ANTI-SKID switch off or Anti-skid control valve continuously engaged for more than 2 seconds, or Faulty anti-skid control valve solenoid or Failure of power supply to anti-skid control unit**	**AC2: No 2 inverter offline**
JPOHT: Jet pipe bay temperature exceeds 150°C	**ECA: Failure of either of both amplifier lanes or fault in amplifier controlling circuits**	**OIL: Engine oil differential pressure below 0.7 bar**	**AC3: No 3 inverter offline**


RAT: **R**am **A**ir **T**urbine
Automatically deployed in case of engine failure in order to supply hydraulic power to the HYD 2 hydraulic system, which powers flight controls.
ROYAL AIR FORCE
XX189

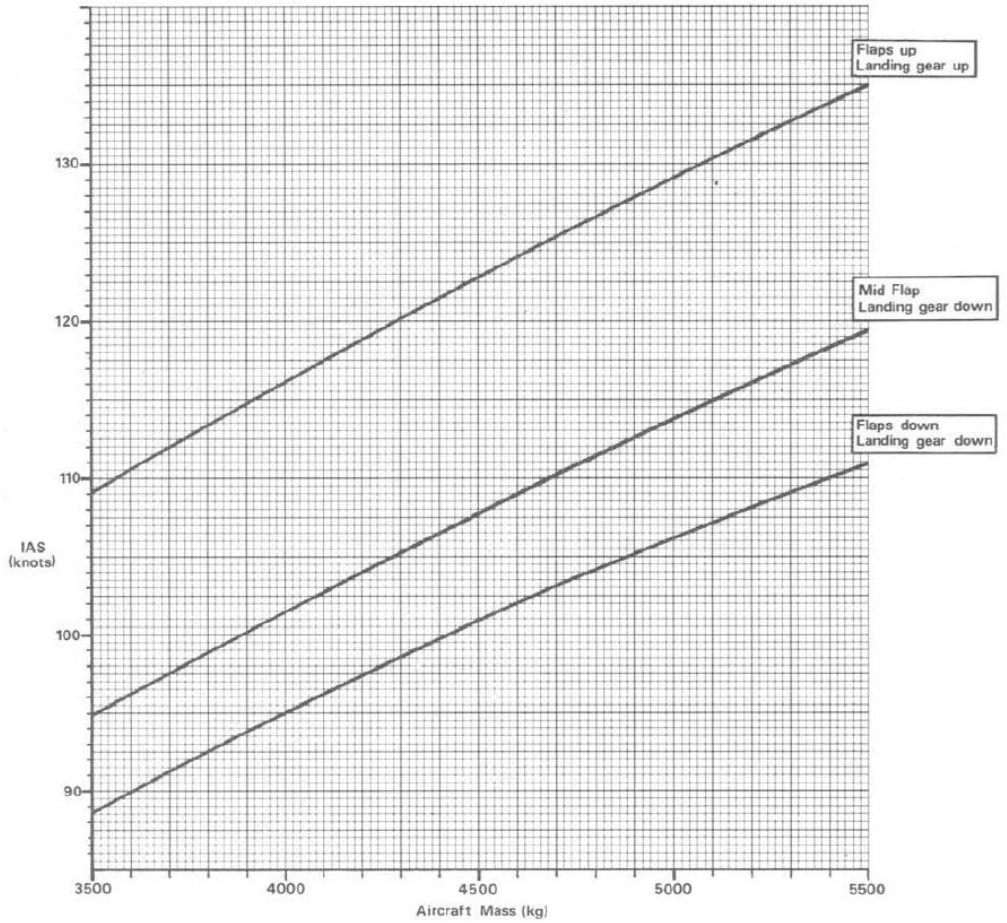
BUFFET ONSET, STALLING SPEED AND MINIMUM CONTROL SPEED

Configuration	Nominal RPM (%)	Buffet Speed (IAS)	Stall Speed (IAS)	Min Control Speed (IAS)
Flap and Landing Gear UP	Flight IDLE	130	124	115
MID Flap and Landing Gear DOWN	80	113	109	105
FULL Flap and Landing Gear Down	80	105	102	99

AIRSPEED/MACH NUMBER LIMITATIONS



STALLING SPEEDS GRAPH



RECOMMENDED AIRSPEEDS FOR FLIGHT MANOEUVERS			
ROLL	LOOP	ROLL OFF THE TOP	VERTICAL ROLL
300 kts	350 kts	350 kts	400 kts

NOTES:

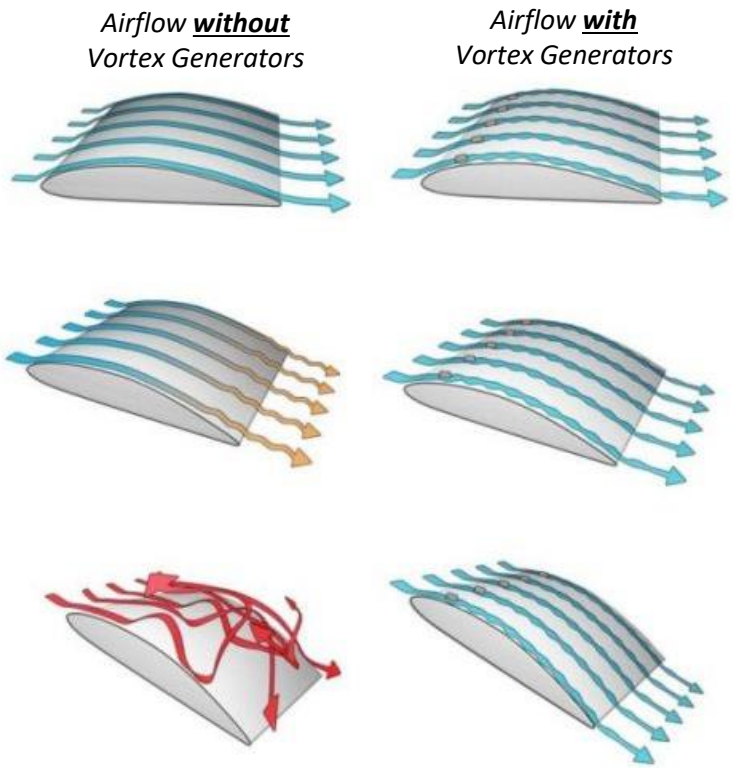
The amount of pre-stall buffet warning in manoeuver increases with Mach number. The buffet boundary is very clear and provides a good natural warning of the stall at all altitudes. Stall characteristics are variable with Mach number but may take the form of a wing drop, a pitching oscillation (sometimes preceded by a small movement in yaw), or by the control column reaching the fully aft position. Below about Mach 0.4, the buffet onset approximates to the maximum turning performance of the aircraft. Recovery is immediate on easing the control column forward.

The aircraft is very spin resistant and is reluctant to enter a spin inadvertently. Keep in mind that it can be made to spin by the use of certain techniques such as closing the throttle and progressively applying full rudder in the intended direction of the spin while simultaneously applying full aft stick to ensure that the ailerons remain neutral.

Spin recovery is very easy: release stick, cut throttle and let the Hawk recover by itself after a few turns.

Vortex Generators

Vortex generators are small components deployed on the wings and stabilizers surfaces. They modify the flow around these surfaces affecting boundary layer. Properly arranged, they improve the performance and controllability of the aircraft, particularly at low flight speeds, climb, and high angles of attack. A turbulent boundary layer is more resistant to airflow separation. This way, wing vortex generators allow the aircraft to fly at a slower speed and higher angles of attack, while vortex generators on stabilizers act similarly, improving the effectiveness of control at low speeds and with high deflections of control surfaces.



Vortilons

Vortilons are somewhat like vortex generators, but without the penalty of drag. Their main function is to generate a vortex of air over the top of the main wing only at high angles of attack. When the AoA (angle of attack) on the main wing is raised, the lower surface airflow starts to move outboard at an increasing angle. Vortilons stick up and more forward as the wing angle increases and they start acting as little fences to the span-wise air flow, causing a vortex. This vortex has the effect of keeping the air flow attached to the upper surface of the wing - reducing the wing's local stall angle and increasing aileron effectiveness at low speeds/high AoA.

Tail Fins (Strakes)

Strakes are used to provide adequate stability at high angles of attack when the tail fin is shielded from the main airstream by the fuselage and/or the wing wake.

Wing Fences

Also known as “boundary layer fences” or “potential fences”, wing fences obstruct the span-wise air flow from moving too far along the wing and gaining speed, preventing the entire wing from stalling at once, as opposed to wingtip devices, which increase aerodynamic efficiency by seeking to recover wing vortex energy. When meeting the fence, the air is directed back over the wing surface and delays or eliminates the “sabre dance” aerodynamic effect.

Effects of Vortex Generators, Vortilons, Strakes and Wing Fences on the Hawk Flight Model

The Hawk was designed to be a very stable aircraft aerodynamically speaking. Historically, the optimal location of these devices was determined empirically by observing aerodynamic effects through a process of trial and error. As technology and computing power evolved, wind tunnel testing and CFD analyses allowed engineers to study these phenomenon with more accuracy.

The effects of all these aerodynamic devices are translated through the following aspects of the Hawk's flight model:

- Lower stall speed at high AoAs (angle of attack)
- Buffet effect when pulling back the stick at high AoA
- A secondary stall occurs when attempting to hasten the completion of a stall recovery before the aircraft has regained sufficient airspeed
- "Departure stall" (or "power-on" stall) occurs when the pilot fails to maintain positive pitch control due to a nose-high trim setting or premature flap retraction
- "Arrival stall" (or "power-off" stall") occurs when the pilot attempts to recover from a high sink rate and improper airspeed control on final approach
- "Accelerated stall" occurs at higher-than-normal airspeeds due to abrupt and/or excessive control applications during steep turns, pull-ups or abrupt changes in flight path.

THE WEAPONS

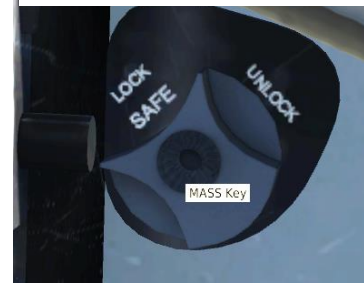
The Hawk comes equipped with the ADEN 30 mm revolver cannon, unguided bombs such as the Mk-82, BDU-33 and CBU-87, unguided Mk 151 HE rockets and AIM-9M Sidewinder air-to-air missiles.

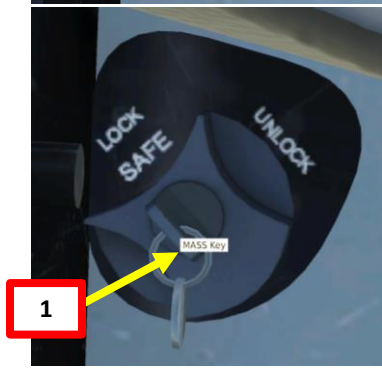
THE WEAPONS – ADEN CANNON EMPLOYMENT

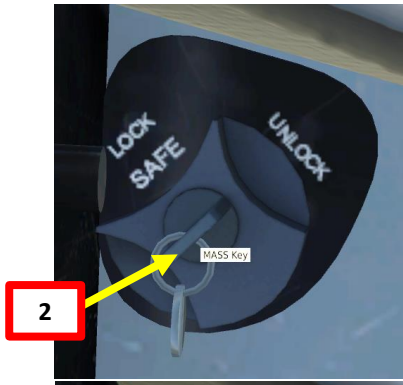
1) Right-click on MASS (Master Armament Safety Switch) keyhole to insert Master Arm key in the LOCK position.
2) Right-click on MASS key to turn it to the UNLOCK position.
3) Right-Click on MASS switch (grey cover) to set it from the SAFE to the LIVE position. MAS switch should display “UNLOCK LIVE” and gunsight reticle should be illuminated on HUD.
4) Turn Gun switch ON (UP) on the armament panel.
5) Press Gun Trigger (keyboard: ENTER) to fire ADEN cannon.

