DCS GUIDE
MiG-15BIS

By Chuck

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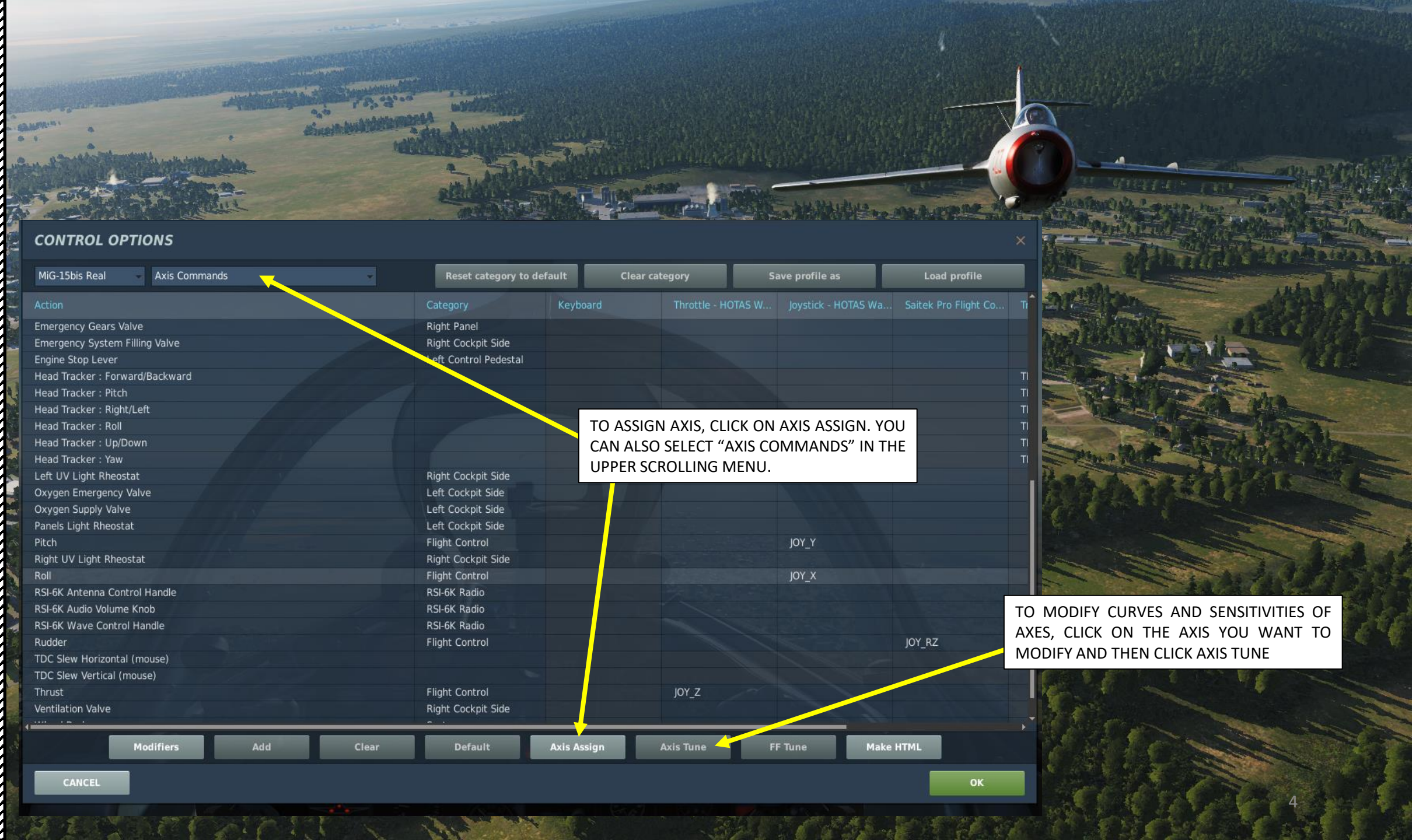
Special thanks to Paul "Goldwolf" Whittingham for creating the guide icons.

PART 1 – CONTROLS SETUP

These controls should be mapped to your joystick and are essential. Names on the left column are what you should look for in the "ACTION" column of the Controls Setup Menu in DCS. Description of the action is on the right column.

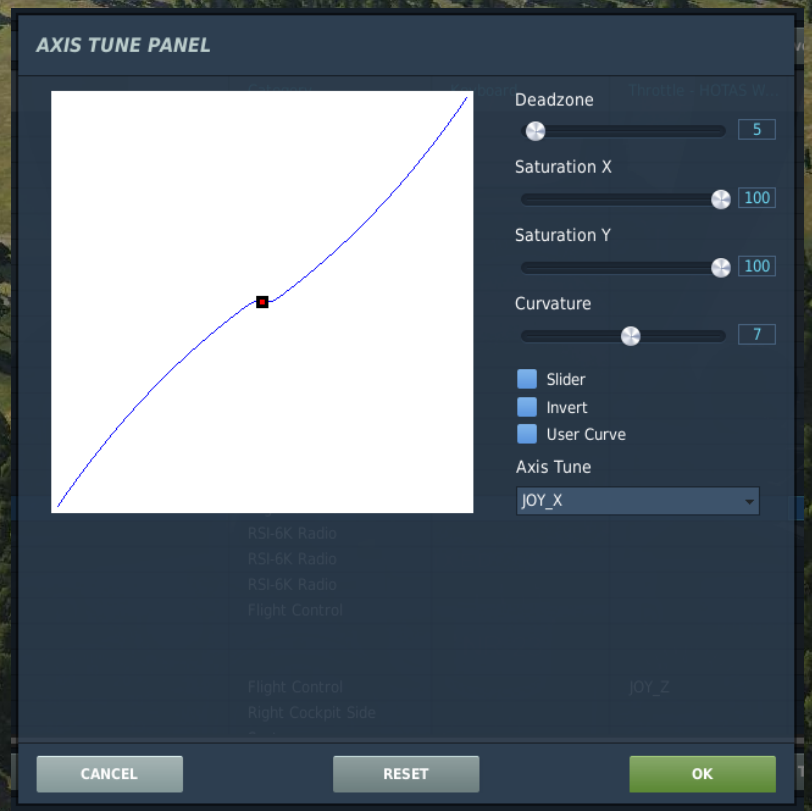
• MICROPHONE BUTTON	ALLOWS YOU TO USE RADIO MENU WHILE FLYING
• ASP-3N GUNSIGHT TARGET DISTANCE, DECREASE/INCREASE	DECREASE/INCREASE GUNSIGHT TARGET RANGE
• ASP-3N GUNSIGHT TARGET WINGSPAN, DECREASE/INCREASE	DECREASE/INCREASE GUNSIGHT TARGET WINGSPAN
• AILERON TRIMMER SWITCH, LEFT/RIGHT	TRIM AILERON LEFT/RIGHT (THERE IS NO RUDDER TRIM)
• AIRBRAKE SWITCH, CLOSE/OPEN	OPENS/CLOSES AIRBRAKES
• ELEVATOR TRIMMER SWITCH, PULL (CLIMB)/PUSH (DESCEND)	TRIM ELEVATOR UP OR DOWN
• ENGINE START BUTTON – PUSH TO START	ENGINE STARTER
• GUNS SAFETY COVER	GUNS SAFETY SWITCH
• LANDING GEAR HANDLE, UP/DOWN	RAISES OR LOWERS LANDING GEAR
• N-37D CANNON FIRE BUTTON	FIRES 37 MM CANNON
• NR-23 CANNON FIRE BUTTON	FIRES 23 MM CANNON
• WINGS FLAPS HANDLE, UP/DOWN	LOWERS OR RAISES FLAPS BY INCREMENTS
• WEAPONS RELEASE BUTTON	DROPS BOMBS OR OTHER ORDNANCE
• WHEEL BRAKE ON	PUTS ON THE BRAKE (LIKE A CAR BRAKE)
• ZOOM IN SLOW	ALLOWS YOU TO ZOOM IN
• ZOOM OUT SLOW	ALLOWS YOU TO ZOOM OUT

PART 1 – CONTROLS SETUP

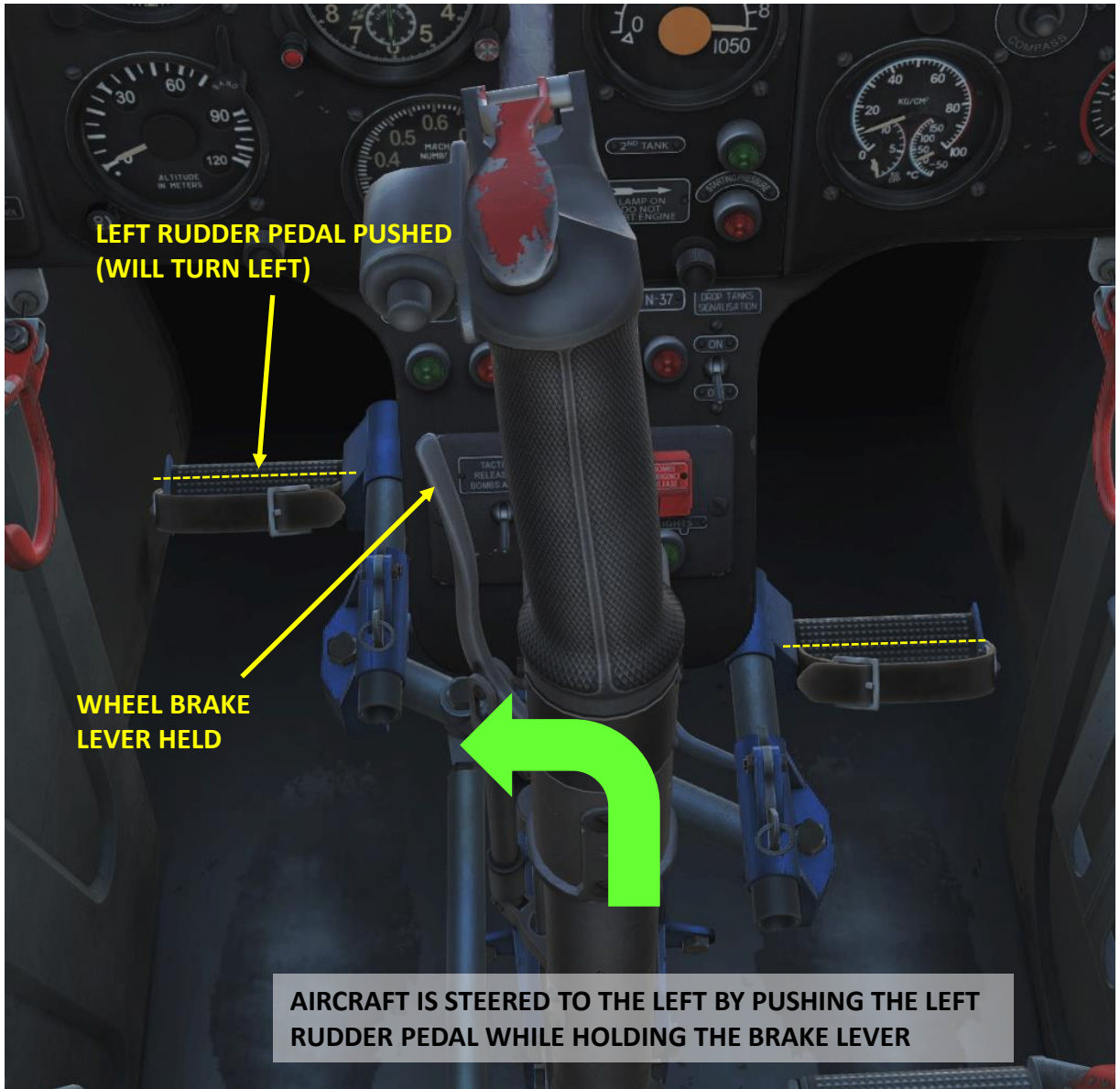


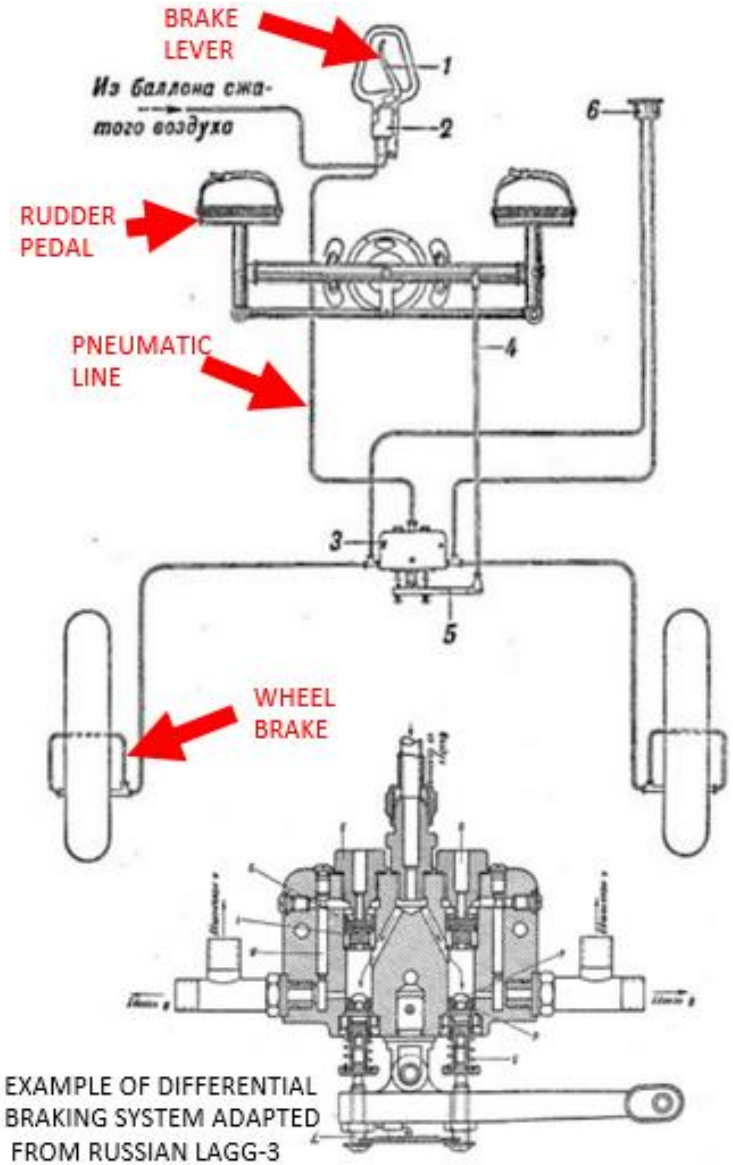
PART 1 – CONTROLS SETUP

- PITCH (DEADZONE AT 5, SATURATION X AT 100, SATURATION Y AT 100, CURVATURE AT 20)
- ROLL (DEADZONE AT 5, SATURATION X AT 100, SATURATION Y AT 100, CURVATURE AT 20)
- RUDDER (DEADZONE AT 0, SATURATION X AT 100, SATURATION Y AT 100, CURVATURE AT 0)
- THROTTLE – CONTROLS ENGINE RPM



Braking is done by holding the braking lever while giving rudder input to steer the aircraft in the direction you want to turn. Make sure you have adequate RPM settings or your turn radius will suffer. The best way to move safely on the tarmac is to give very gentle throttle input to ensure you maintain control of the aircraft while steering left and right once in a while to check for obstacles. It is best to turn while moving and then straighten nose wheel prior to stopping.