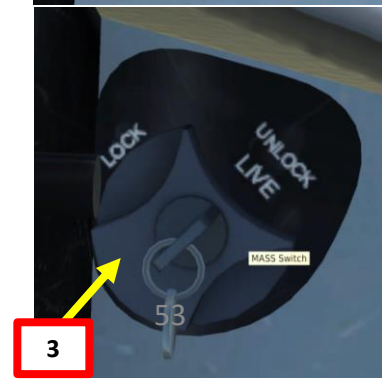

Royal Small Arms Factory ADEN
30 mm revolver cannon

MASS in LOCKED and SAFE position







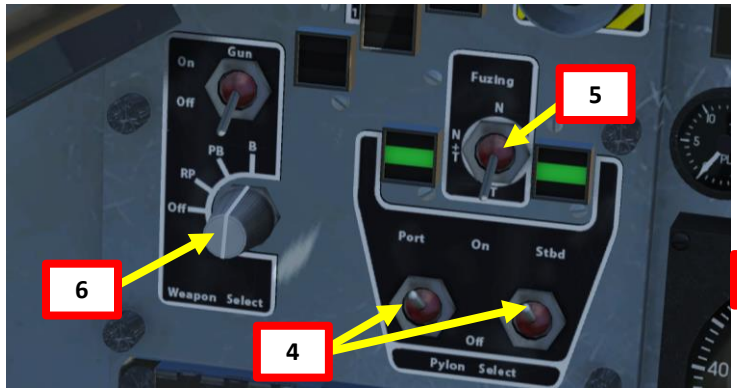


THE WEAPONS – UNGUIDED BOMBS EMPLOYMENT

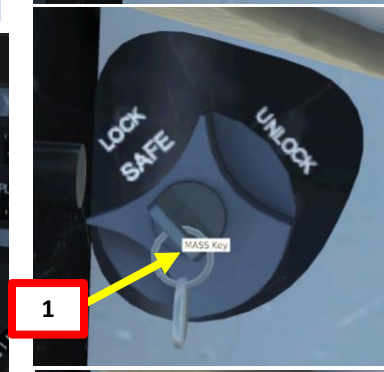
Choice (per pylon): Mk-82 x 3, BDU-33 x 3, CBU-87 x 1

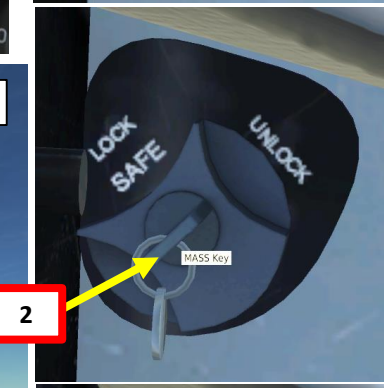
1) Right-click on MASS (Master Armament Safety Switch) keyhole to insert Master Arm key in the LOCK position.
2) Right-click on MASS key to turn it to the UNLOCK position.
3) Right-Click on MASS switch (grey cover) to set it from the SAFE to the LIVE position. MASS switch should display “UNLOCK LIVE” and gunsight reticle should be illuminated on HUD.
4) Turn on PORTSIDE and STARBOARD pylon power switches (UP). Power indicators should turn green.
5) Set desired bomb fuzing (recommended: Tail)
6) Right-click to set Weapon Selector switch to B (Bomb) if using Mk-82 or CBU-87 bombs.
   OR
   Right-click to set Weapon Selector switch to PB (Practice Bomb) if using BDU-33 practice bombs.
7) **Hold** Weapons Release button (keyboard: SPACEBAR) until bomb releases.

Bomb Type	Description
Mk-82 3 per pylon	500 lbs unguided, low-drag general-purpose bomb
BDU-33 3 per pylon	25 lbs unguided, low-drag practice bombs used to simulate Mk-82 bombs
CBU-87 1 per pylon	950 lbs unguided, combined effects cluster bomb



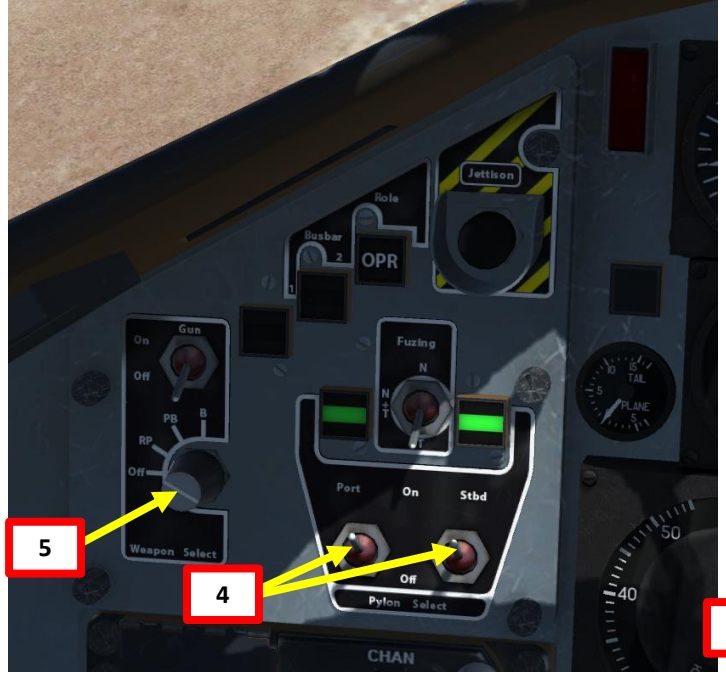
MASS in LOCKED and SAFE position

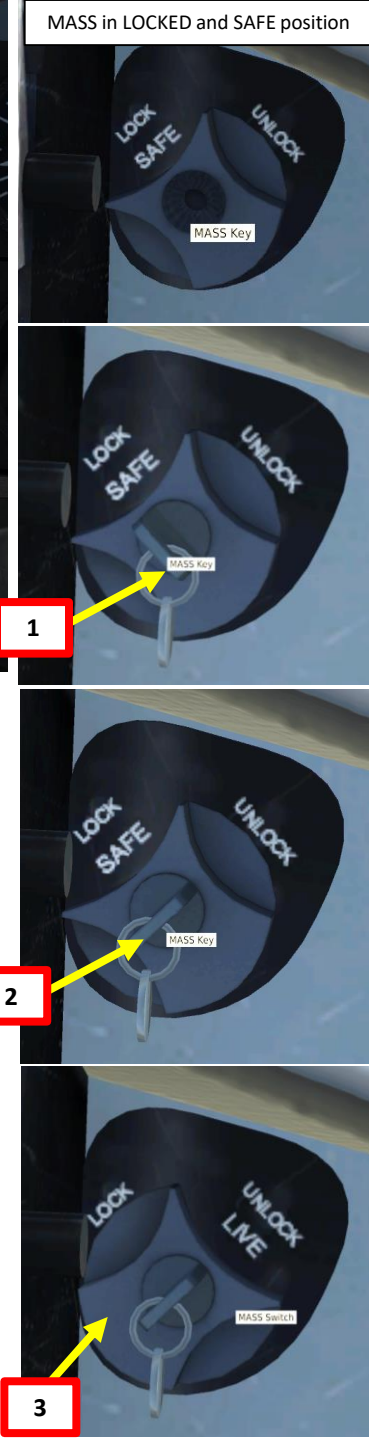




THE WEAPONS – MK 151 HE ROCKETS EMPLOYMENT

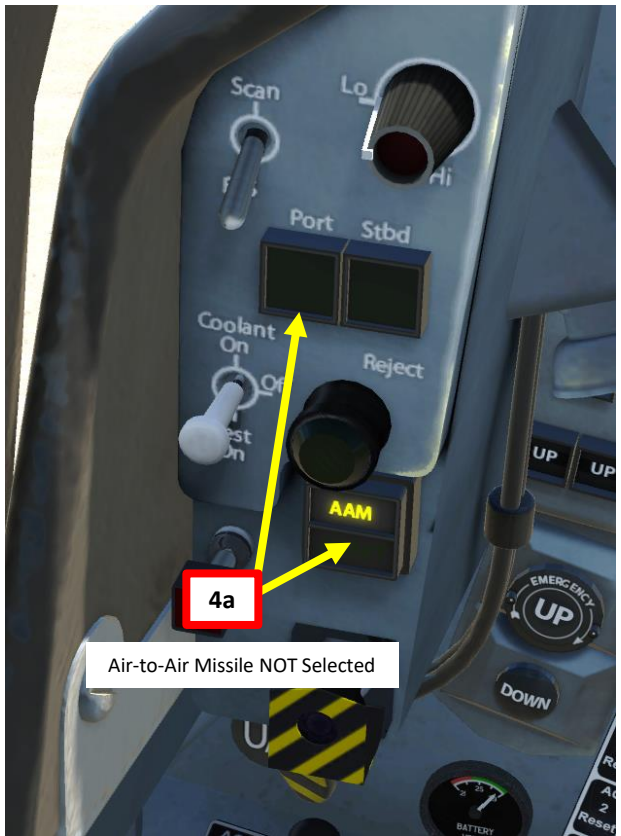
1) Right-click on MASS (Master Armament Safety Switch) keyhole to insert Master Arm key in the LOCK position.
2) Right-click on MASS key to turn it to the UNLOCK position.
3) Right-Click on MASS switch (grey cover) to set it from the SAFE to the LIVE position. MASS switch should display “UNLOCK LIVE” and gunsight reticle should be illuminated on HUD.
4) Turn on PORTSIDE and STARBOARD pylon power switches (UP). Power indicators should turn green.
5) Right-click to set Weapon Selector switch to RP (Rocket Pod).
6) **Hold** Weapons Release button (keyboard: SPACEBAR) until a pair of rockets launches.

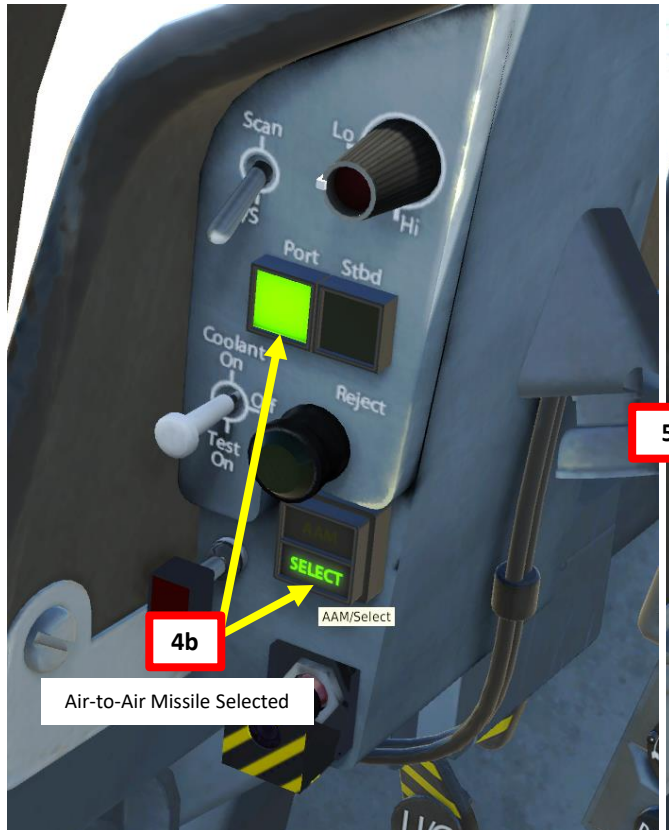


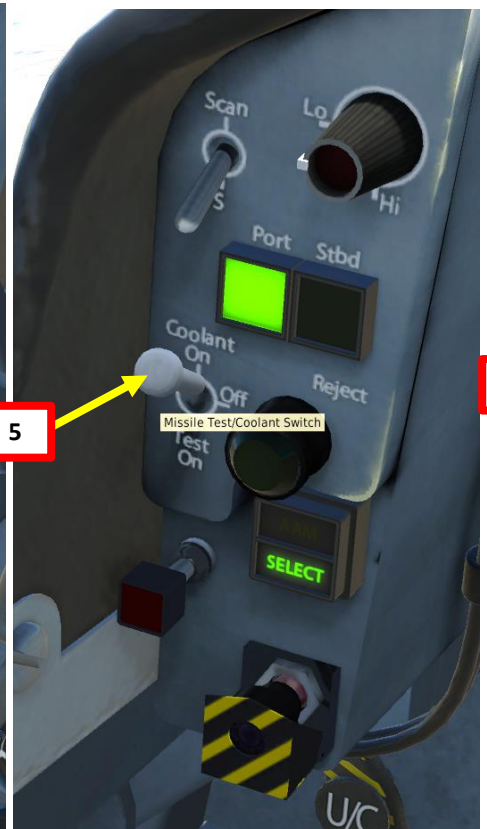


THE WEAPONS – AIM-9M SIDEWINDER AIR-TO-AIR MISSILES EMPLOYMENT

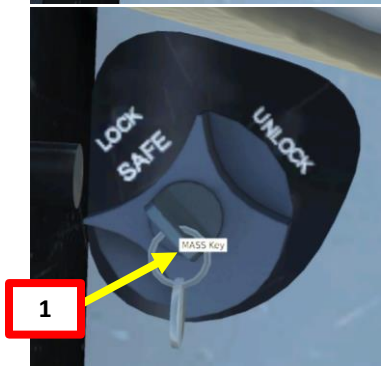
1) Right-click on MASS (Master Armament Safety Switch) keyhole to insert Master Arm key in the LOCK position.
2) Right-click on MASS key to turn it to the UNLOCK position.
3) Right-Click on MASS switch (grey cover) to set it from the SAFE to the LIVE position. MASS switch should display “UNLOCK LIVE” and gunsight reticle
   should be illuminated on HUD.
4) On left missile panel, press AAM/Select button. Port missile indication will illuminate.
5) Set MISSILE COOLANT switch to ON to start missile cooling process.
   NOTE: Scan/BS switch has no function as the missile is caged to boresight.
6) Wait 3 minutes for missile cooling phase to be complete.
   NOTE: Your missiles are duds until cooling is complete... I recommend this step to be done right after takeoff to save time.
7) Spot target and position yourself 1 nm or less behind it in order to get a missile lock.
8) When green LOCK light comes on MISSILE REJECT switch and a lock tone is heard, **hold** Weapons Release button (keyboard: SPACEBAR) until missile launches.

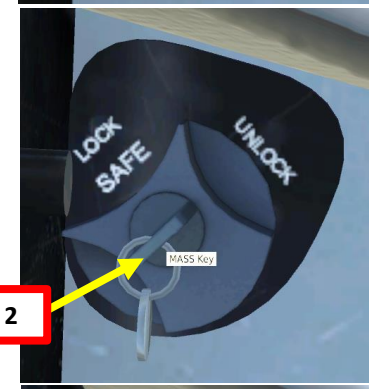


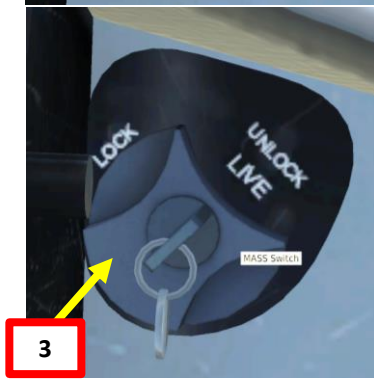




MASS in LOCKED and SAFE position







THE WEAPONS – AIM-9M SIDEWINDER AIR-TO-AIR MISSILES EMPLOYMENT

MISCELLANEOUS– ORDNANCE JETTISON

STORES JETTISON button

MISSILE JETTISON button

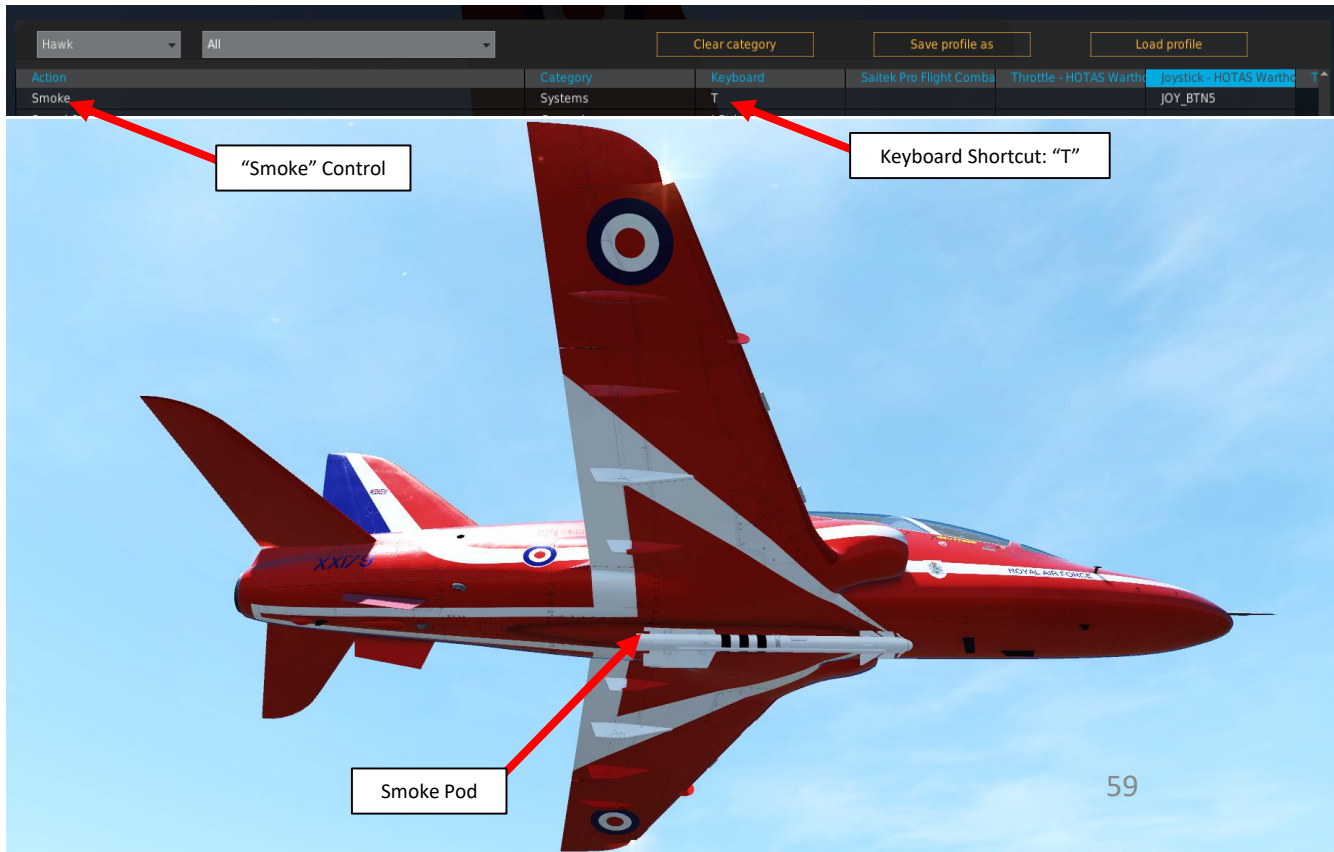
Flip safety cover to access button

MISCELLANEOUS – SMOKE POD

Due to legal reasons and contractual restrictions, VEAO couldn't produce the aerobatic Red Arrows Hawk version. This version has a couple of small differences with the T.1A version currently implemented in DCS.

One of these differences is the smoke generator system located inside the fuselage, which allows smoke trails to come directly out of the engine's exhaust. The Aerobatic Hawk's system has a specific smoke management panel inside the cockpit, which VEAO's T.1A does not have.

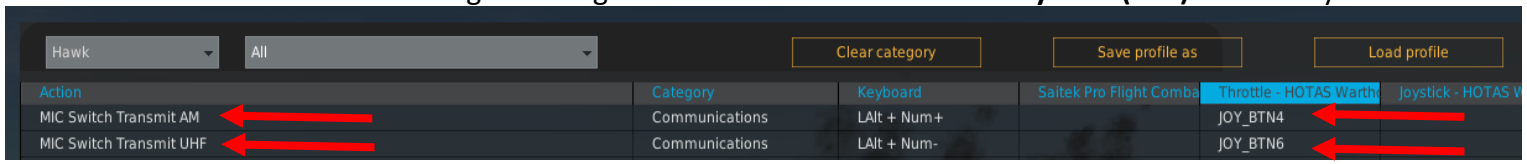
Still, VEAO implemented a basic "fictional" smoke system in order to cater to the virtual aerobatic community. Via the mission editor or ground crew menu, a smoke pylon can be installed on the central pylon under the fuselage. Smoke can then be generated by simply pressing the "T" key (or a custom key mapped to the "Smoke" control input.