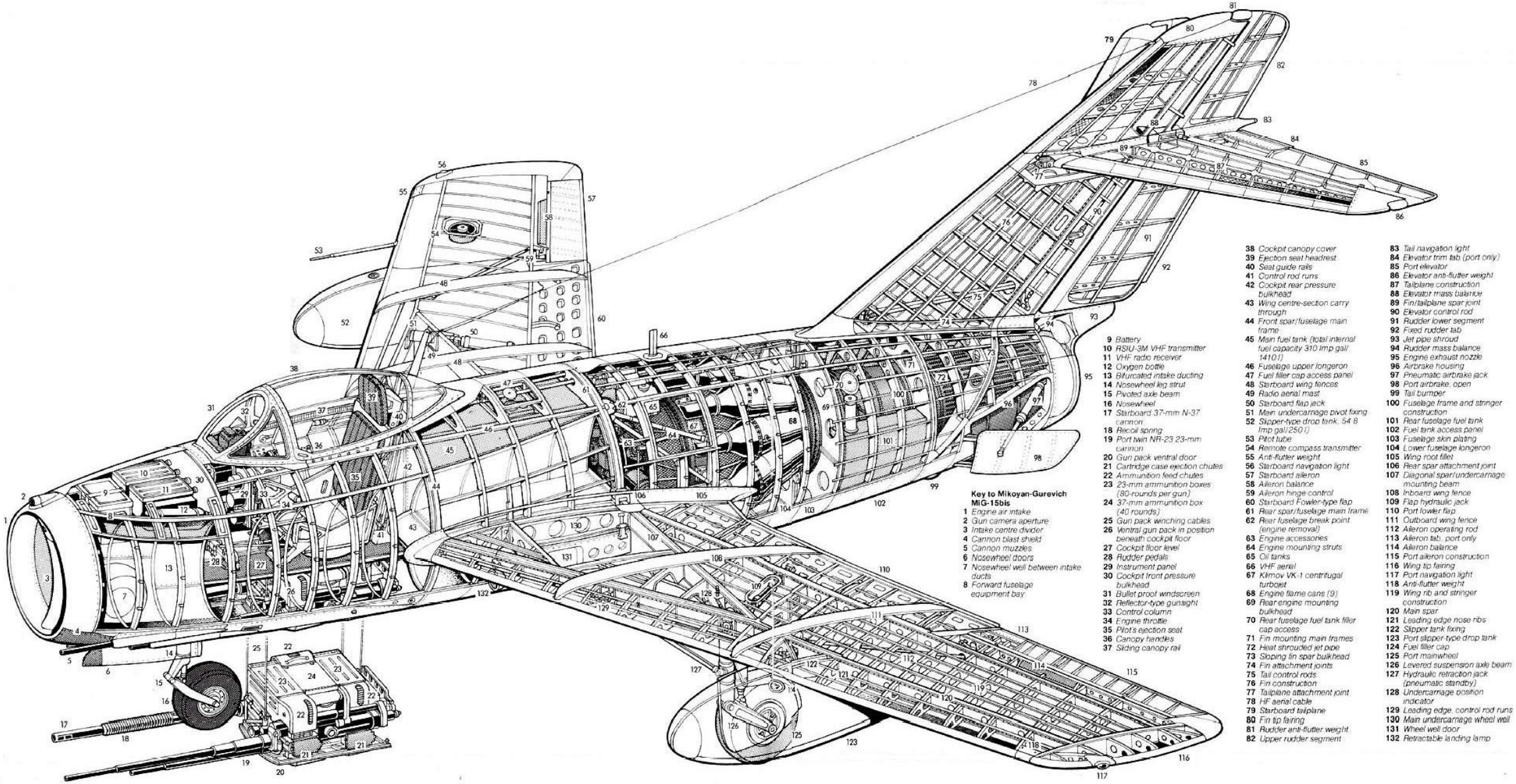




EXAMPLE OF DIFFERENTIAL BRAKING SYSTEM ADAPTED FROM RUSSIAN LAGG-3


GYRO
FIXED
NR-23
AFTER ENGINE AIR START SWITCH IGNITION OFF

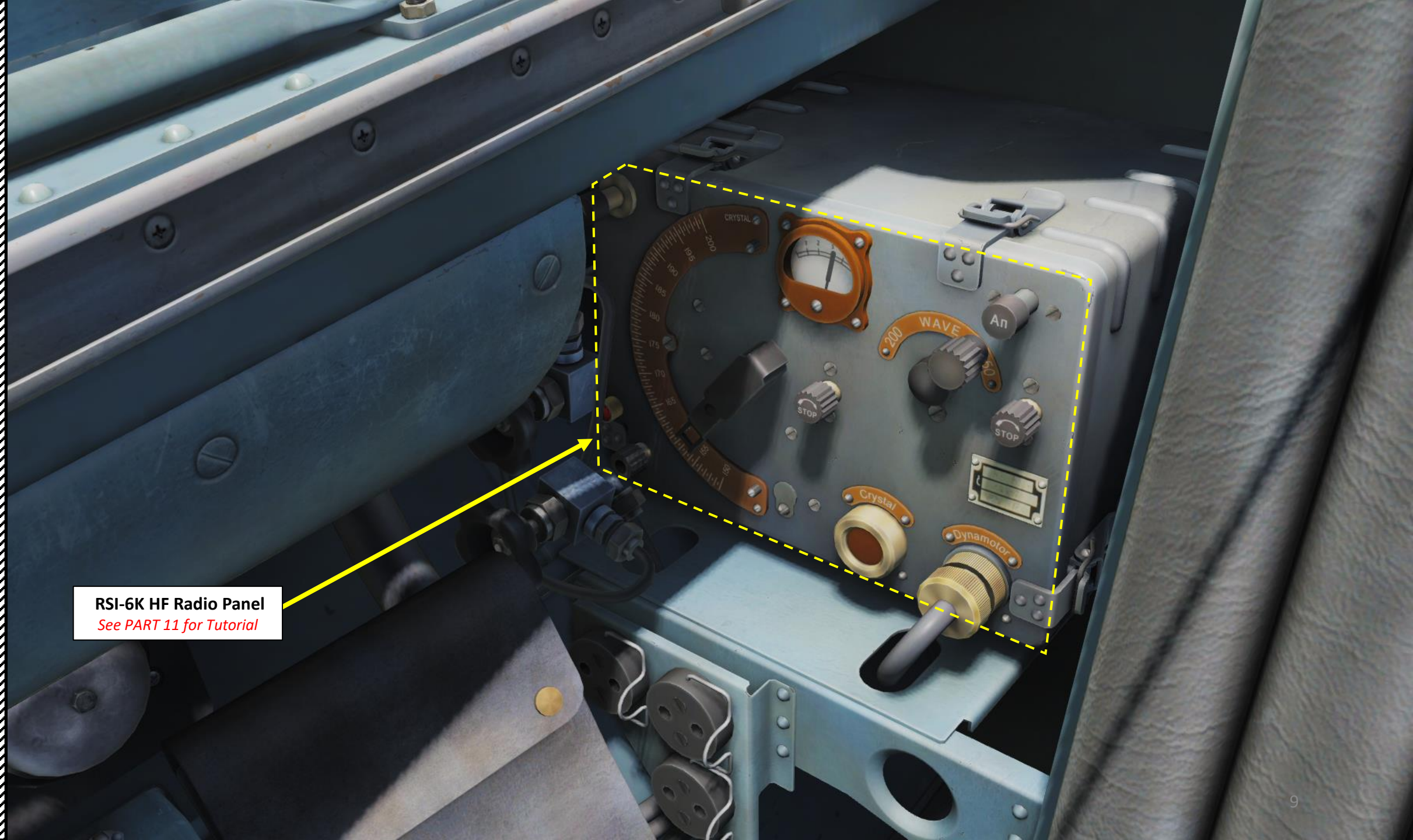
MIG-15 bis



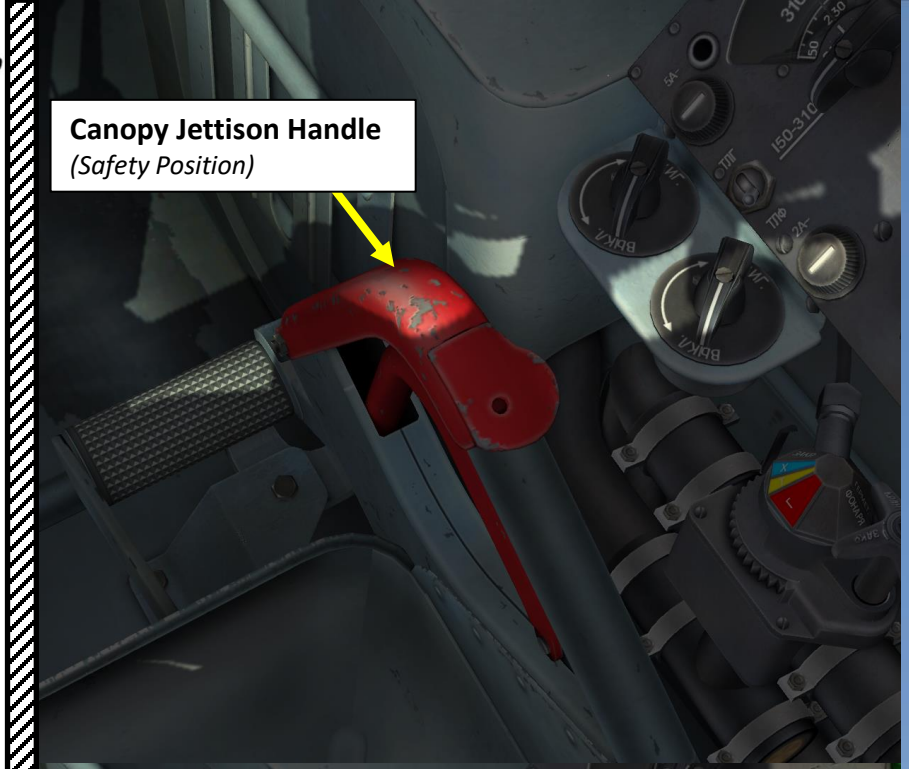
Key to Mikoyan-Gurevich MIG-15bis

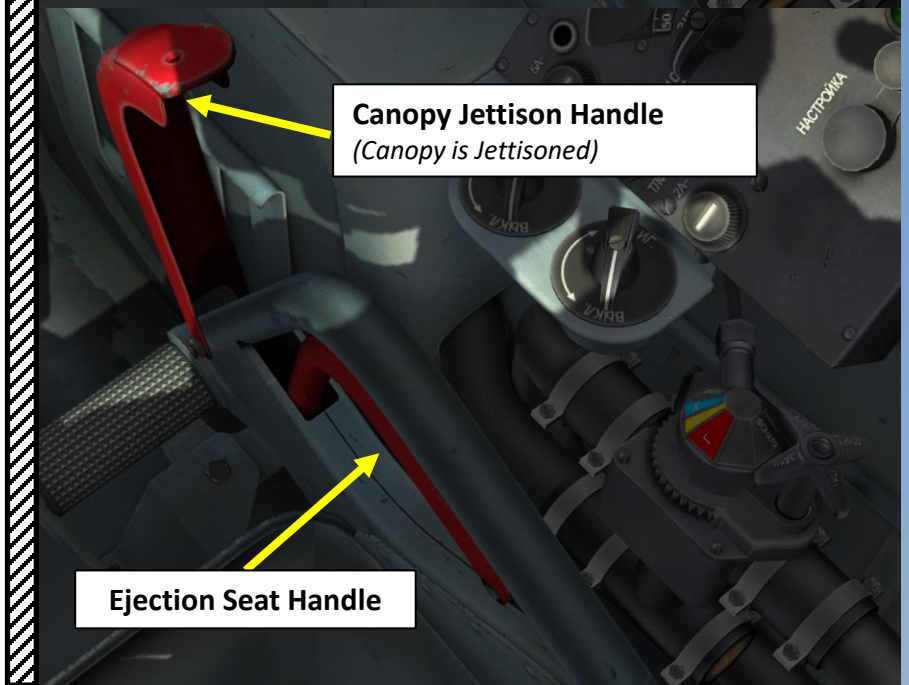
1 *Engine air intake*
2 *Gun camera aperture*
3 *Intake centre divider*
4 *Cannon blast shield*
5 *Cannon muzzles*
6 *Nosewheel doors*
7 *Nosewheel well between intake ducts*
8 *Forward fuselage equipment bay*
9 *Battery*
10 *RSIU-3M VHF transmitter*
11 *VHF radio receiver*
12 *Oxygen bottle*
13 *Bifurcated intake ducting*
14 *Nosewheel leg strut*
15 *Pivoted axle beam*
16 *Nosewheel*
17 *Starboard 37-mm N-37 cannon*
18 *Recoil spring*
19 *Port twin NR-23 23-mm cannon*
20 *Gun pack ventral door*
21 *Cartridge case ejection chutes*
22 *Ammunition feed chutes*
23 *23-mm ammunition boxes (80 rounds per gun)*
24 *37-mm ammunition box (40 rounds)*
25 *Gun pack winching cables*
26 *Ventral gun pack in position beneath cockpit floor*
27 *Cockpit floor level*
28 *Rudder pedals*
29 *Instrument panel*
30 *Cockpit front pressure bulkhead*
31 *Bullet proof windscreen*
32 *Reflector-type gunsight*
33 *Control column*
34 *Engine throttle*
35 *Pilot's ejection seat*
36 *Canopy handles*
37 *Sliding canopy rail*
38 *Cockpit canopy cover*
39 *Ejection seat headrest*
40 *Seat guide rails*
41 *Control rod runs*
42 *Cockpit rear pressure bulkhead*
43 *Wing centre-section carry through*
44 *Front spar/fuselage main frame*
45 *Main fuel tank (total internal fuel capacity 310 Imp gal/ 1410 l)*
46 *Fuselage upper longeron*
47 *Fuel filler cap access panel*
48 *Starboard wing fences*
49 *Radio aerial mast*
50 *Starboard flap jack*
51 *Main undercarriage pivot fixing*
52 *Slipper-type drop tank; 54·8 Imp gal/250 l)*
53 *Pitot tube*
54 *Remote compass transmitter*
55 *Anti-flutter weight*
56 *Starboard navigation light*
57 *Starboard aileron*
58 *Aileron balance*
59 *Aileron hinge control*
60 *Starboard Fowler-type flap*
61 *Rear spar/fuselage main frame*
62 *Rear fuselage break point (engine removal)*
63 *Engine accessories*
64 *Engine mounting struts*
65 *Oil tanks*
66 *VHF aerial*
67 *Klimov VK-1 centrifugal turbojet*
68 *Engine flame cans (9)*
69 *Rear engine mounting bulkhead*
70 *Rear fuselage fuel tank filler cap access*
71 *Fin mounting main frames*
72 *Heat shrouded jet pipe*
73 *Sloping fin spar bulkhead*
74 *Fin attachment joints*
75 *Tail control rods*
76 *Fin construction*
77 *Tailplane attachment joint*
78 *HF aerial cable*
79 *Starboard tailplane*
80 *Fin tip fairing*
81 *Rudder anti-flutter weight*
82 *Upper rudder segment*
83 *Tail navigation light*
84 *Elevator trim tab (port only)*
85 *Port elevator*
86 *Elevator anti-flutter weight*
87 *Tailplane construction*
88 *Elevator mass balance*
89 *Fin/tailplane spar joint*
90 *Elevator control rod*
91 *Rudder lower segment*
92 *Fixed rudder tab*
93 *Jet pipe shroud*
94 *Rudder mass balance*
95 *Engine exhaust nozzle*
96 *Airbrake housing*
97 *Pneumatic airbrake jack*
98 *Port airbrake, open*
99 *Tail bumper*
100 *Fuselage frame and stringer construction*
101 *Rear fuselage fuel tank*
102 *Fuel tank access panel*
103 *Fuselage skin plating*
104 *Lower fuselage longeron*
105 *Wing root fillet*
106 *Rear spar attachment joint*
107 *Diagonal spar/undercarriage mounting beam*
108 *Inboard wing fence*
109 *Flap hydraulic jack*
110 *Port fowler flap*
111 *Outboard wing fence*
112 *Aileron operating rod*
113 *Aileron tab, port only*
114 *Aileron balance*
115 *Port aileron construction*
116 *Wing tip fairing*
117 *Port navigation light*
118 *Anti-flutter weight*
119 *Wing rib and stringer construction*
120 *Main spar*
121 *Leading edge nose ribs*
122 *Slipper tank fixing*
123 *Port slipper-type drop tank*
124 *Fuel filler cap*
125 *Port mainwheel*
126 *Levered suspension axle beam*
127 *Hydraulic retraction jack (pneumatic standby)*
128 *Undercarriage position indicator*
129 *Leading edge, control rod runs*
130 *Main undercarriage wheel well*
131 *Wheel well door*
132 *Retractable landing lamp*