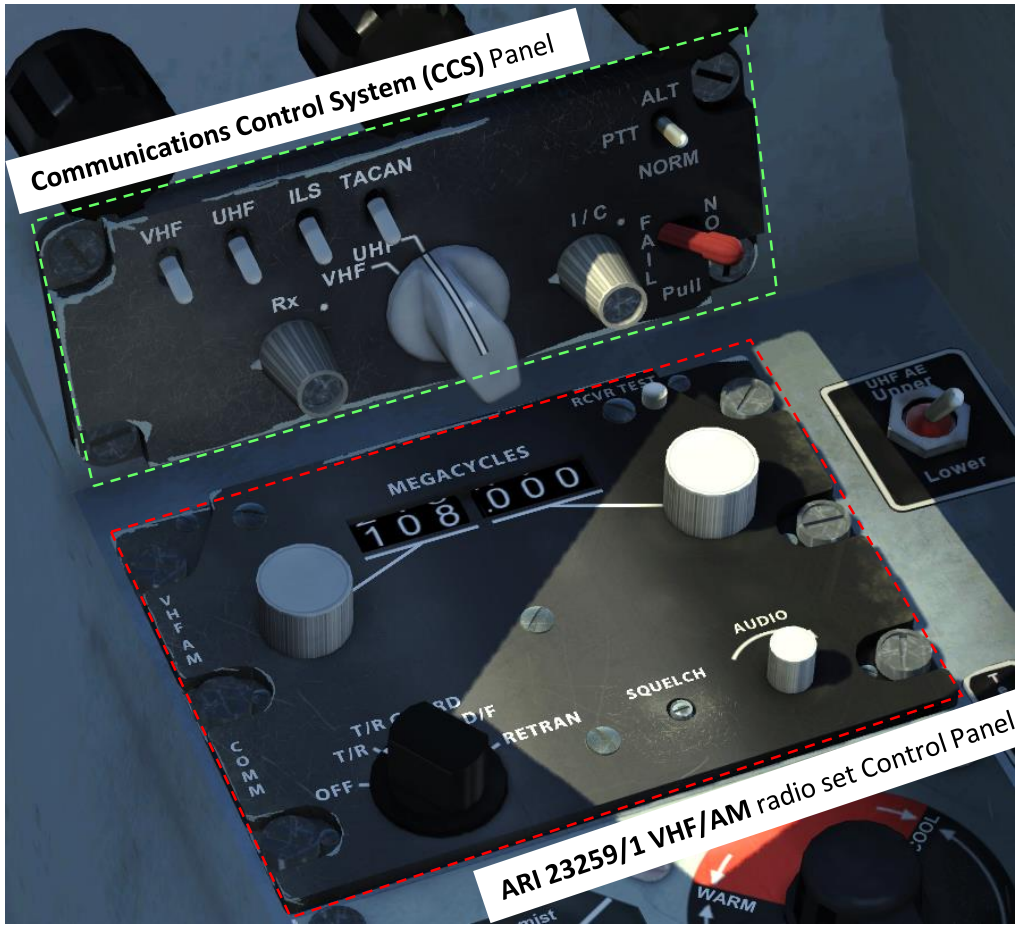


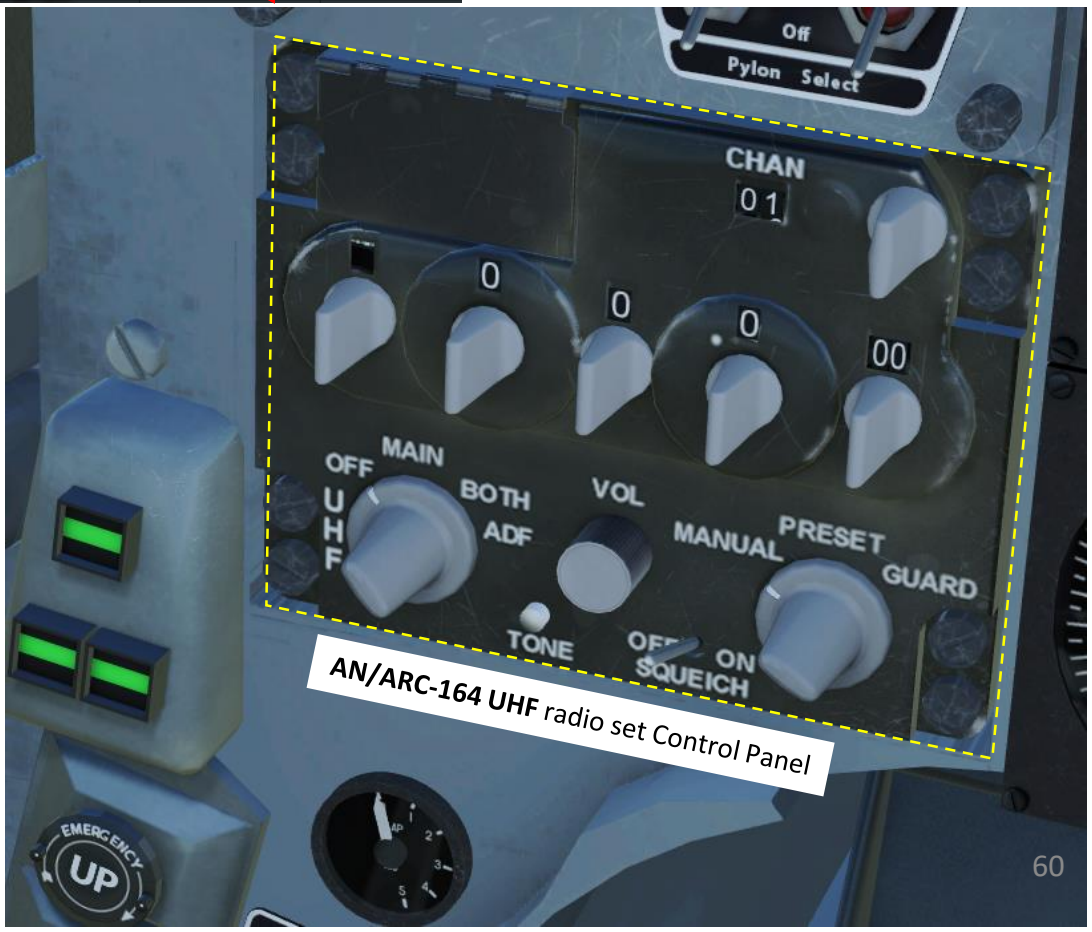
You have two main radio communications systems.

- The **ARI 23259/1 VHF/AM** radio set is used for air and ground units
  - Frequencies between 116.00 and 149.975 MHz
  - A separate guard receiver preset channel is set to 121.500 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
  - A separate guard receiver preset channel is set to 243.500 MHz (also known as STANDBY UHF)
- Your comms interface is managed through the **Communications Control System (CCS).** It allows you to choose which radio set you communicate on.

Note: the *MIC Switch Transmit* switches for the VHF/AM radio and the UHF radio are located on the throttle. They need to be mapped to custom control bindings via the CONTROLS options menu.



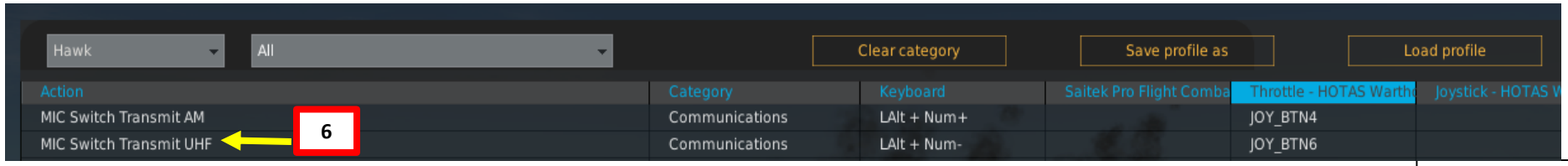


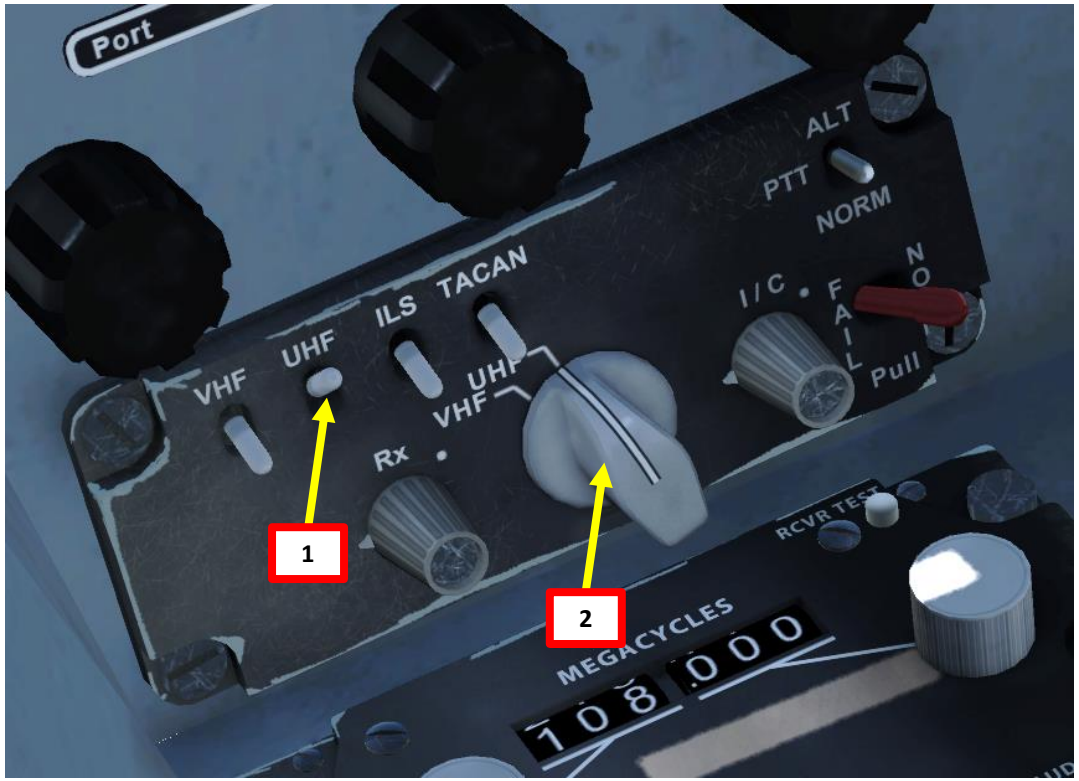


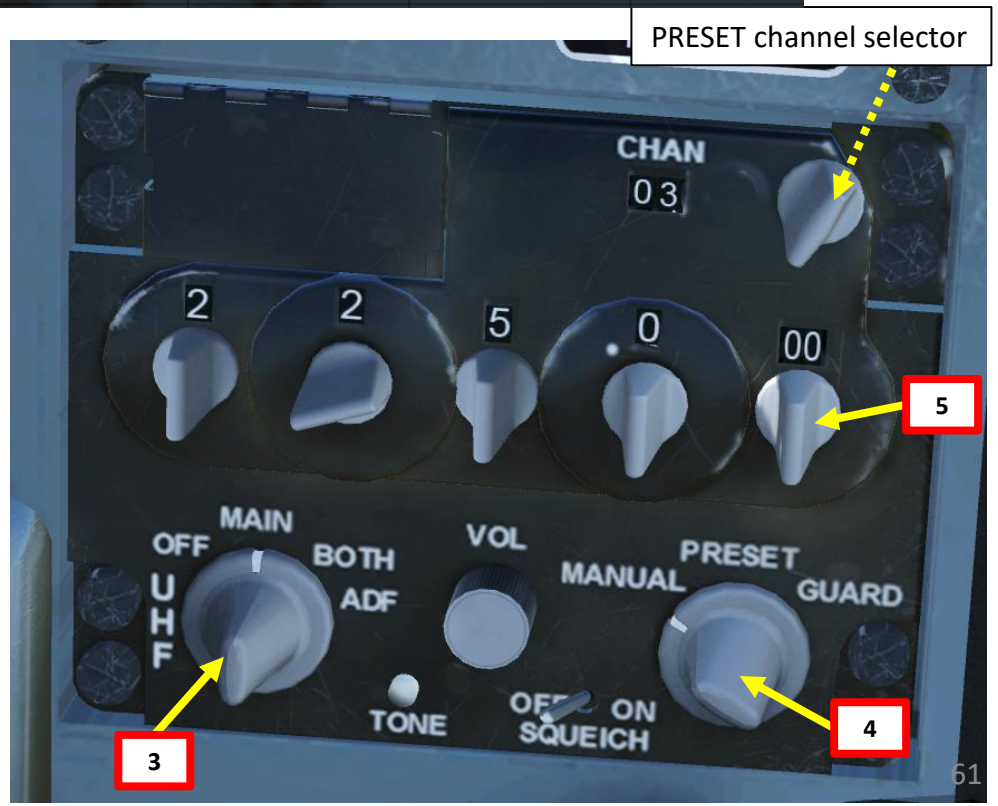
AN/ARC-164 UHF RADIO PROCEDURE

Note: Radio will only be functional if aircraft battery switches are ON and aircraft is powered.

1. On CCS panel, set UHF switch to ON (UP)
2. On CCS panel, set radio selector switch to UHF
3. On UHF radio panel, set UHF radio power selector to MAIN
4. On UHF radio panel, set UHF radio mode selector to MANUAL (or PRESET if you have a preset frequency already set up from the mission editor)
5. On UHF radio panel, set desired UHF radio frequency using the frequency dials (or select desired PRESET channel).
6. Press the MIC Switch Transmit UHF switch (keyboard: LAlt+Num-) to transmit on set UHF frequency.