PART 2 – COCKPIT & GAUGES

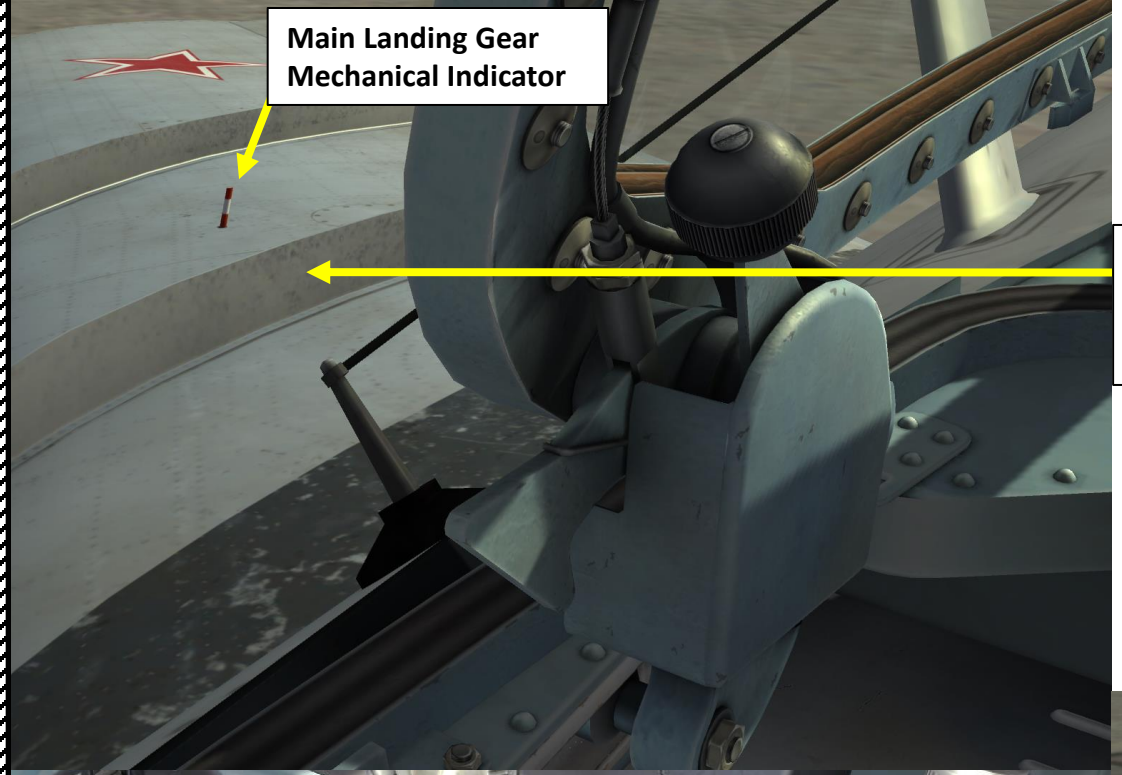


RSI-6K HF Radio Panel
See PART 11 for Tutorial


Canopy Jettison Handle
(Safety Position)

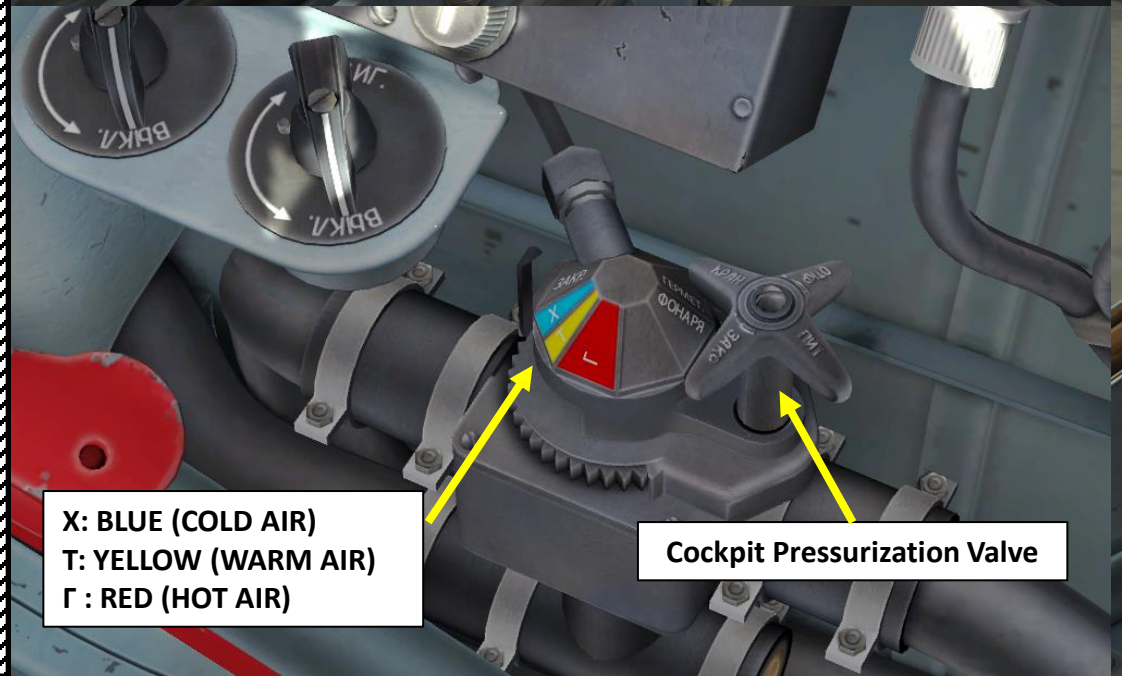

Canopy Jettison Handle
(Canopy is Jettisoned)
Ejection Seat Handle

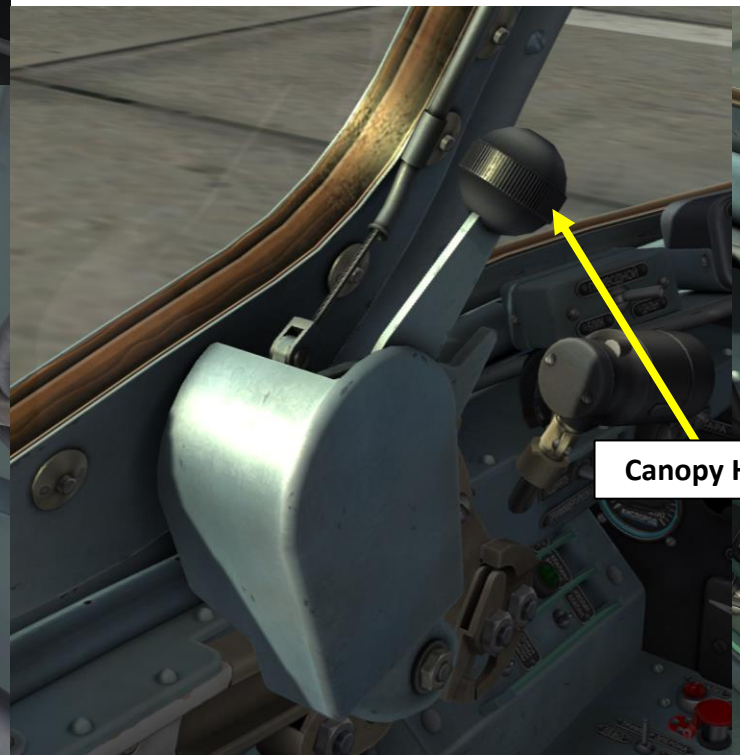

Ejection Seat Handle
Press LCTRL + E three times to eject
after you jettisoned the canopy

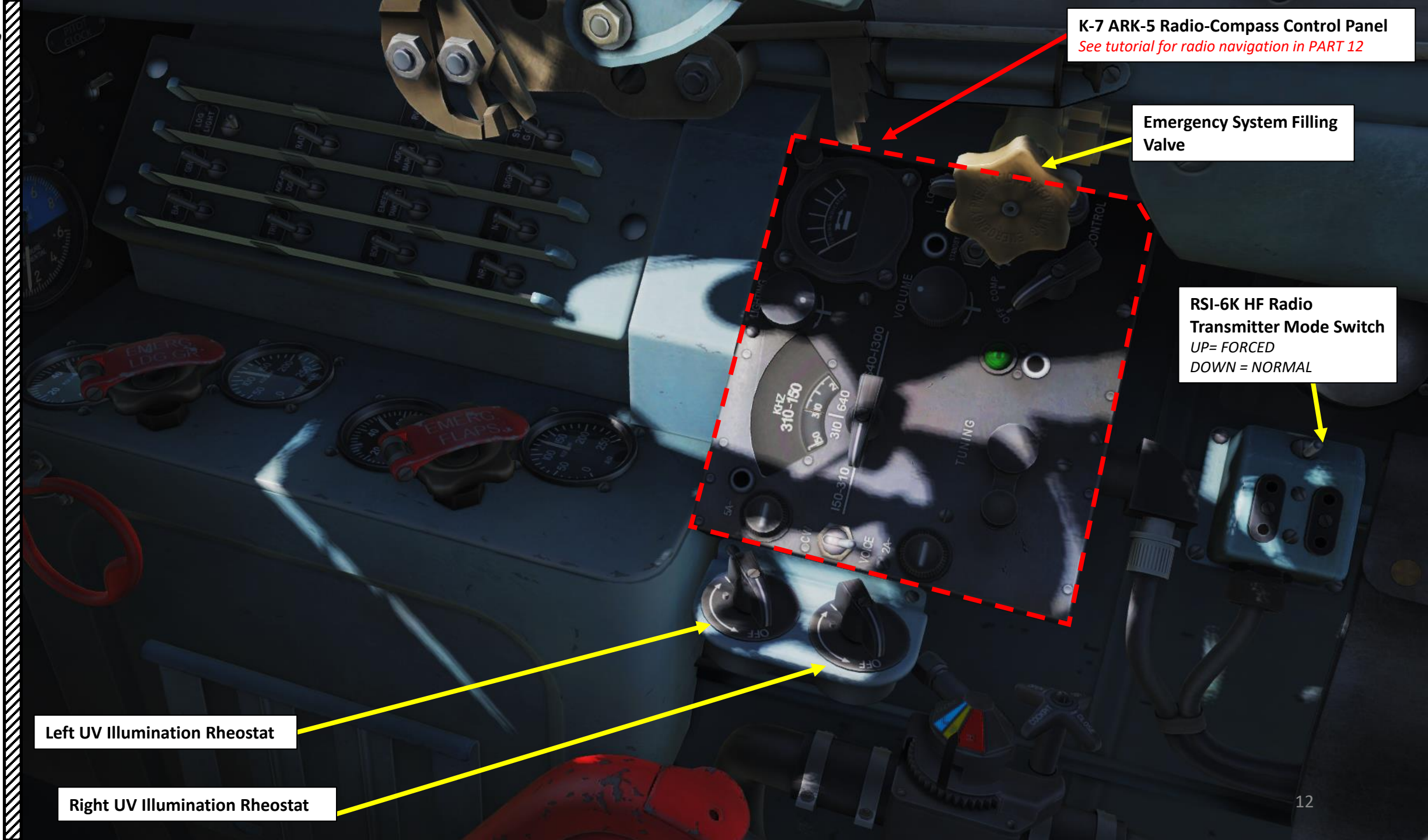


Wing Fences

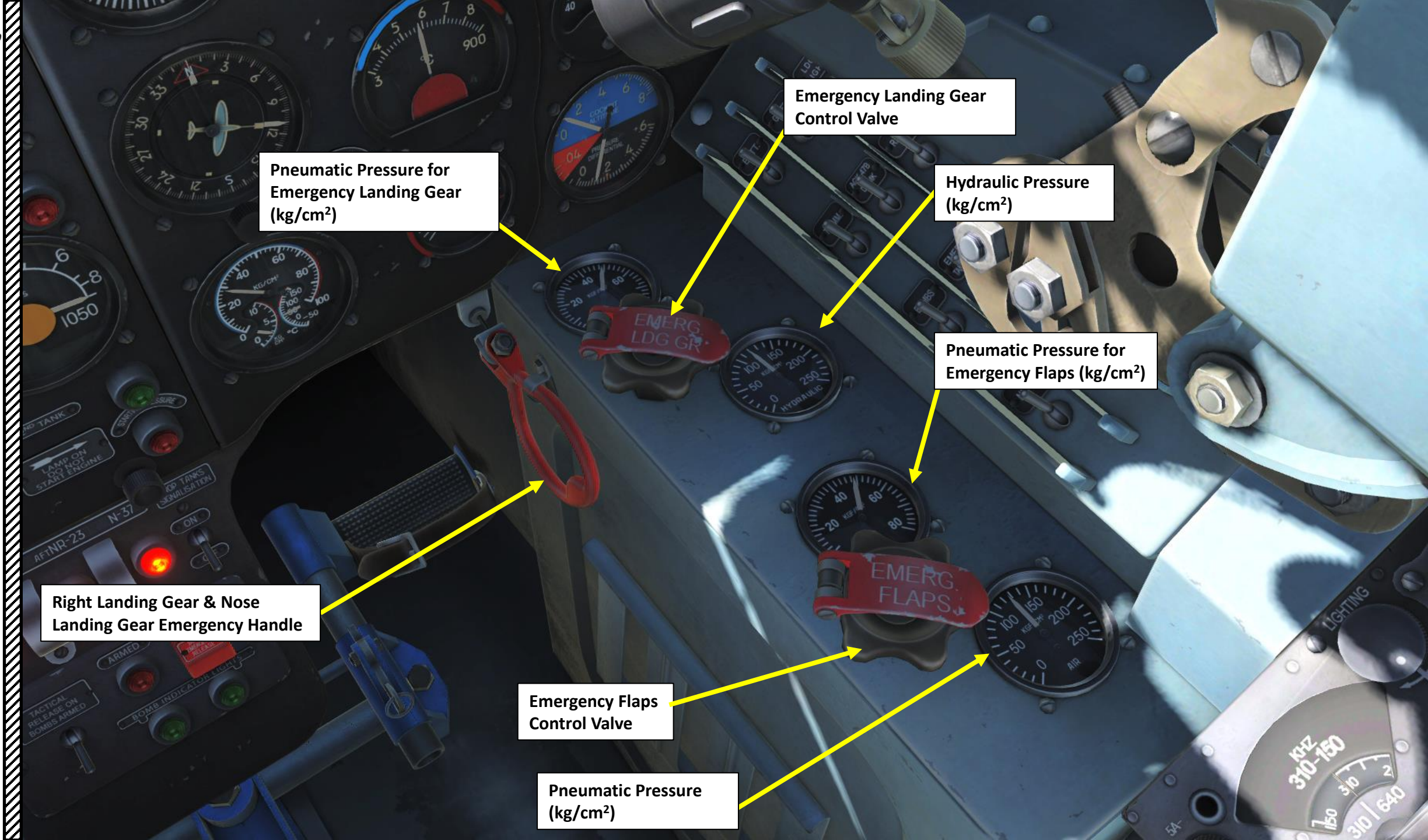
Also known as boundary layer fences or potential fences, wing fences delay or eliminate the "Sabre Dance" aerodynamic effect by preventing the span-wise air flow from moving too far along the wing and gaining speed. When meeting the fence, the air is directed back over the wing surface.