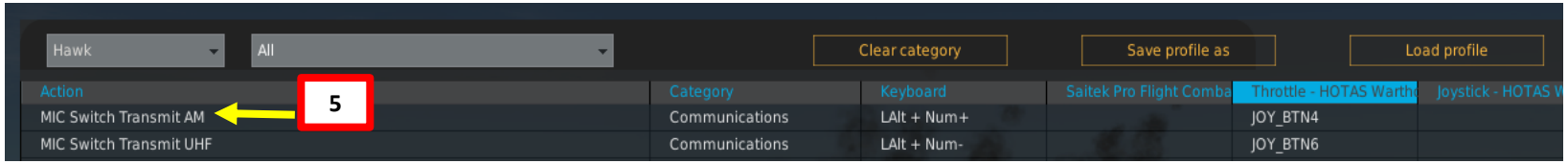


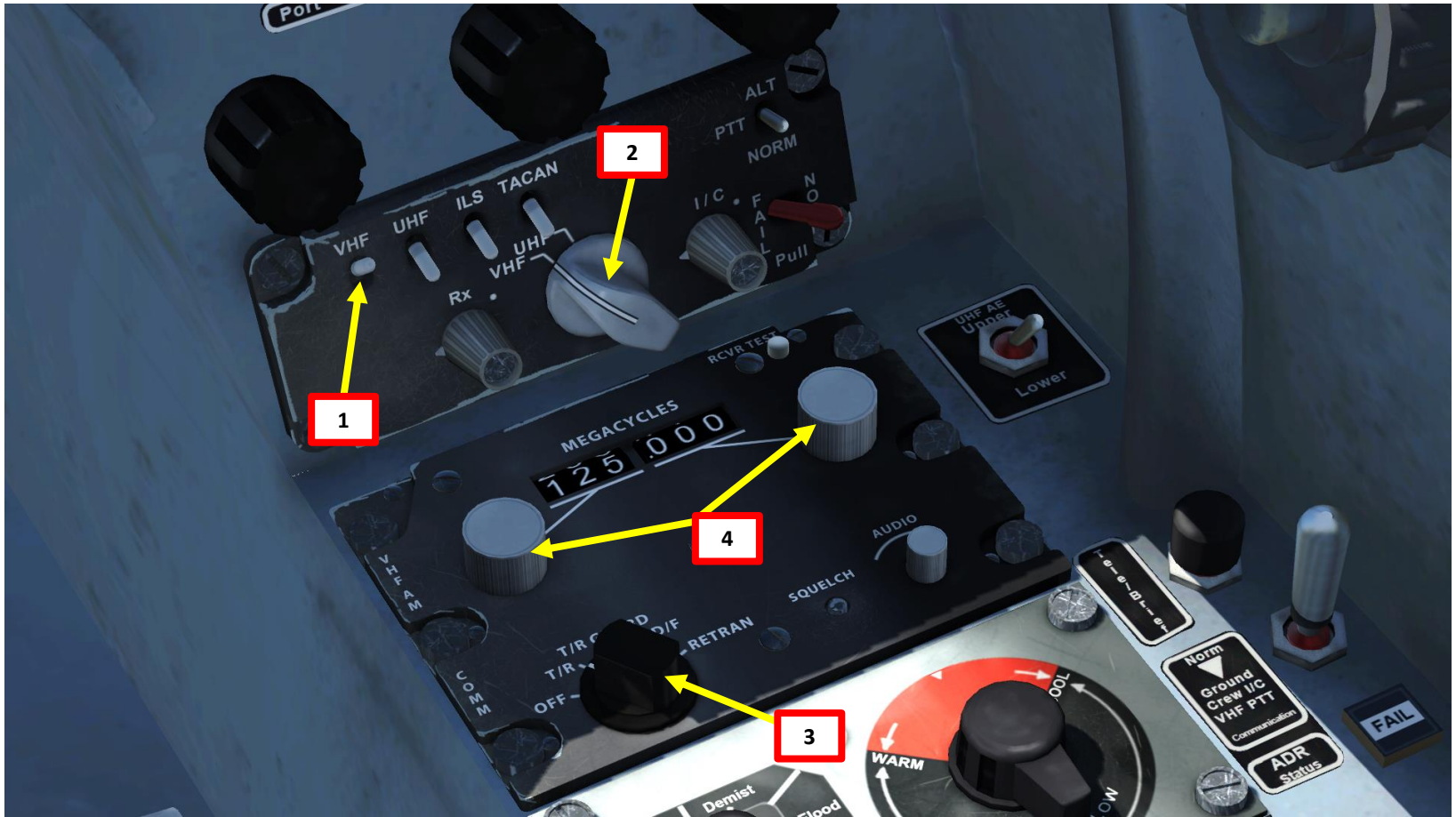


ARI 23259/1 VHF/AM RADIO PROCEDURE

Note: Radio will only be functional if aircraft battery switches are ON and aircraft is powered.

1. On CCS panel, set VHF switch to ON (UP)
2. On CCS panel, set radio selector switch to VHF
3. On VHF/AM radio panel, set VHF radio mode selector to T/R (Transmit/Receive)
4. On VHF/AM radio panel, set desired radio frequency using the frequency dial
5. Press the MIC Switch Transmit AM switch (keyboard: LAlt+Num+) to transmit on set VHF/AM frequency.





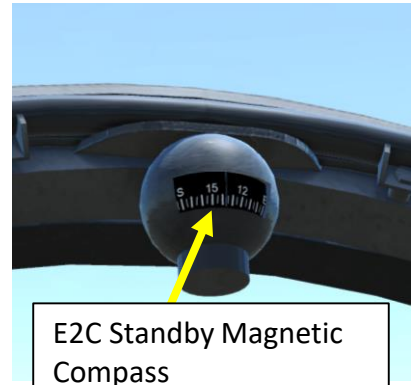
VHF RADIO FREQUENCIES – AIRFIELDS

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

NAVIGATION SYSTEMS IN A NUTSHELL

There are many tools available at your disposal to navigate. Here is a quick summary of what you can use:

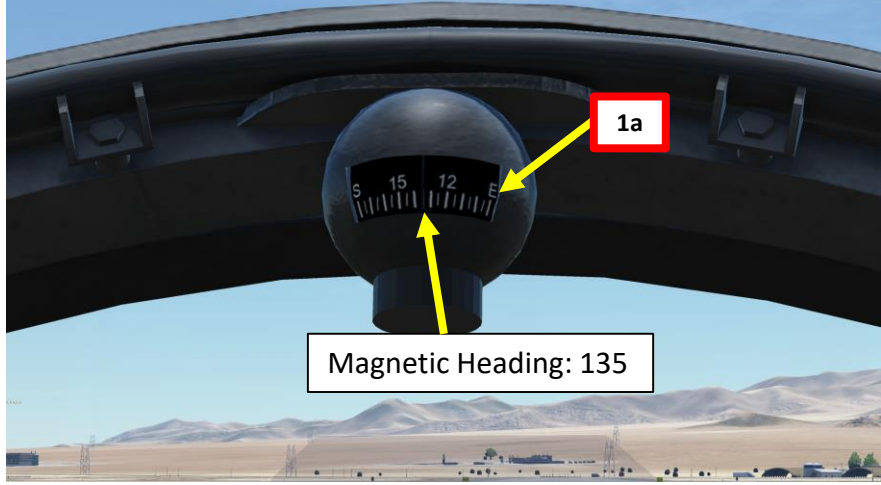
- **AHRS** (Attitude and Heading Reference System): used as a primary instrument, it's a navigation system composed of a Displacement Gyroscope Assembly (DGA = vertical gyro + directional gyro) and an Electronics Controls Amplifier located in the equipment bay. The AHRS requires an alignment period of 3 minutes. *Fun fact: the AHRS (or HARS) system is also available on the A-10C since it is a legacy nav system from the A-10A.*
- **E2C Standby Magnetic Compass**: used as a backup instrument, it gives your magnetic heading
- **DGI** (Directional Gyro Indicator): used as a backup instrument, it gives you the heading from your directional gyro only
- **HSI** (Horizontal Situation Indicator): used to display aircraft attitude from either the AHRS (directional + vertical gyro assembly) or the DG itself (directional gyro only). HSI is prone to being desynchronized with the DG, so a SYNC pusher button can be used to re-synchronize the DG with the HSI if need be.
- **ILS**: used as navigation beacons, can be tracked and displayed on the HSI if AHRS system is set up properly. ILS (Instrumented Landing System) is typically used during night and/or foul weather. This system will give you indications on what heading and what gliding slope to take in order to make a successful approach to an airfield.
- **VOR** beacons: VOR is what we call a VHF Omnidirectional Range system. It transmits radio waves on a certain frequency. These waves are read by a VOR receiver. VOR systems, just like NDBs (non-directional beacons), can be used for radio navigation. The Hawk we have in game cannot track VOR beacons.
- **TACAN** beacons: TACAN is a Tactical Air Navigation System used by the military. TACAN beacons can be placed on ground stations, airfields or even aircraft themselves like tankers. A TACAN beacon will provide you line-of-sight bearing and range to the selected TACAN station.