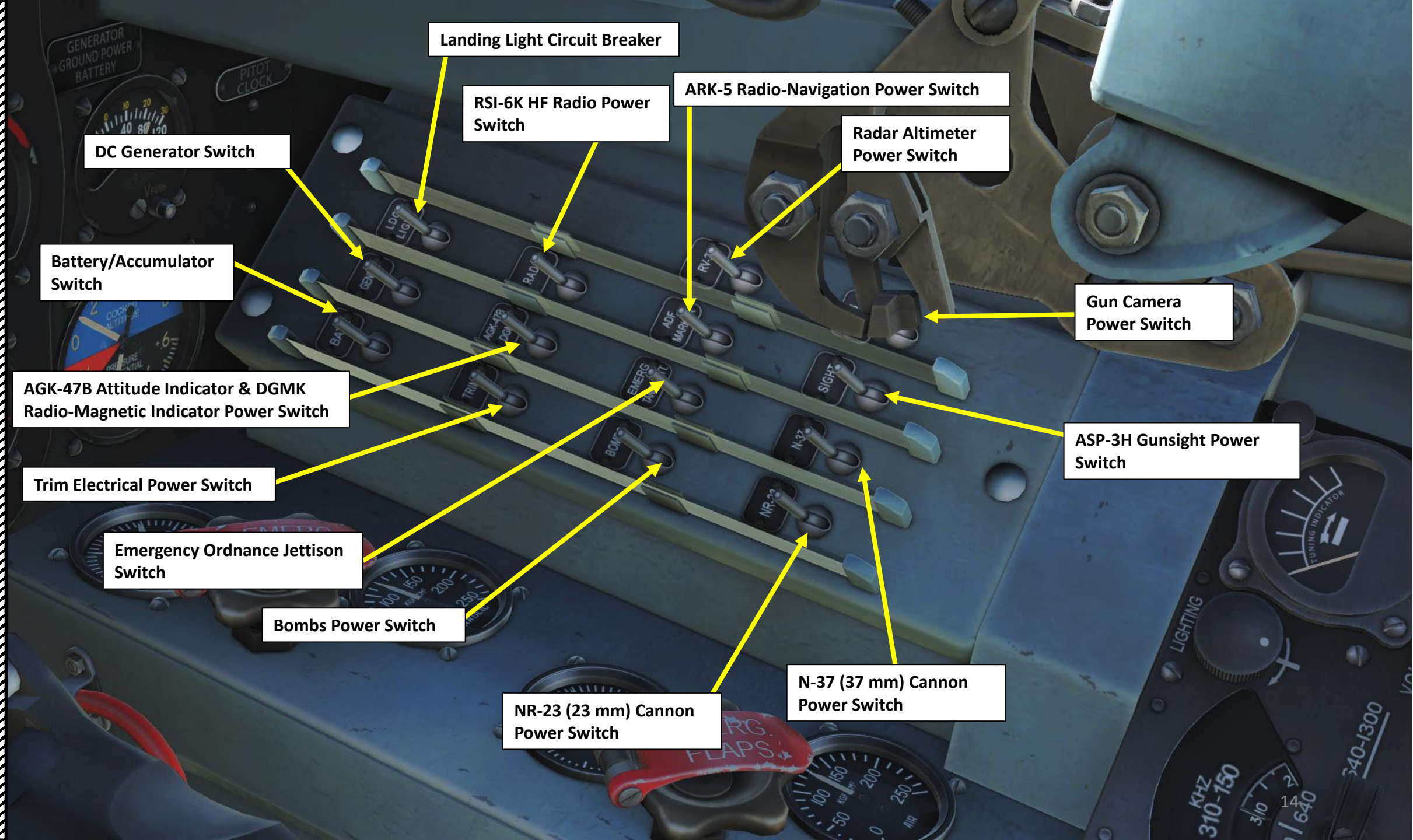




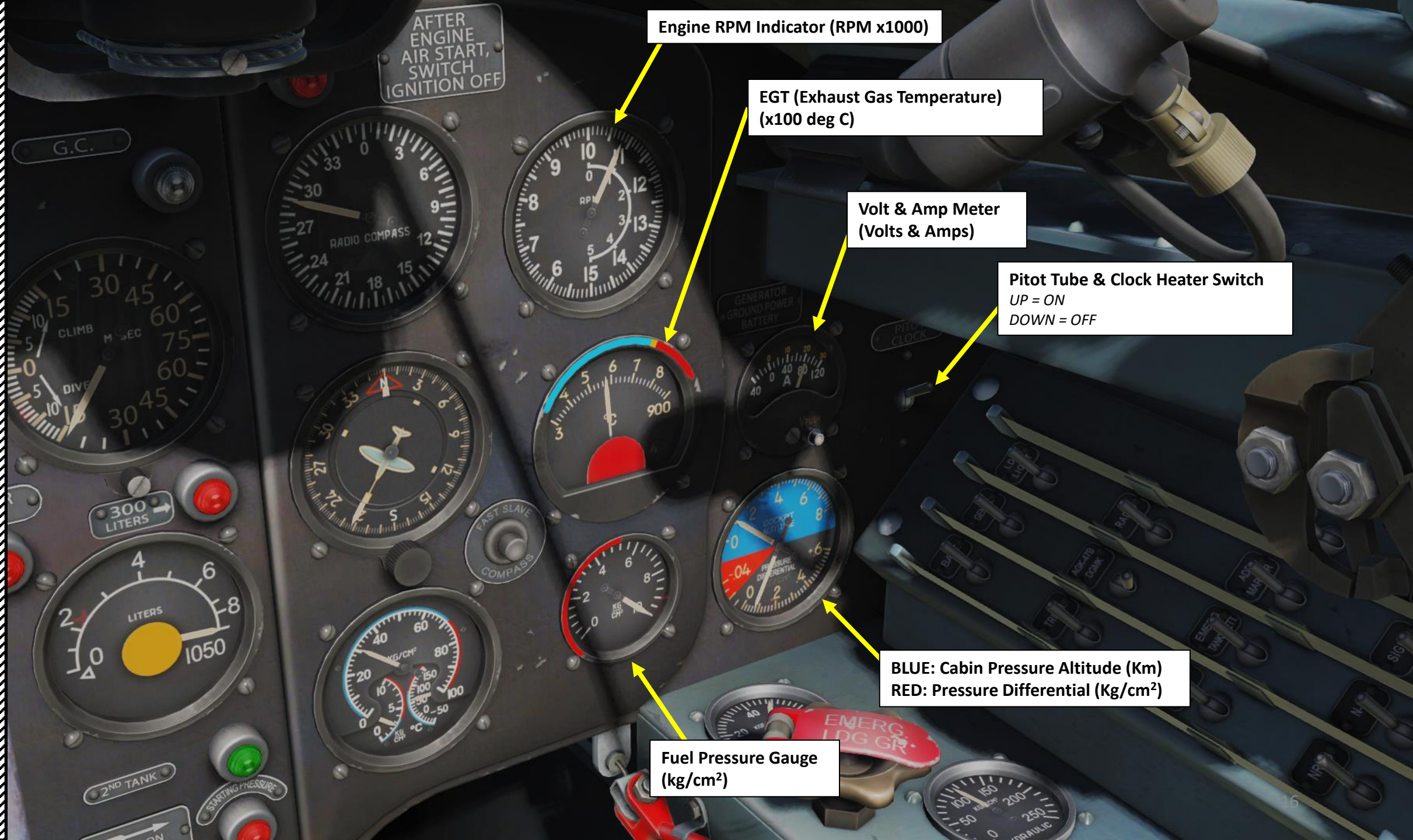

K-7 ARK-5 Radio-Compass Control Panel
See tutorial for radio navigation in PART 12
Emergency System Filling Valve
RSI-6K HF Radio Transmitter Mode Switch
UP= FORCED
DOWN = NORMAL
Left UV Illumination Rheostat
Right UV Illumination Rheostat

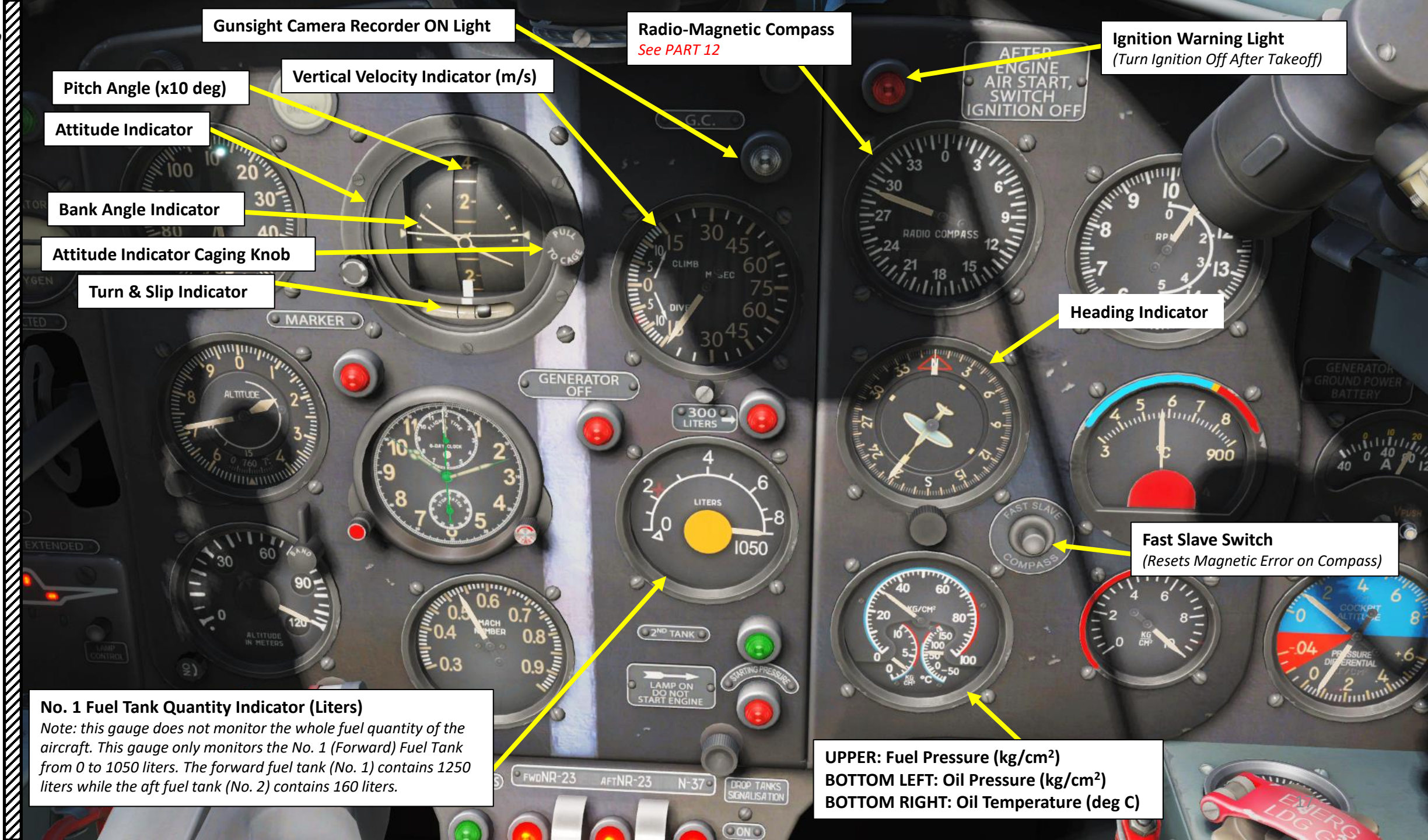
PART 2 – COCKPIT & GAUGES

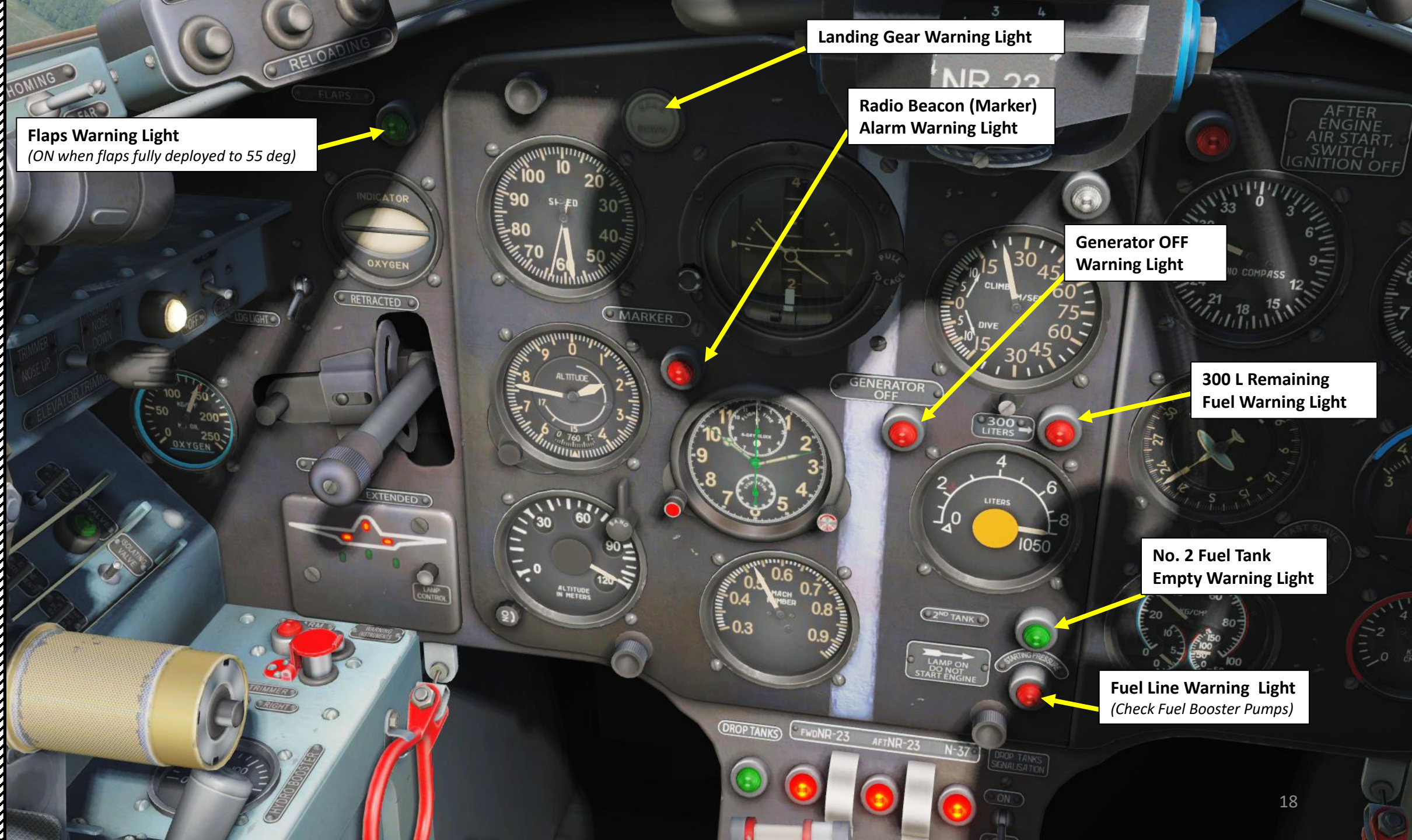


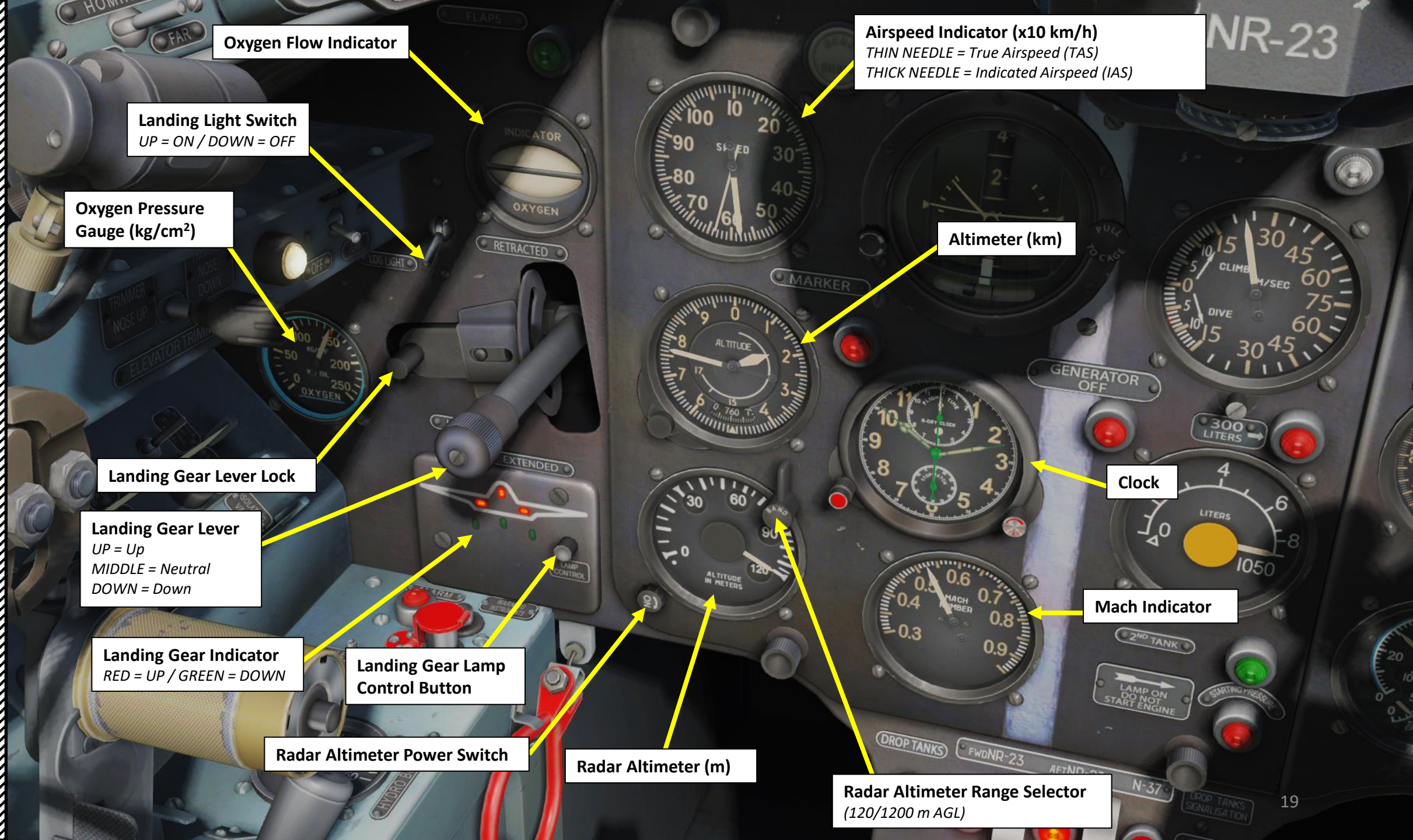

Landing Light Circuit Breaker
RSI-6K HF Radio Power Switch
ARK-5 Radio-Navigation Power Switch
Radar Altimeter Power Switch
DC Generator Switch
Battery/Accumulator Switch
Gun Camera Power Switch
AGK-47B Attitude Indicator & DGMK Radio-Magnetic Indicator Power Switch
ASP-3H Gunsight Power Switch
Trim Electrical Power Switch
Emergency Ordnance Jettison Switch
Bombs Power Switch
NR-23 (23 mm) Cannon Power Switch
N-37 (37 mm) Cannon Power Switch

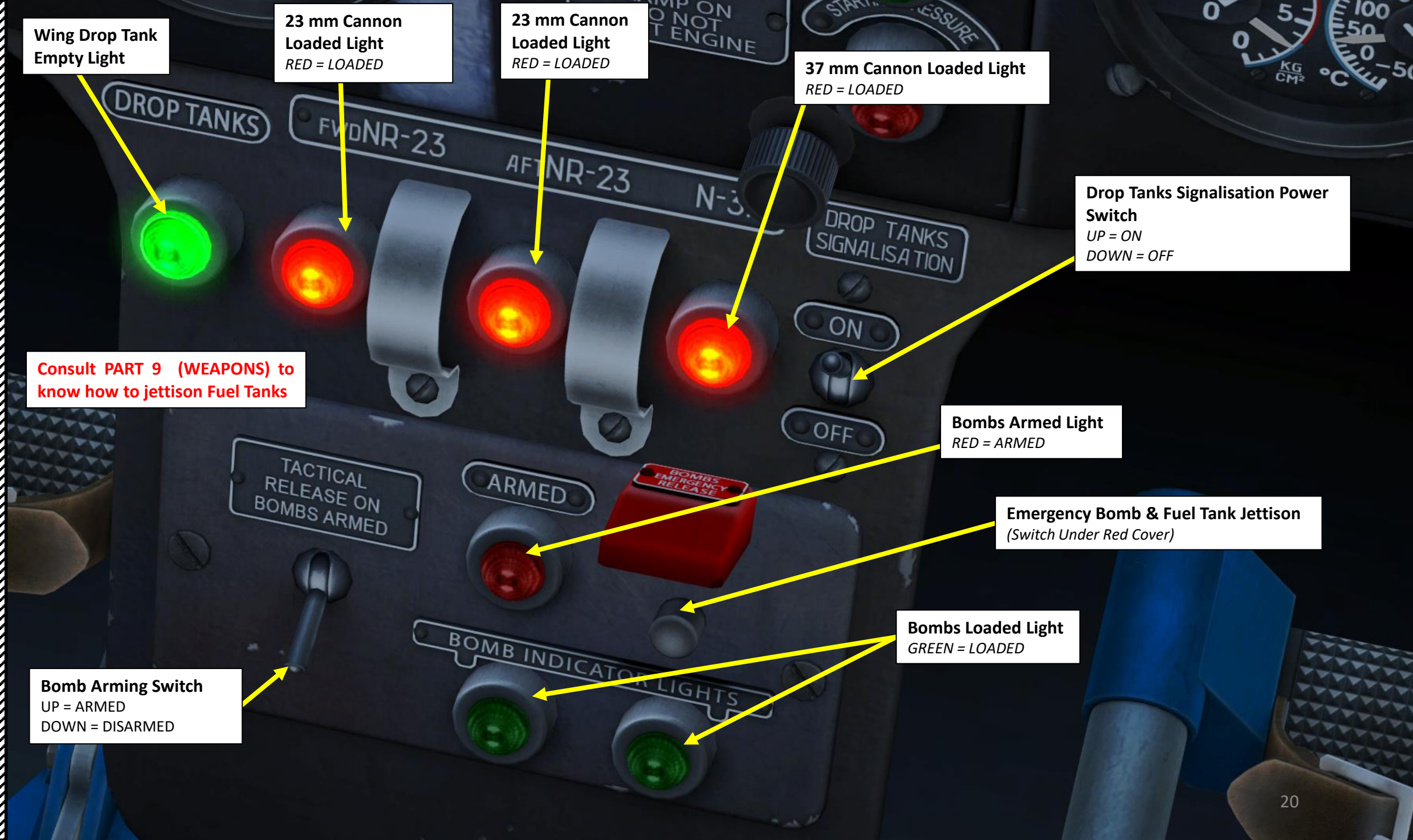

Utility Light
GYRO
FIXED
BRIGHT
NR-23
MARKER
GENERATOR
OFF


AFTER ENGINE AIR START, SWITCH IGNITION OFF
RADIO COMPASS
CLIMB
DIVE
300 LITERS
LITERS
1050
2ND TANK
STARTING PRESSURE
FAST SLAVE COMPASS
EMERG LDG GR
Engine RPM Indicator (RPM x1000)
EGT (Exhaust Gas Temperature) (x100 deg C)
Volt & Amp Meter (Volts & Amps)
Pitot Tube & Clock Heater Switch
UP = ON
DOWN = OFF
BLUE: Cabin Pressure Altitude (Km)
RED: Pressure Differential (Kg/cm²)
Fuel Pressure Gauge (kg/cm²)


Gunsight Camera Recorder ON Light
Radio-Magnetic Compass
See PART 12
Ignition Warning Light
(Turn Ignition Off After Takeoff)
Pitch Angle (x10 deg)
Vertical Velocity Indicator (m/s)
Attitude Indicator
Bank Angle Indicator
Attitude Indicator Caging Knob
Turn & Slip Indicator
Heading Indicator
Fast Slave Switch
(Resets Magnetic Error on Compass)
No. 1 Fuel Tank Quantity Indicator (Liters)
Note: this gauge does not monitor the whole fuel quantity of the aircraft. This gauge only monitors the No. 1 (Forward) Fuel Tank from 0 to 1050 liters. The forward fuel tank (No. 1) contains 1250 liters while the aft fuel tank (No. 2) contains 160 liters.
UPPER: Fuel Pressure (kg/cm²)
BOTTOM LEFT: Oil Pressure (kg/cm²)
BOTTOM RIGHT: Oil Temperature (deg C)
AFTER ENGINE AIR START, SWITCH IGNITION OFF
RADIO COMPASS
CLIMB
ALTITUDE
MARKER
GENERATOR OFF
300 LITERS
LITERS
1050
2ND TANK
LAMP ON DO NOT START ENGINE
FWD NR-23
AFT NR-23
N-37
DROP TANKS SIGNALISATION
FAST SLAVE COMPASS
GENERATOR GROUND POWER BATTERY
PULL TO CAGE


Landing Gear Warning Light
Radio Beacon (Marker) Alarm Warning Light
Flaps Warning Light
(ON when flaps fully deployed to 55 deg)
Generator OFF Warning Light
300 L Remaining Fuel Warning Light
No. 2 Fuel Tank Empty Warning Light
Fuel Line Warning Light
(Check Fuel Booster Pumps)
RELOADING
HOMING
FLAPS
INDICATOR
OXYGEN
RETRACTED
MARKER
EXTENDED
GENERATOR OFF
300 LITERS
LITERS
2ND TANK
LAMP ON DO NOT START ENGINE
DROP TANKS
FWD NR-23
AFT NR-23
N-37
DROP TANKS SIGNALISATION
ON
AFTER ENGINE AIR START, SWITCH IGNITION OFF
ALTITUDE
SPEED
CLIMB
DIVE
MACH NUMBER
ALTITUDE IN METERS
HYDRO BOOSTER
TRIMMER
RIGHT
LAMP CONTROL
ELEVATOR TRIMMER
NOSE UP
NOSE DOWN
LDG LIGHT
OFF


Oxygen Flow Indicator
Airspeed Indicator (x10 km/h)
THIN NEEDLE = True Airspeed (TAS)
THICK NEEDLE = Indicated Airspeed (IAS)
Landing Light Switch
UP = ON / DOWN = OFF
Oxygen Pressure Gauge (kg/cm²)
Altimeter (km)
Landing Gear Lever Lock
Clock
Landing Gear Lever
UP = Up
MIDDLE = Neutral
DOWN = Down
Mach Indicator
Landing Gear Indicator
RED = UP / GREEN = DOWN
Landing Gear Lamp Control Button
Radar Altimeter Power Switch
Radar Altimeter (m)
Radar Altimeter Range Selector
(120/1200 m AGL)



Wing Drop Tank Empty Light

23 mm Cannon Loaded Light
RED = LOADED

23 mm Cannon Loaded Light
RED = LOADED

37 mm Cannon Loaded Light
RED = LOADED

Drop Tanks Signalisation Power Switch
UP = ON
DOWN = OFF

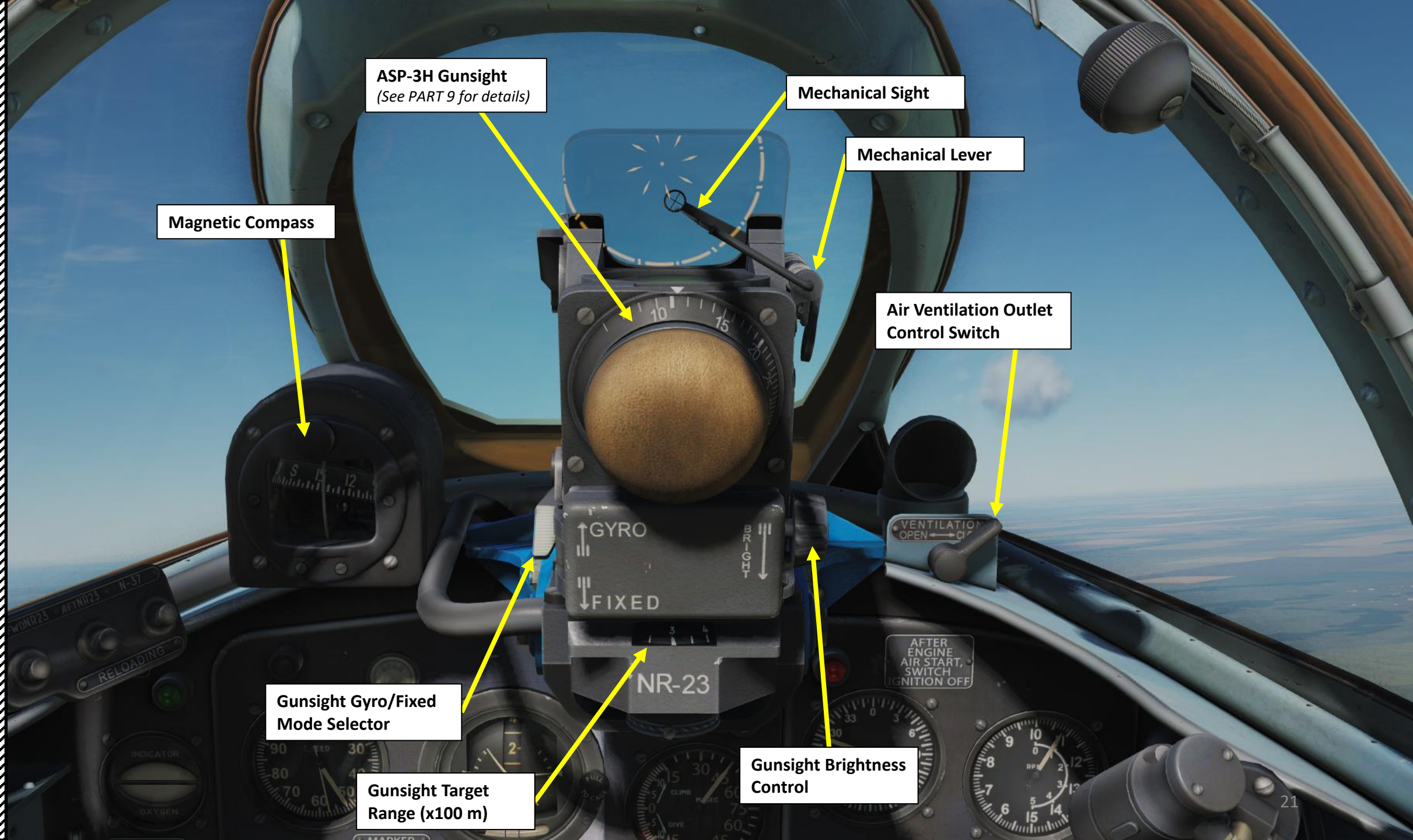
Consult PART 9 (WEAPONS) to know how to jettison Fuel Tanks