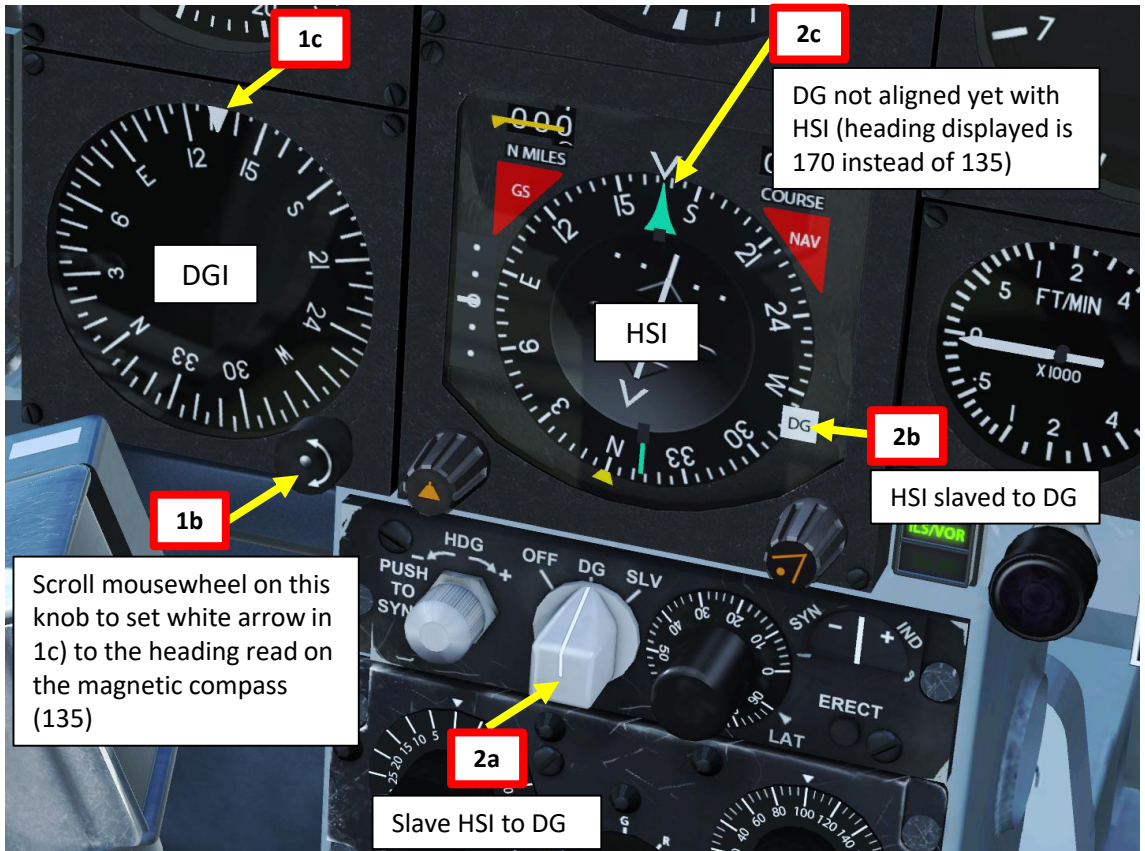


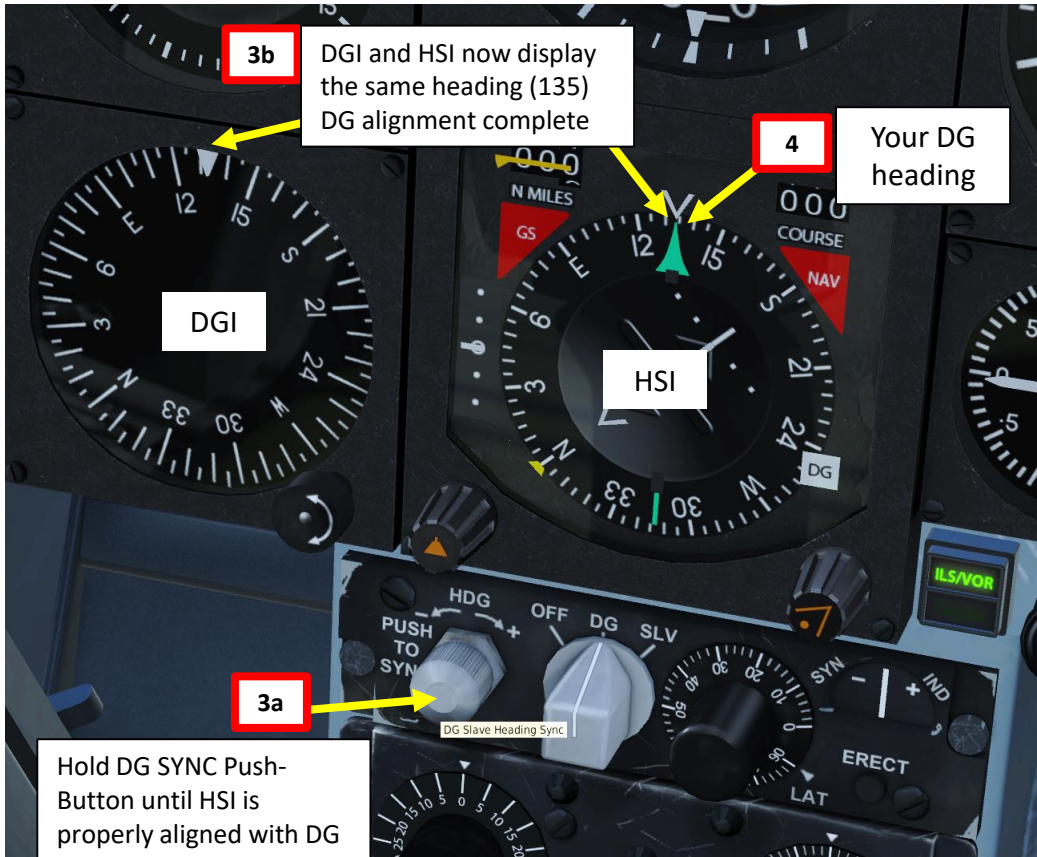
DG: DIRECTIONAL GYRO EMPLOYMENT

1. Check Magnetic Compass and set DGI to the same heading in order to ensure proper directional gyro indicator alignment
2. Set AHRS Mode to DG to slave your HSI (Horizontal Situation Indicator) to the directional gyro only.
3. Push (left click) on DG SYNC button and hold it until heading indicated on the HSI is aligned with the heading indicated on the directional gyro indicator.
4. Green arrow on the HSI will now display your current heading according to the directional gyro.

NOTE: Directional Gyro employment is independent of the AHRS and can be used as a stand-alone. The DG can sometimes accumulate drift error. If that happens, just repeat step 3) to ensure proper DG alignment.

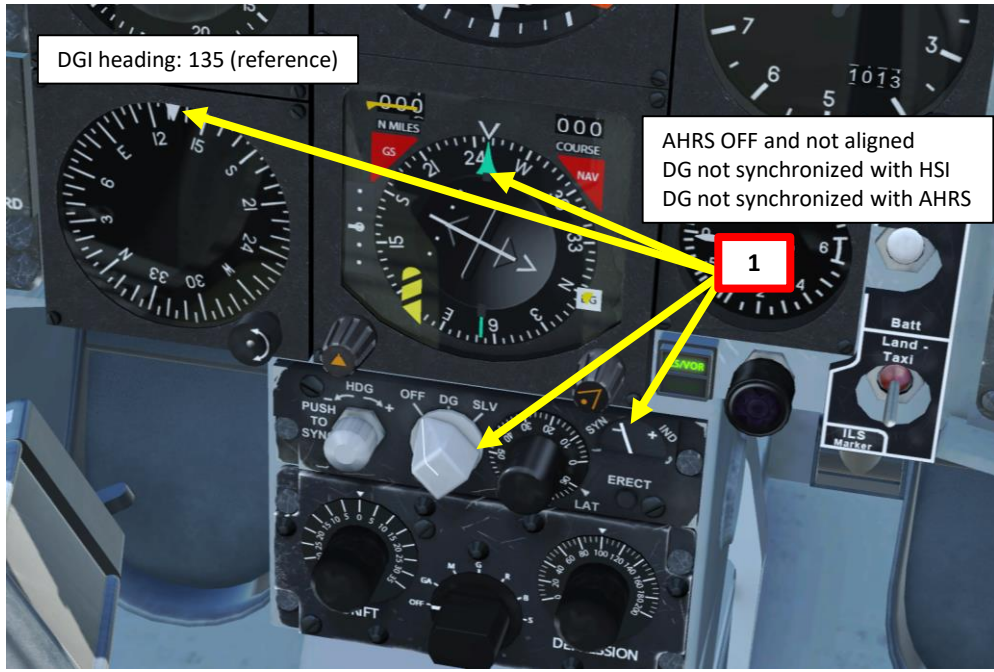


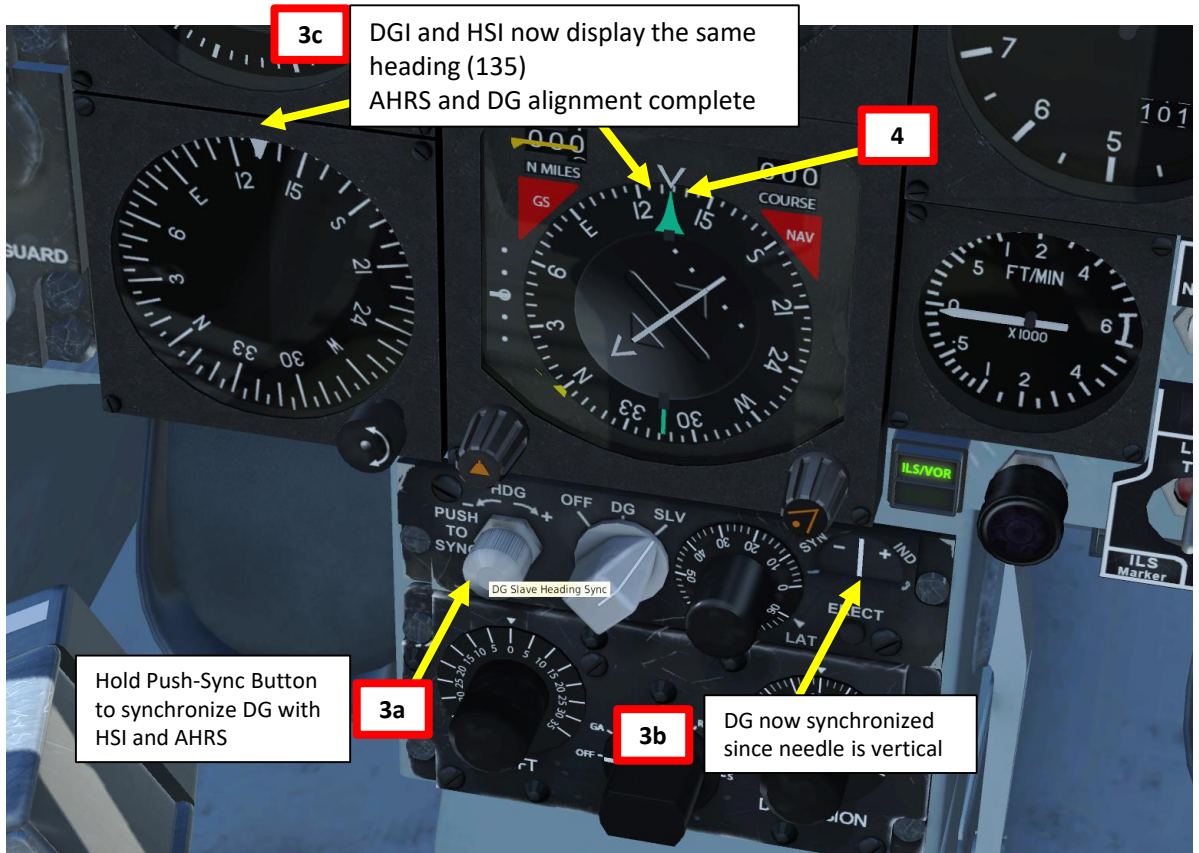


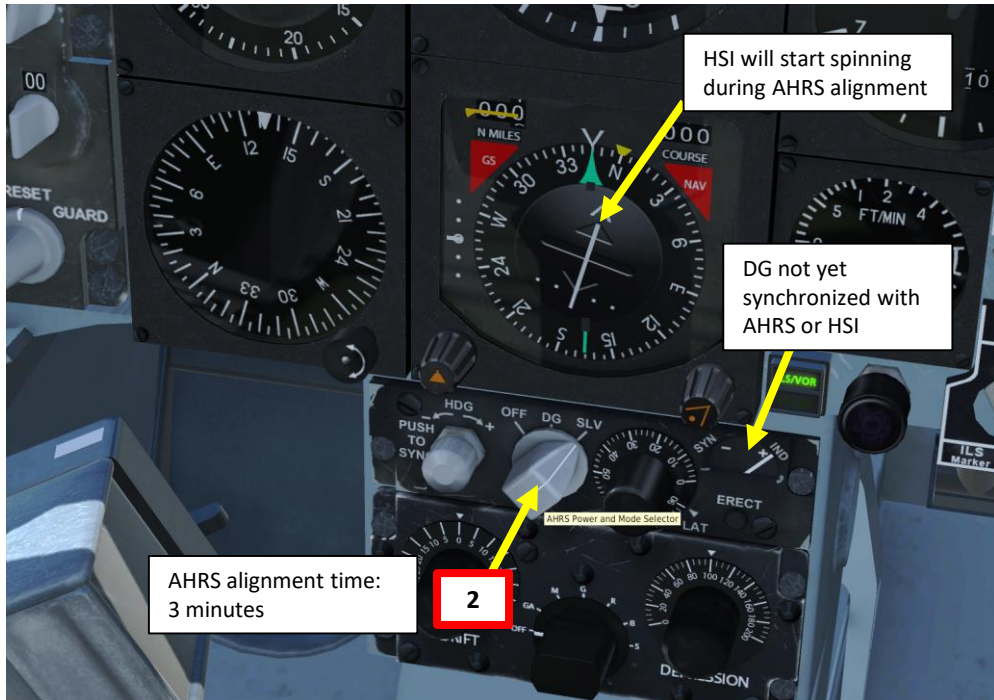


AHRS: ATTITUDE AND HEADING REFERENCE SYSTEM EMPLOYMENT

1. Ensure DGI is properly set up as shown in Directional Gyro tutorial on the previous page.
2. When on the ground, set AHRS Mode to SLV to slave your HSI (Horizontal Situation Indicator) to the AHRS (directional gyro + vertical gyro system). Alignment will take approx. 3 minutes.
3. Once safety flags on the HSI and the Main Attitude Indicator are removed (sign that AHRS alignment is complete), push (left click) on DG SYNC button and hold it until the SYNCHRONIZATION INDICATOR needle is vertical (this needle pointing towards + or – means that the DG component of the AHRS is not synchronized with the HSI).
4. Green arrow on the HSI will now display your current heading according to the directional gyro.