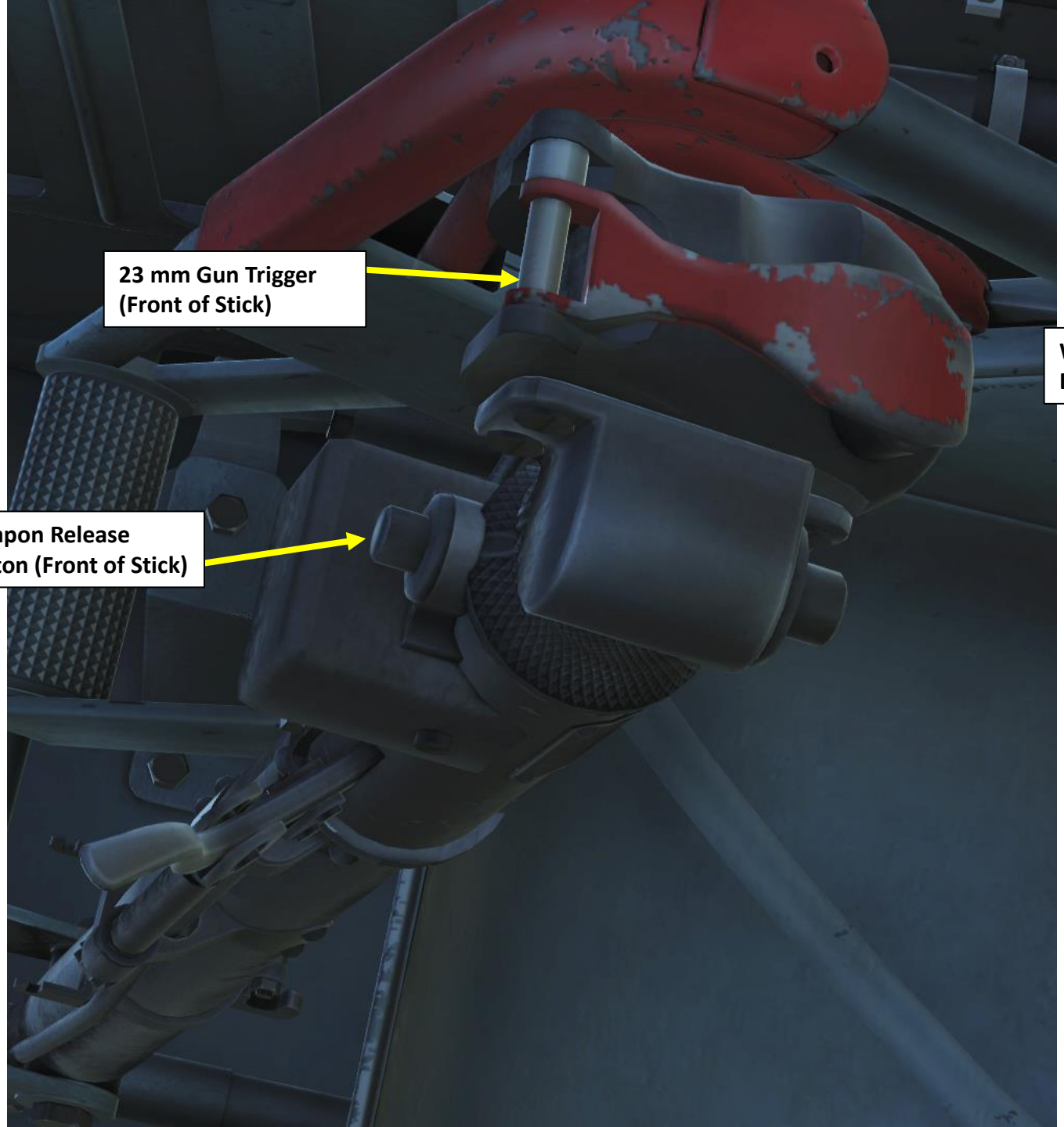
Bombs Armed Light
RED = ARMED

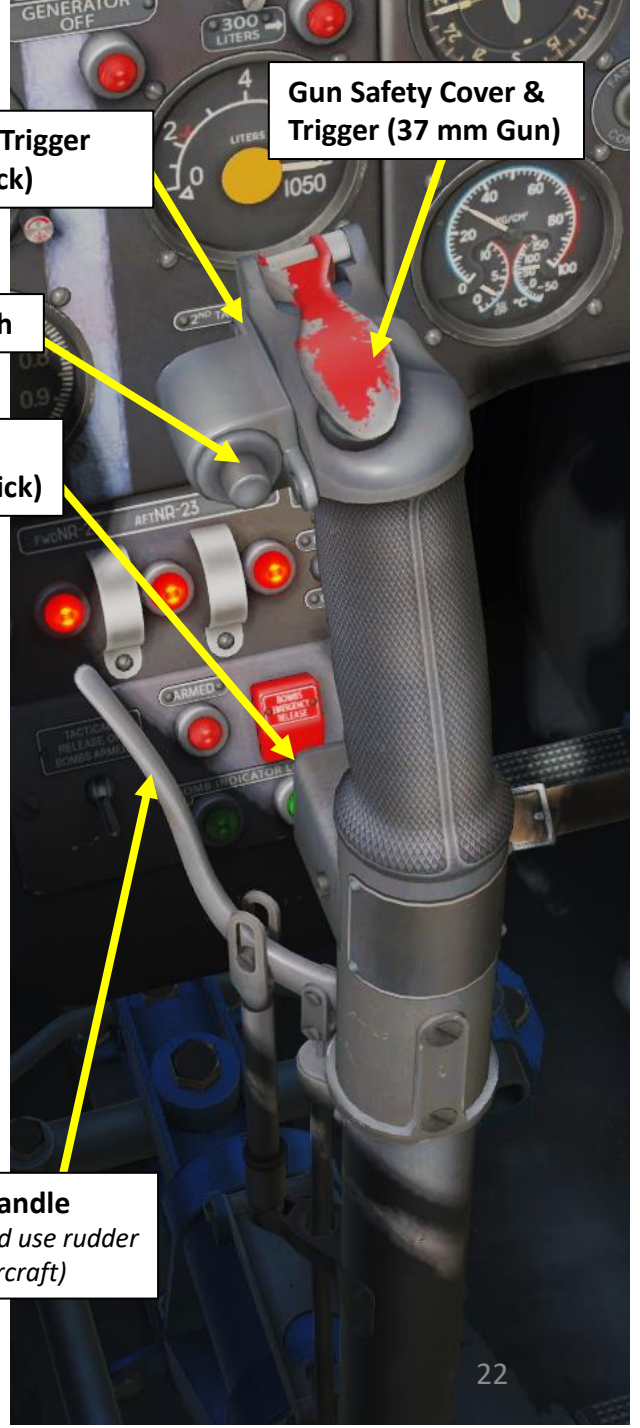
Emergency Bomb & Fuel Tank Jettison
(Switch Under Red Cover)

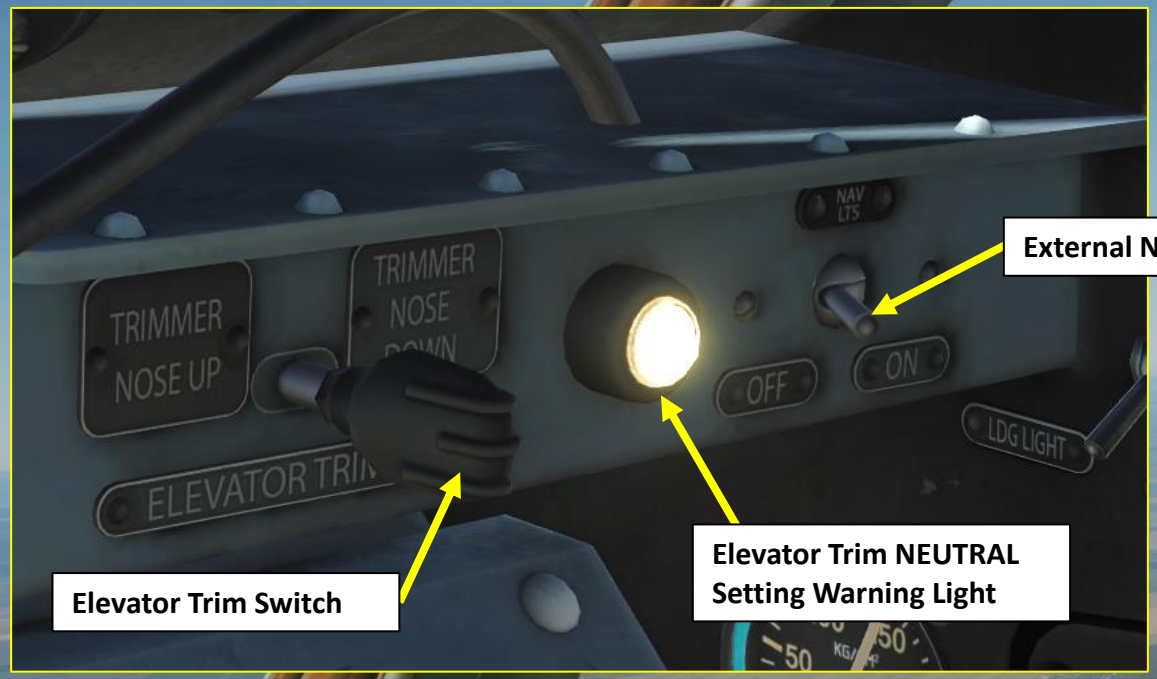
Bombs Loaded Light
GREEN = LOADED

Bomb Arming Switch
UP = ARMED
DOWN = DISARMED


ASP-3H Gunsight
(See PART 9 for details)
Mechanical Sight
Mechanical Lever
Magnetic Compass
Air Ventilation Outlet Control Switch
Gunsight Gyro/Fixed Mode Selector
Gunsight Target Range (x100 m)
Gunsight Brightness Control
GYRO
FIXED
BRIGHT
NR-23
VENTILATION
OPEN
AFTER ENGINE AIR START, SWITCH IGNITION OFF
RELOADING


23 mm Gun Trigger (Front of Stick)
Weapon Release Button (Front of Stick)


23 mm Gun Trigger (Front of Stick)
Gun Safety Cover & Trigger (37 mm Gun)
Airbrake Switch
Weapon Release Button (Front of Stick)
Wheel Brake Handle
(Hold to brake and use rudder pedals to steer aircraft)



External Navigation Lights Switch

Elevator Trim Switch

Elevator Trim NEUTRAL Setting Warning Light

Note
Russian cannons of this era use a "pyrotechnical" reload system, which means that a cassette equipped with a pyrocartridge will detonate a charge to "reload" a gun. The MiG-21bis, MiG-19 and the L-39ZA use a similar system.

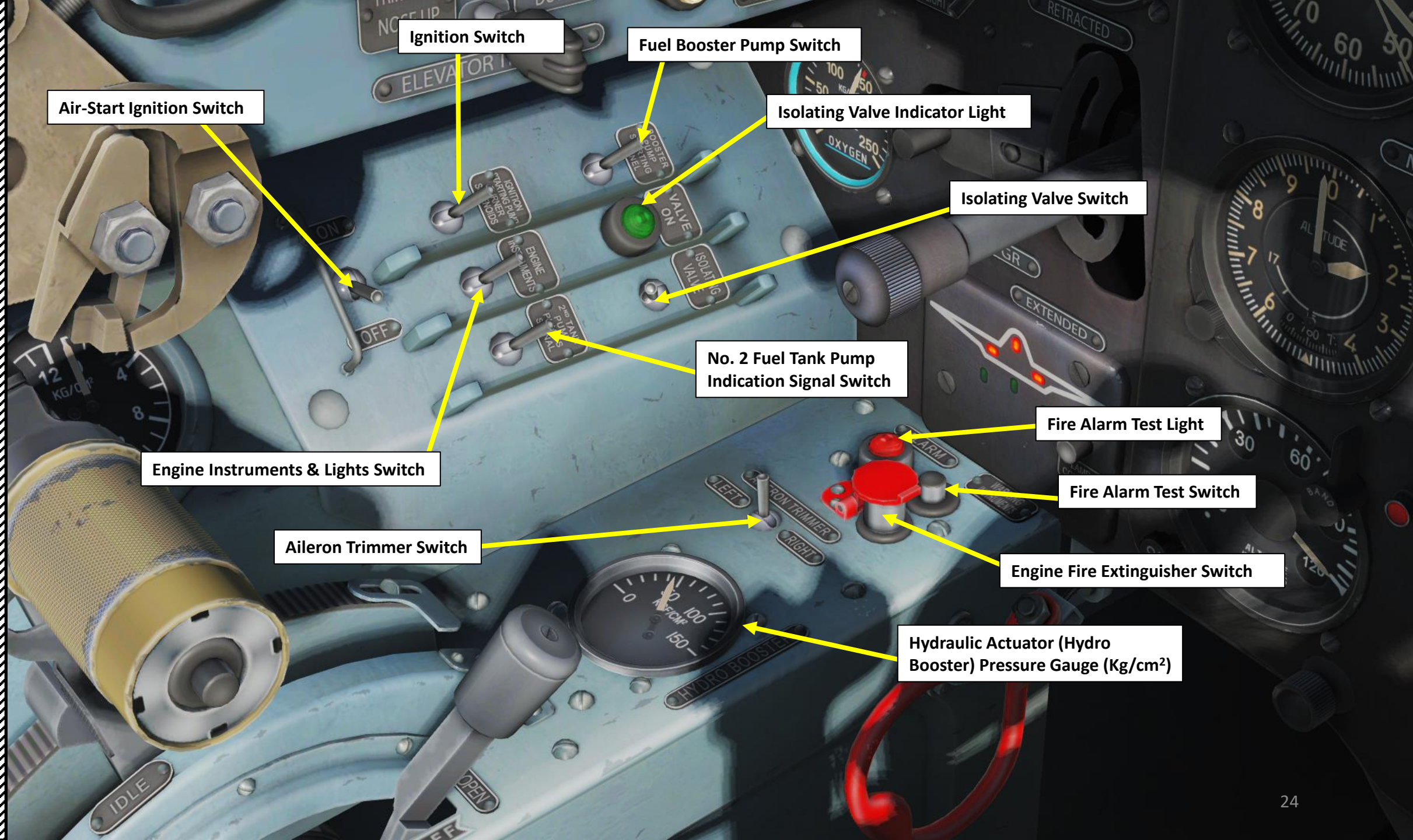
37 mm Cannon Reload Button
(Hold for 3-4 seconds)