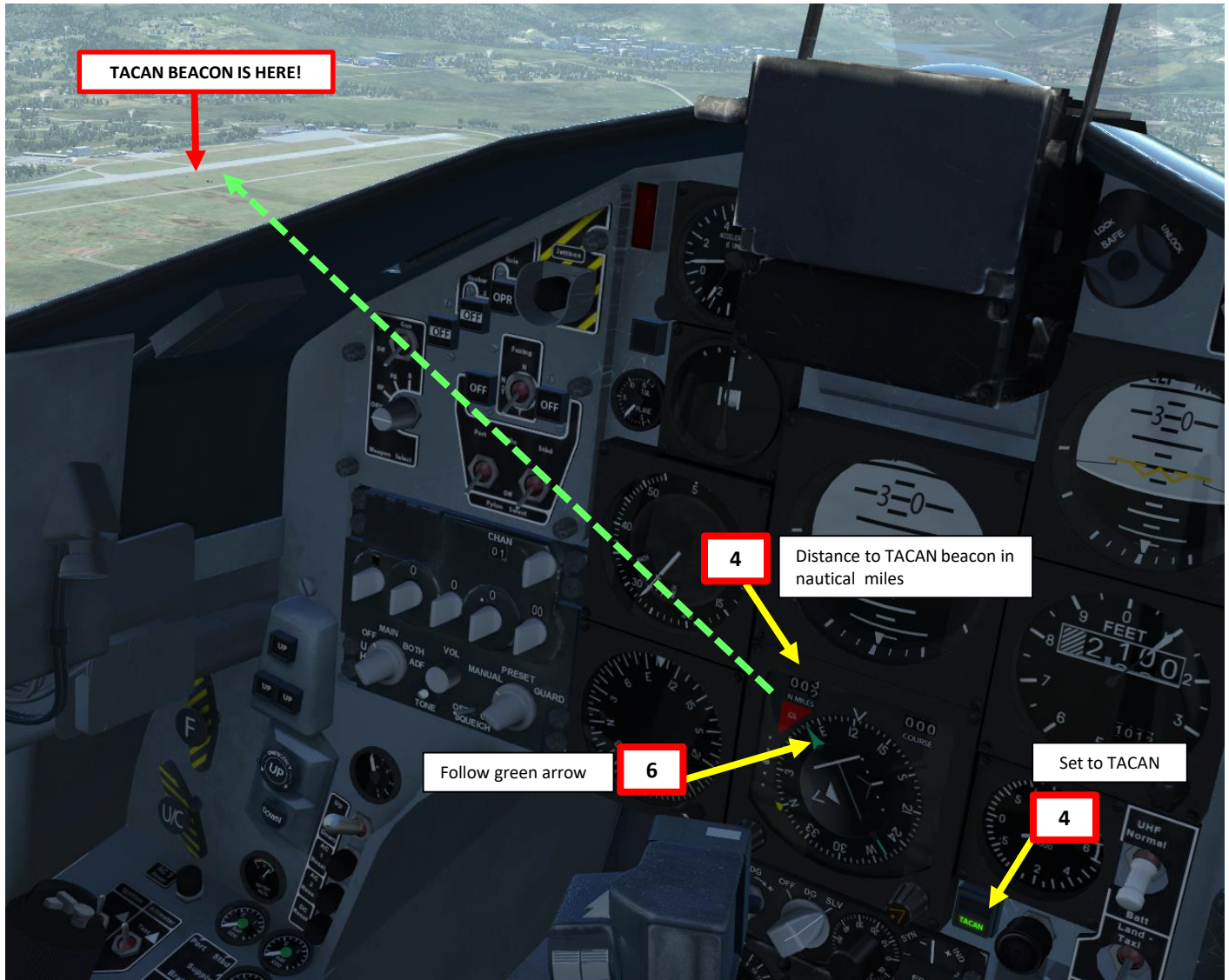
TACAN TUTORIAL

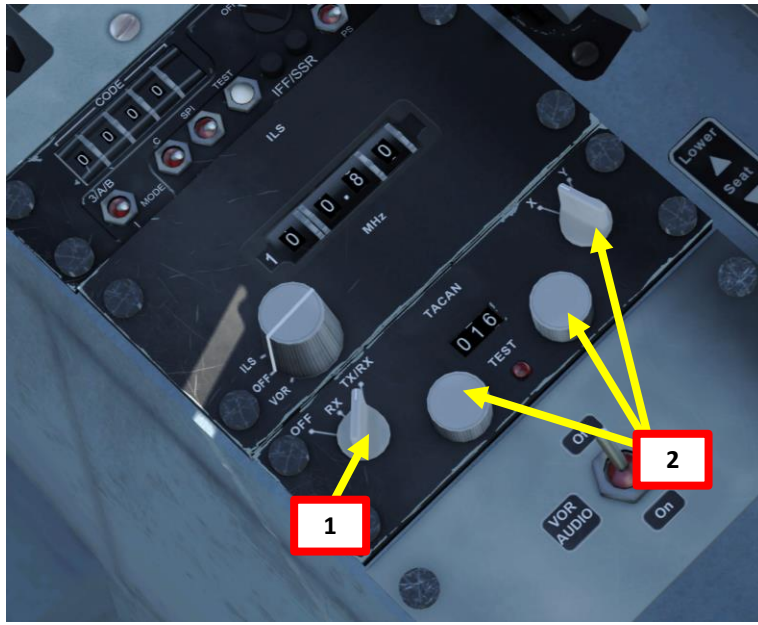
In this short demo, we will try to track a TACAN beacon on our HSI. The TACAN beacon is located on the Batumi Airdrome and its frequency is 16X.

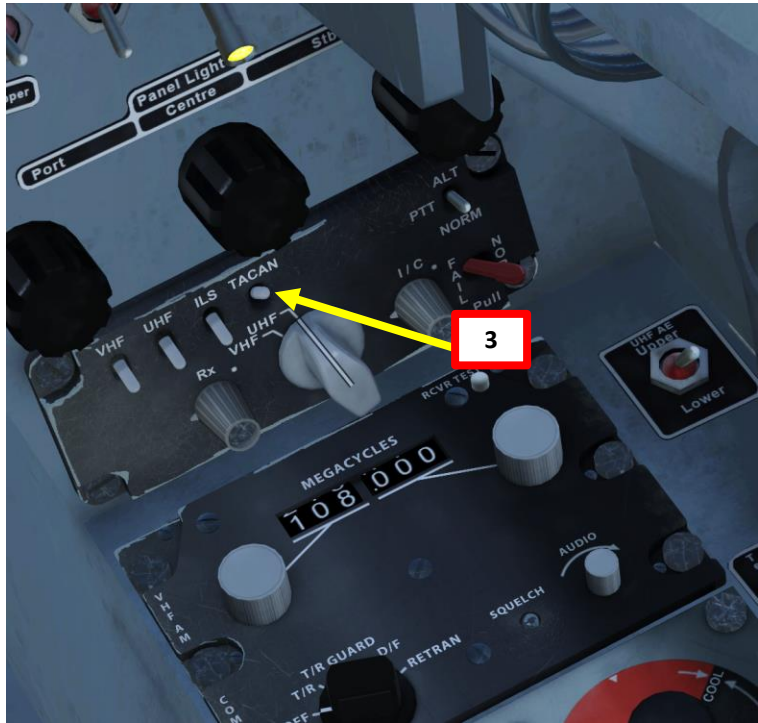
Note: Make sure your AHRS system is properly aligned as shown previously.

TACAN TUTORIAL

1. On TACAN panel, set TACAN power switch to TR/RX
2. On TACAN panel, set TACAN beacon frequency to 16X
3. On CCS panel, turn the TACAN switch UP
4. Set the ILS/VOR/TACAN mode selector to TACAN
5. Distance to TACAN beacon will be displayed on HSI.
6. Follow the green arrow to track the TACAN beacon.







ILS TUTORIAL

1. ILS approach
2. Final Approach
3. Outer ILS marker
4. Inner ILS marker
5. Missed Approach

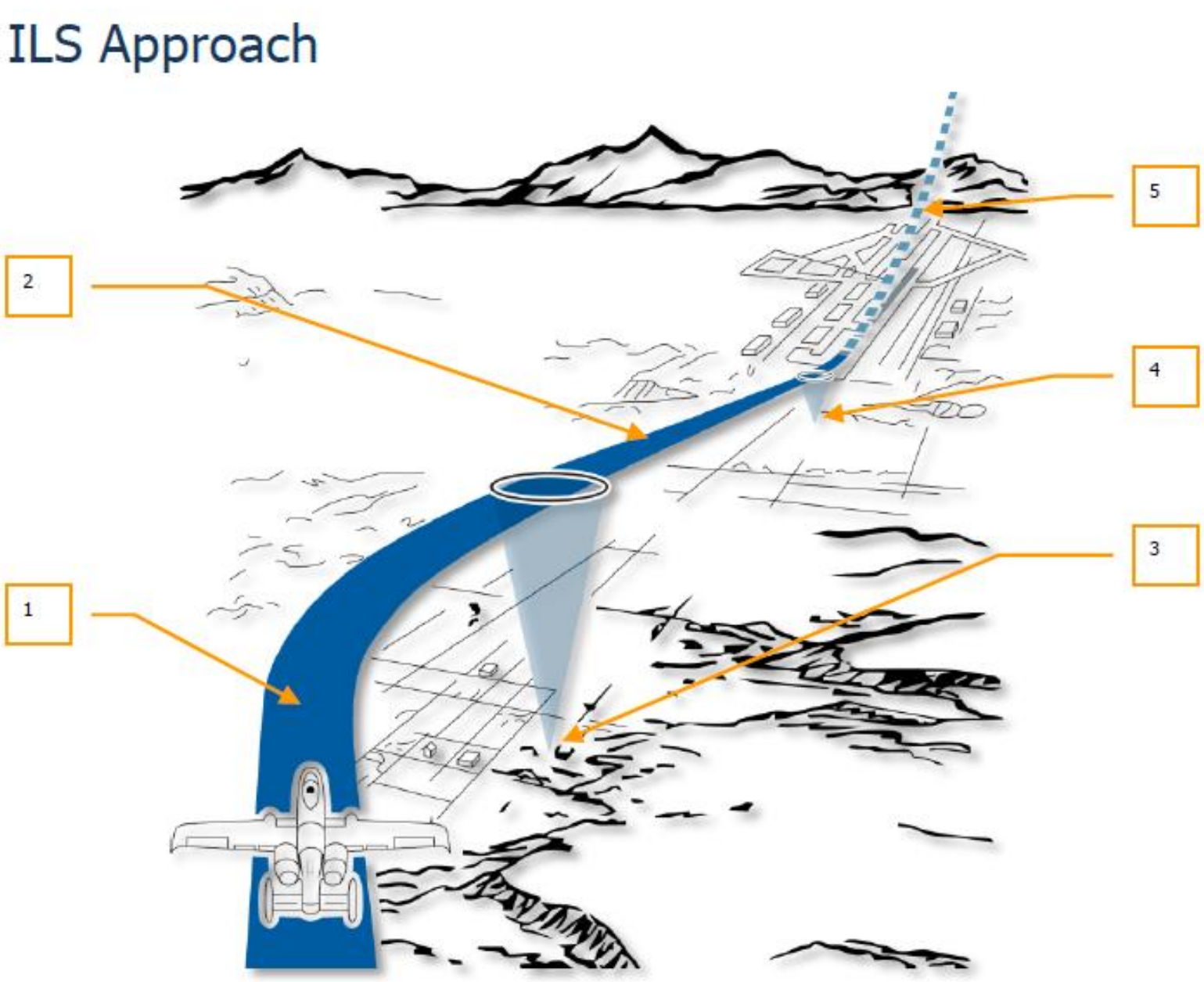


Figure 381. ILS Landing Pattern

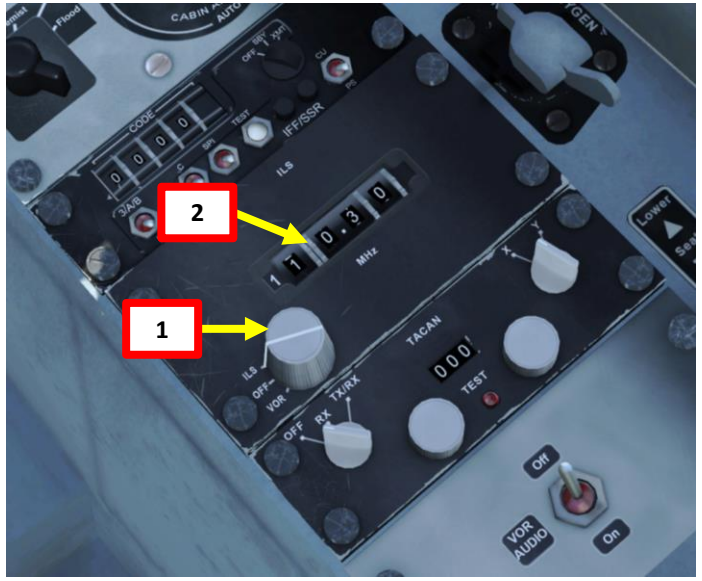
ILS TUTORIAL

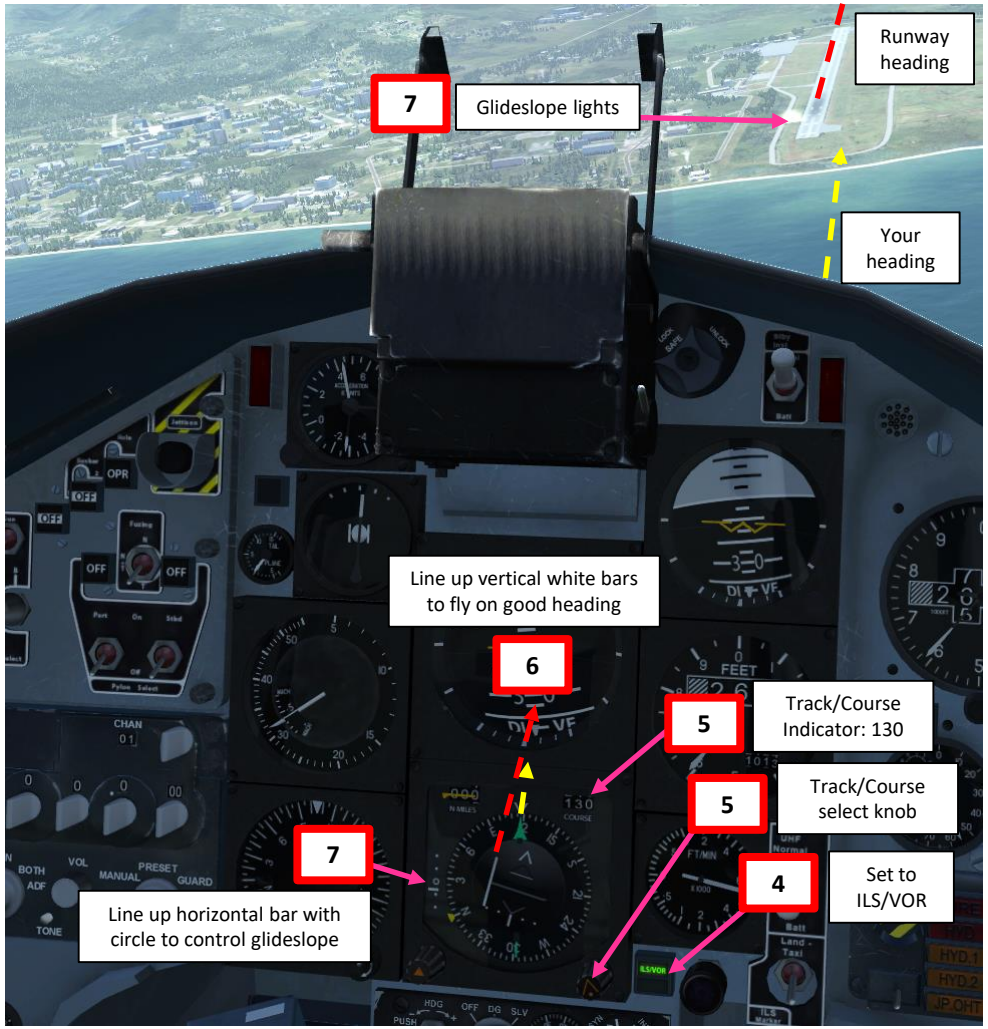
Our ILS approach will be done to Batumi airfield. You can consult the map by pressing F10 and clicking on the airfield to know the following information:
ILS frequency (110.30) and runway heading (130). We will approach the runway following the 130 radial and simply use the guidance provided by our ILS system.

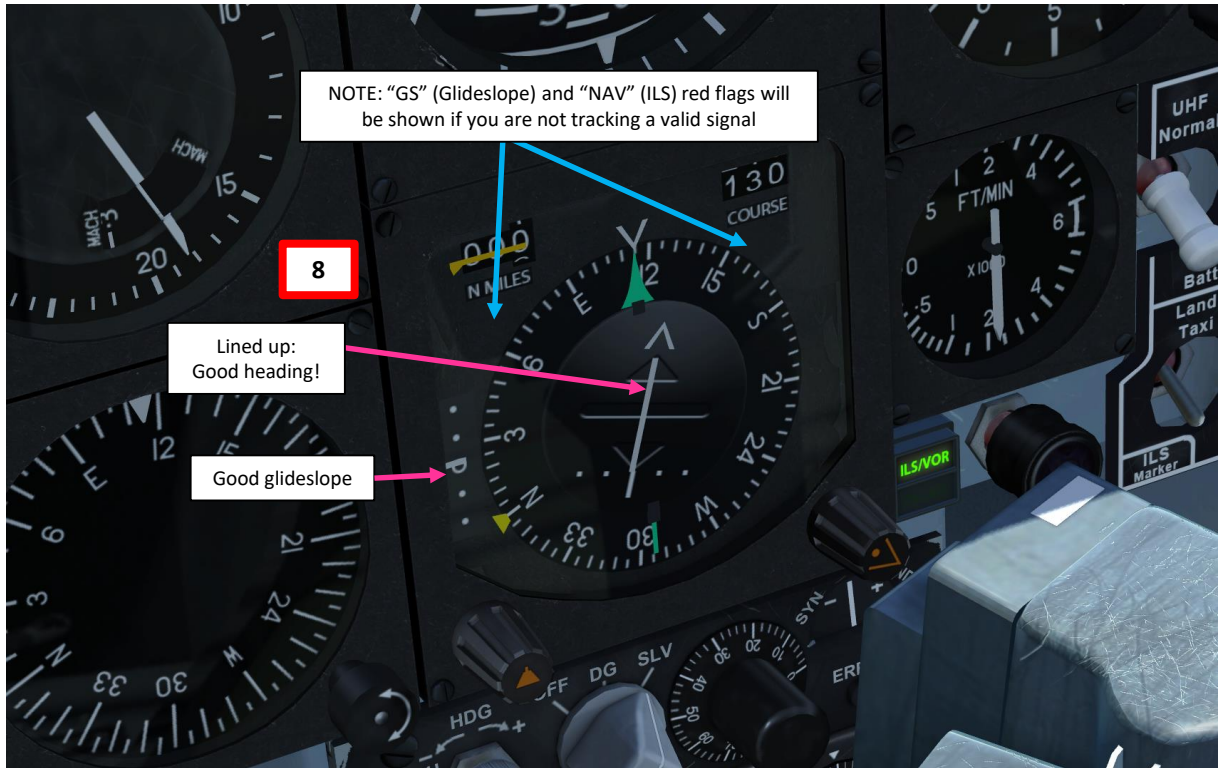
Note: Make sure your AHRS system is properly aligned as shown previously.

ILS (INSTRUMENTED LANDING SYSTEM) LANDING TUTORIAL

1. Set ILS power switch to “ILS”
2. Enter ILS frequency by clicking on the dials (110.30).
3. On CCS panel, turn the ILS switch UP
4. Set the ILS/VOR/TACAN mode selector to ILS/VOR
5. Scroll mousewheel on the Track/Course select knob and set a course of 130 in order to allow us to follow radial 130 leading us to the Batumi Runway 13.
6. Line up both white bars to follow the radial.
7. Use glideslope indicator on HSI and runway light signals to set the aircraft in a good glideslope for landing.
8. Land while keeping good glideslope, course and airspeed.







HAWK T.1A

PART 11 – NAVIGATION & ILS LANDING

ILS (INSTRUMENTED LANDING SYSTEM) LANDING 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

Aerobatic flying deserves a whole book written on it. Formation flying and airshow routines can be some of the toughest things to do in DCS. Many virtual aerobatic teams practice hundreds of hours in order to master their aircraft inside out. The Hawk highlights the fact that the flight sim community is diverse in the sense that everyone has different needs and flies for different reasons. Some folks are just not interested in combat. Although, that doesn't mean that they don't like to fly! Mastering the art of formation flying can be just as challenging as hunting down Flankers in the skies of Georgia.

This superb video of the mighty Red Arrows says it all:
https://www.youtube.com/watch?v=1e-aw3aJpBc

The following screenshots were flown and taken by the virtual aerobatic team "VAT: The Blue Knights".


digital combat series
Chuck_Owl
INSTANT ACTION
CREATE FAST MISSION
MISSION
CAMPAIGN
MULTIPLAYER
LOGBOOK
ENCYCLOPEDIA
TRAINING
REPLAY
MISSION EDITOR
CAMPAIGN BUILDER
EXIT
Nevada 2.0.0
A-10C 2.0.2
Bf 109 K-4 2.0.2 beta
C-101 2.0.2 Beta
CA 2.0.2
F-86F 2.0.2
FC3 2.0.2
Fw 190 D-9 2.0.2
Hawk 2.0.2 Beta EFM
Ka-50 2.0.2
L-39 2.0.2
M-2000C 2.0.0 Beta
Mi-8MTV2 2.0.2 beta
MiG-15bis 2.0.2
MiG-21bis trunk
P-51D 2.0.2
Su-25T 2.0.2
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