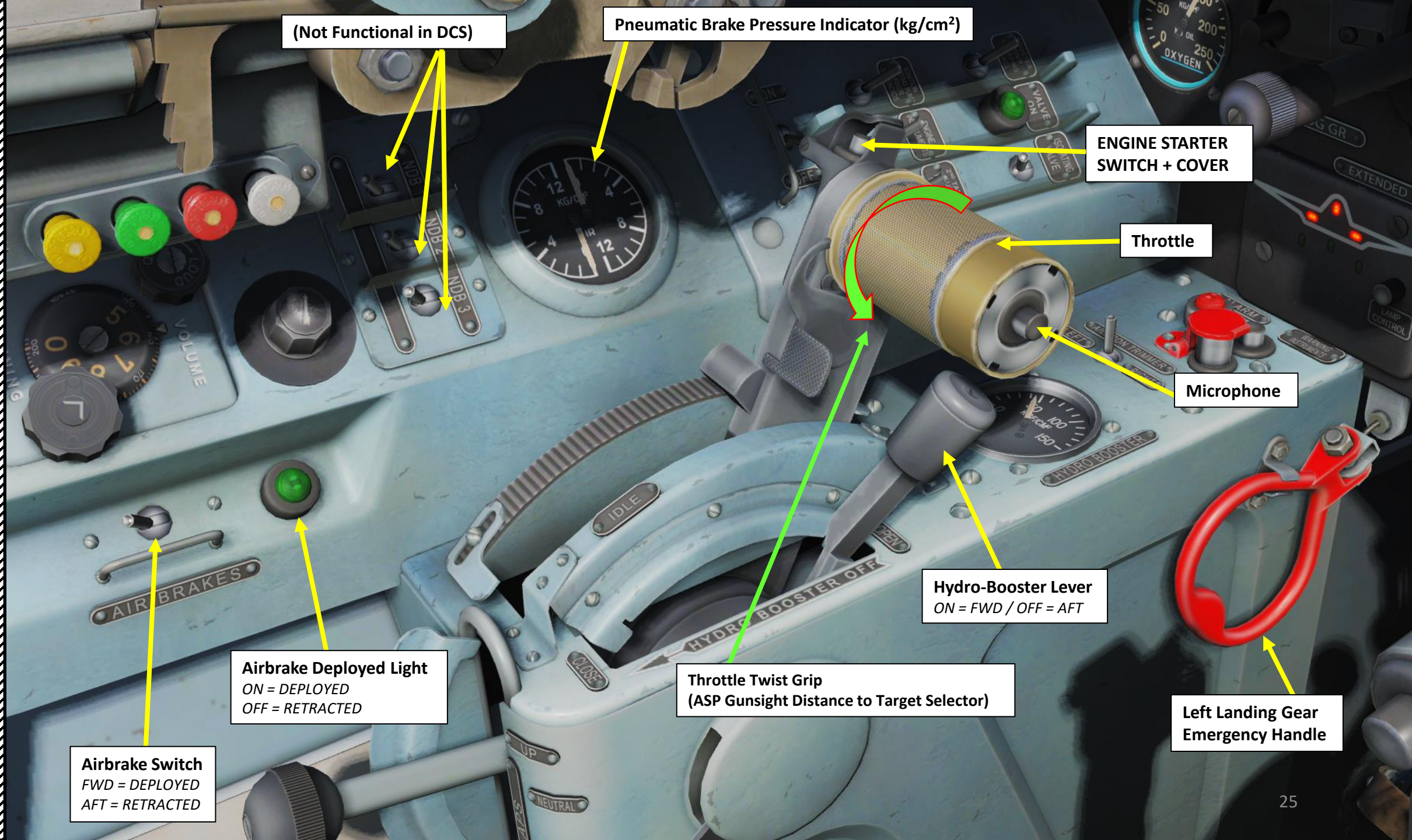
ARK-5 Radio Navigation System NEAR/FAR Frequency Homing Selector Switch

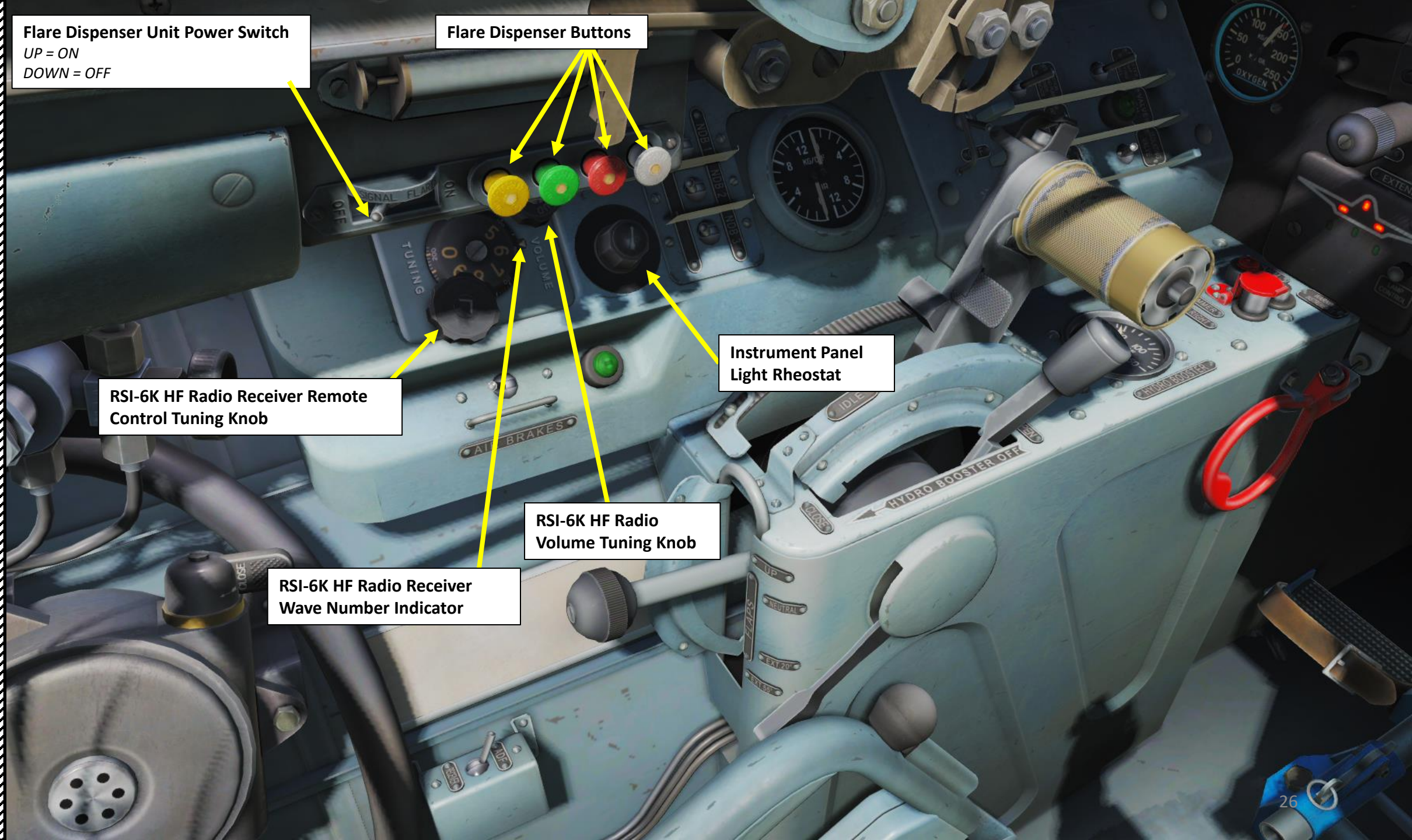
23 mm Cannon #2 Reload Button
(Hold for 3-4 seconds)

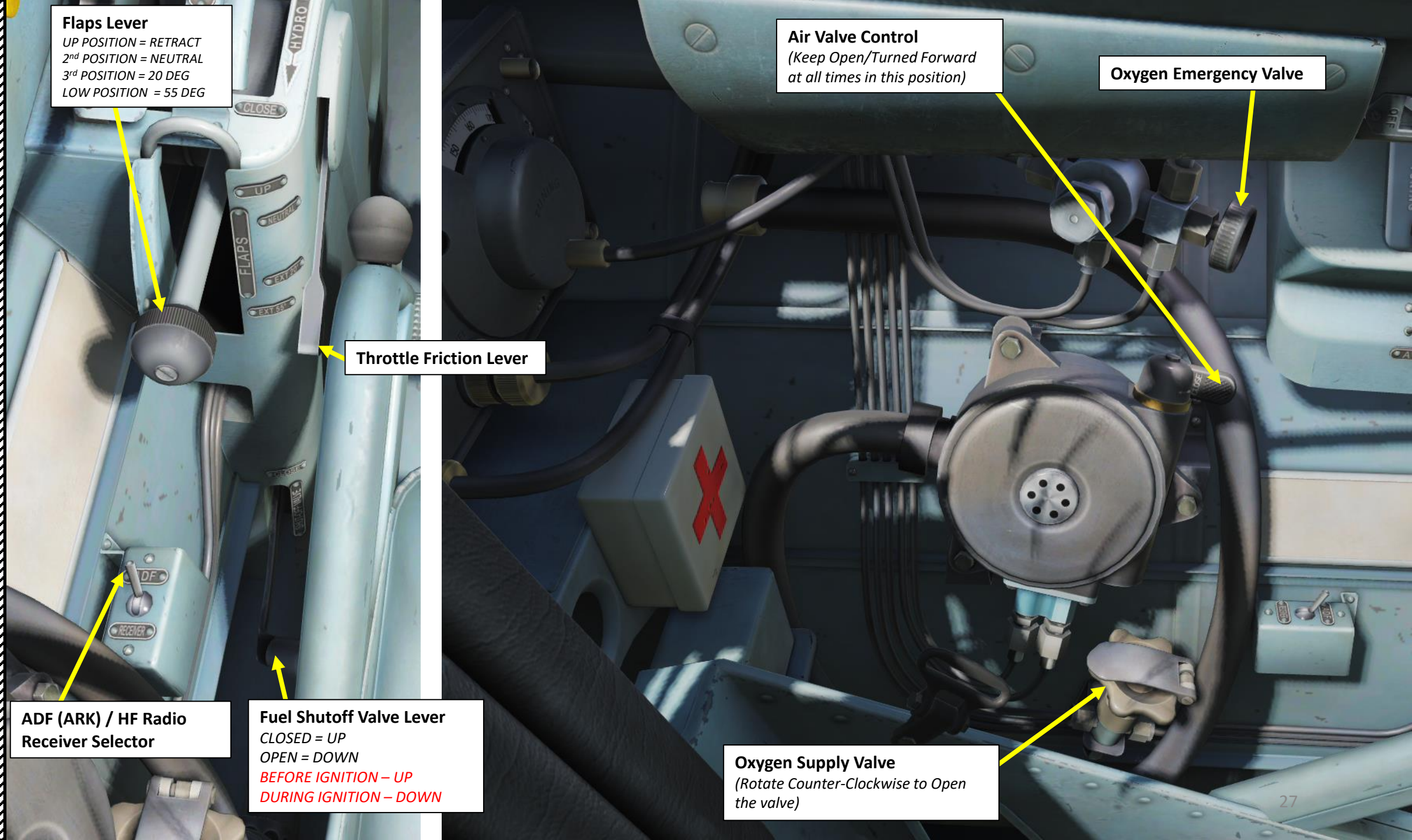
23 mm Cannon #1 Reload Button
(Hold for 3-4 seconds)

Cockpit Utility Light


Ignition Switch
Fuel Booster Pump Switch
Air-Start Ignition Switch
Isolating Valve Indicator Light
Isolating Valve Switch
No. 2 Fuel Tank Pump Indication Signal Switch
Fire Alarm Test Light
Engine Instruments & Lights Switch
Fire Alarm Test Switch
Aileron Trimmer Switch
Engine Fire Extinguisher Switch
Hydraulic Actuator (Hydro Booster) Pressure Gauge (Kg/cm²)


(Not Functional in DCS)
Pneumatic Brake Pressure Indicator (kg/cm²)
ENGINE STARTER SWITCH + COVER
Throttle
Microphone
Hydro-Booster Lever
ON = FWD / OFF = AFT
Throttle Twist Grip
(ASP Gunsight Distance to Target Selector)
Left Landing Gear Emergency Handle
Airbrake Deployed Light
ON = DEPLOYED
OFF = RETRACTED
Airbrake Switch
FWD = DEPLOYED
AFT = RETRACTED


Flare Dispenser Unit Power Switch
UP = ON
DOWN = OFF
Flare Dispenser Buttons
Instrument Panel Light Rheostat
RSI-6K HF Radio Receiver Remote Control Tuning Knob
RSI-6K HF Radio Volume Tuning Knob
RSI-6K HF Radio Receiver Wave Number Indicator



Flaps Lever
UP POSITION = RETRACT
2nd POSITION = NEUTRAL
3rd POSITION = 20 DEG
LOW POSITION = 55 DEG

Throttle Friction Lever

Air Valve Control
(Keep Open/Turned Forward at all times in this position)

Oxygen Emergency Valve

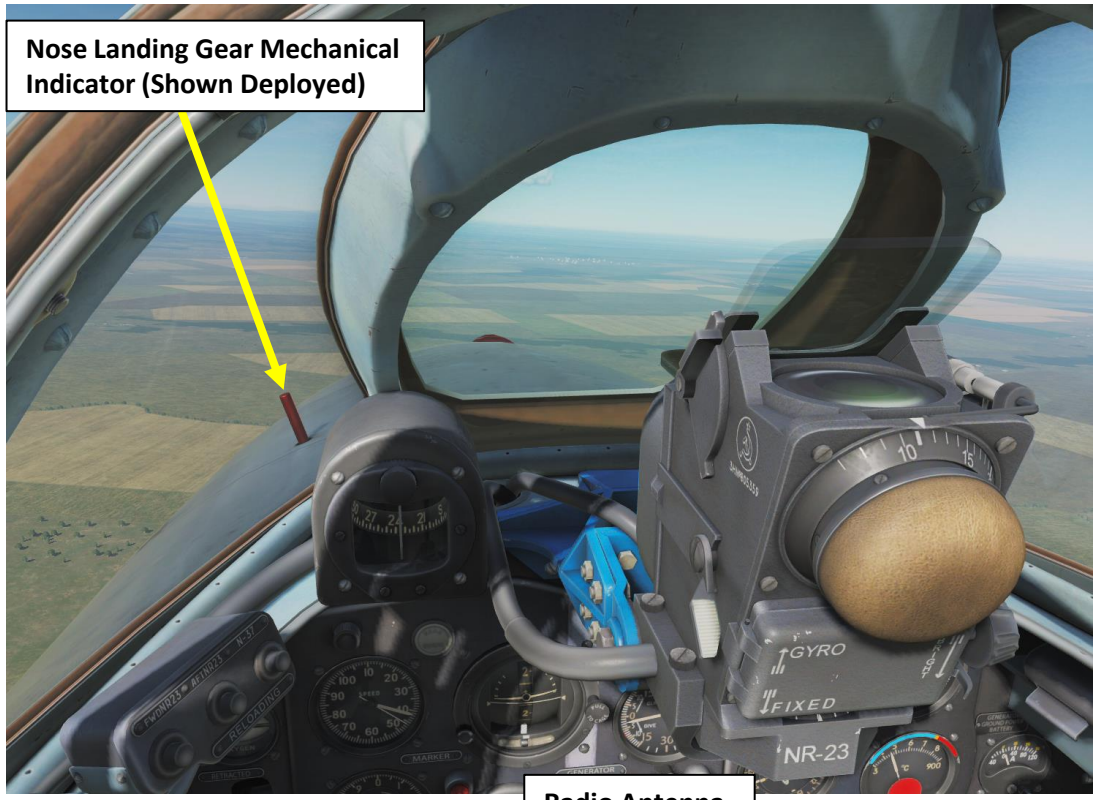
ADF (ARK) / HF Radio Receiver Selector

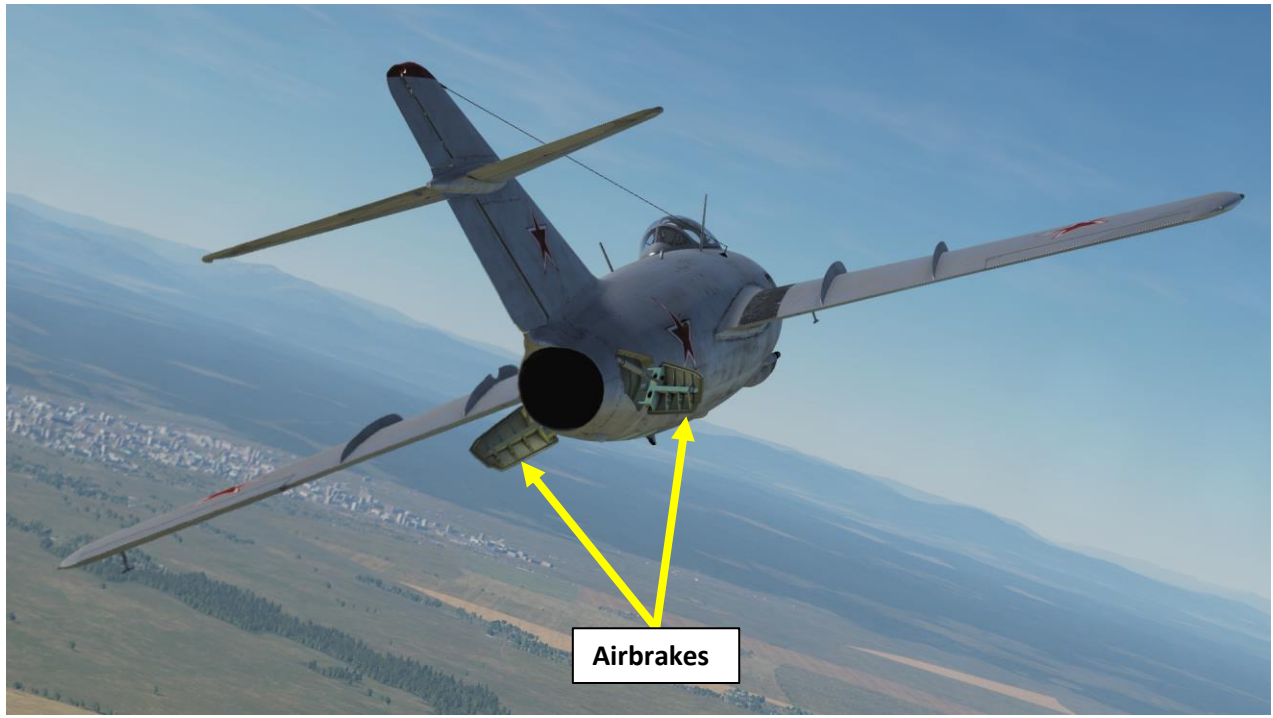
Fuel Shutoff Valve Lever
CLOSED = UP
OPEN = DOWN
BEFORE IGNITION – UP
DURING IGNITION – DOWN

Oxygen Supply Valve
(Rotate Counter-Clockwise to Open the valve)

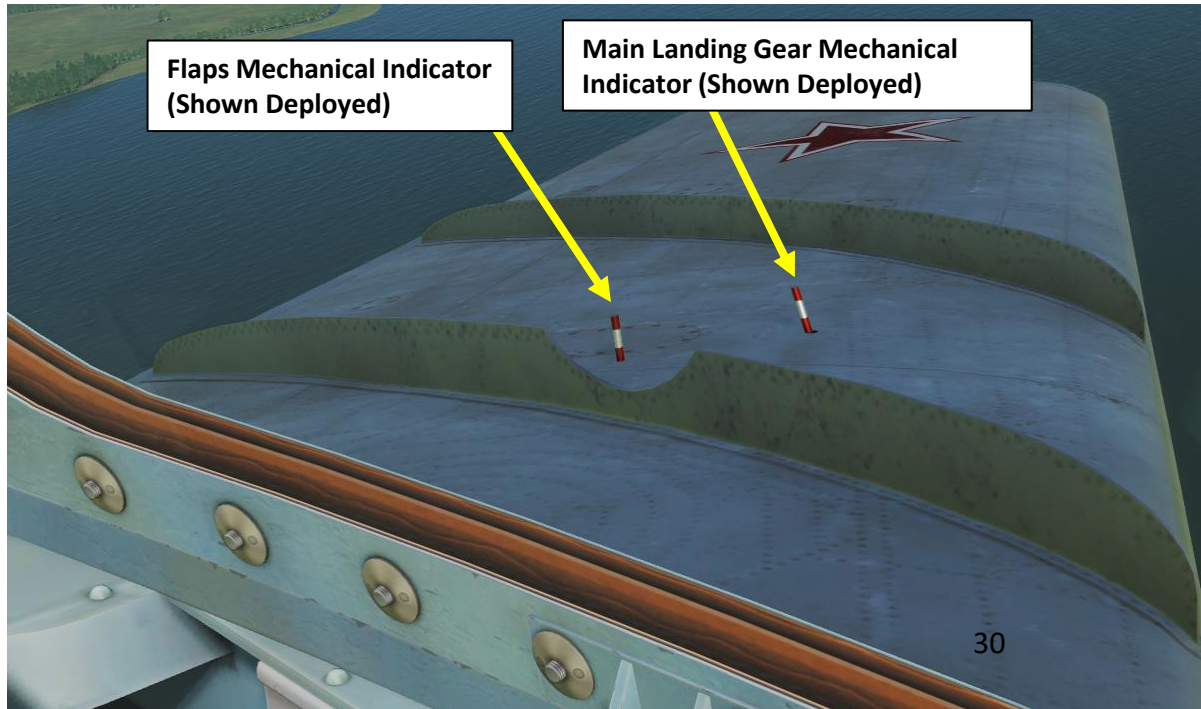

RSI-6K HF Radio Receiver
“WAVE” Number Indicator
See PART 11 for more details
SENSITIVITY CONTROL
POWER
TUNING


Flare Dispenser Unit

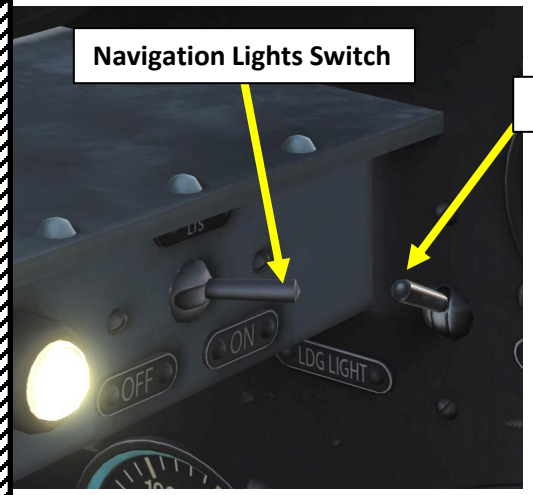

Nose Landing Gear Mechanical Indicator (Shown Deployed)
GYRO
FIXED
NR-23

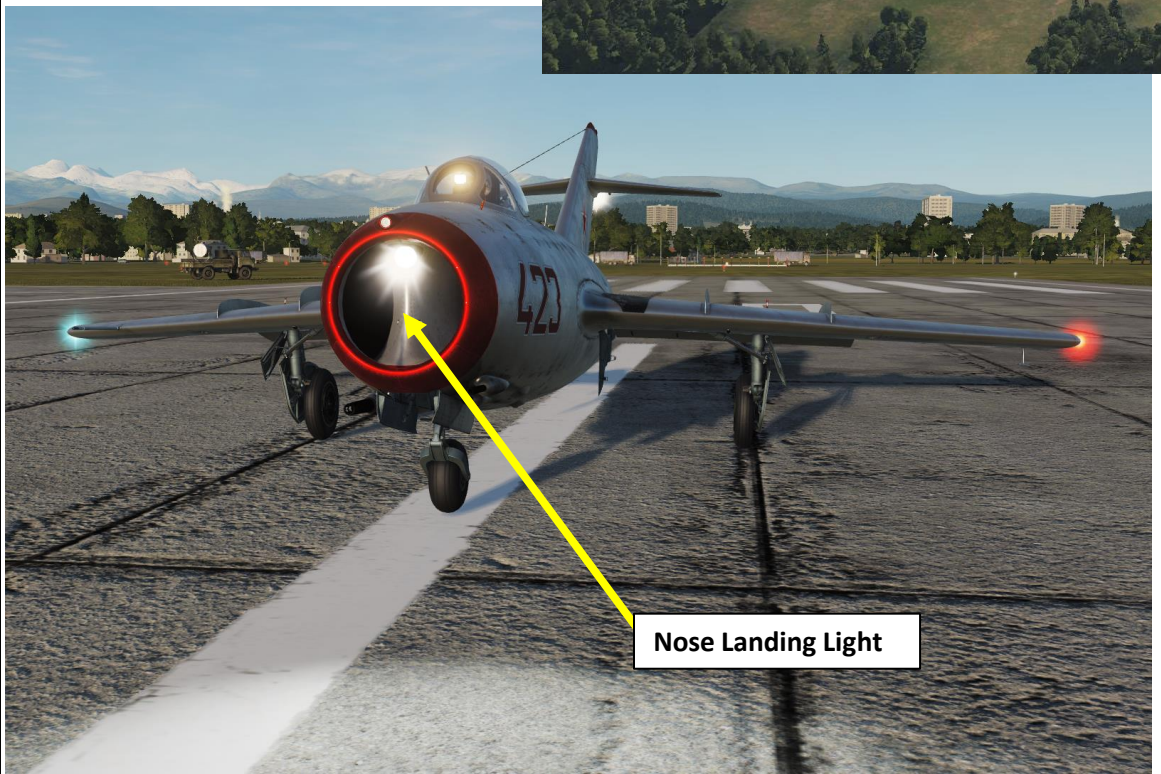

Airbrakes

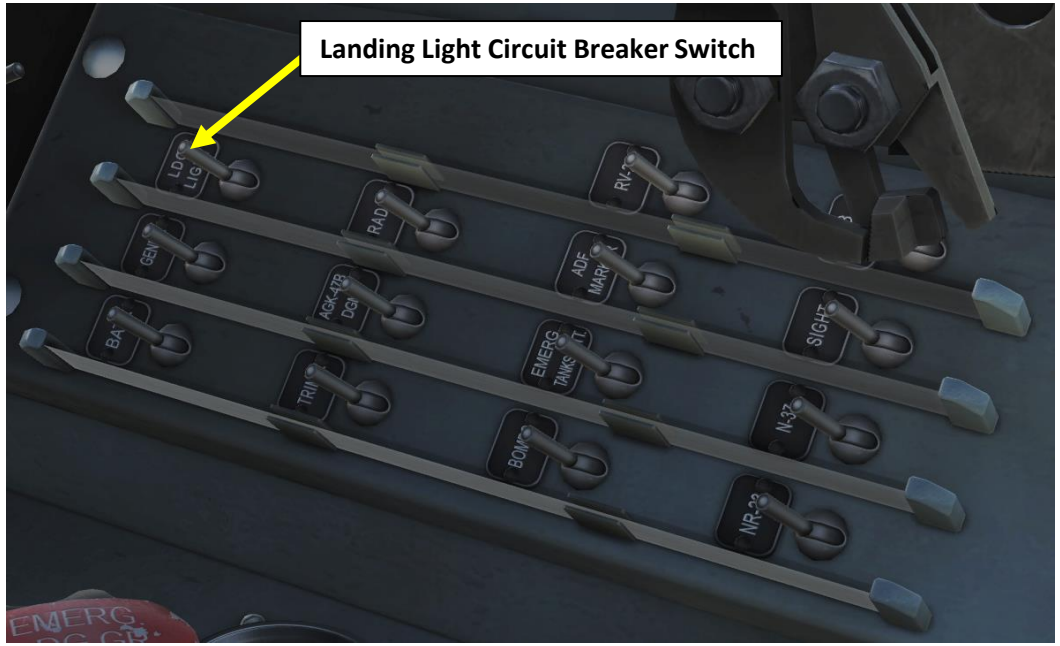

Radio Antenna
Main Landing Gear Mechanical Indicator (Shown Deployed)


Flaps Mechanical Indicator (Shown Deployed)
Main Landing Gear Mechanical Indicator (Shown Deployed)

PART 2 – COCKPIT & GAUGES







Main Pitot Probe (Pitot-Static)

Aircraft of this generation had pretty long pitot tubes in order to avoid the aerodynamic anomalies caused by the air shockwave in front of the wing, which would give erroneous/erratic readings at high speeds. This tube includes both the Pitot Tube (total air pressure) and the static port (static air pressure).

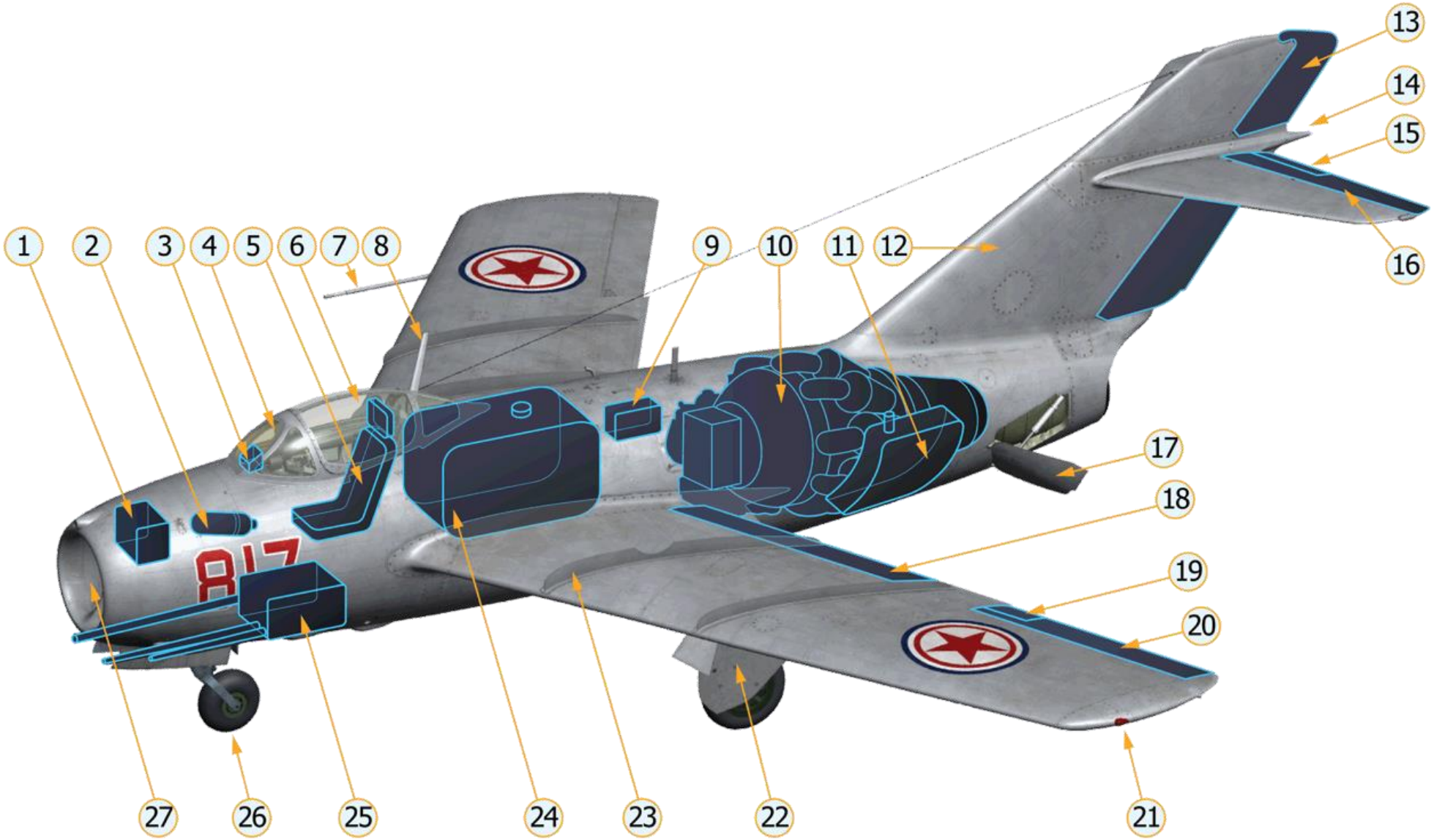
HOW TO READ THE ALTIMETER

1) Knob to set QFE (Barometric) Altimeter Setting
2) Altitude in 100 meters
3) Altitude scale from 10 to 17 kilometers
4) QFE (Barometric) Altimeter setting (mm Hg)
5) Altitude in kilometers
6) Altitude scale from 0 to 10 kilometers

HOW TO READ THE RADAR ALTIMETER

The radar altimeter gives you the height above the ground in meters. It has two measuring ranges: from 0 to 120 meters, and from 100 to 1200 meters.

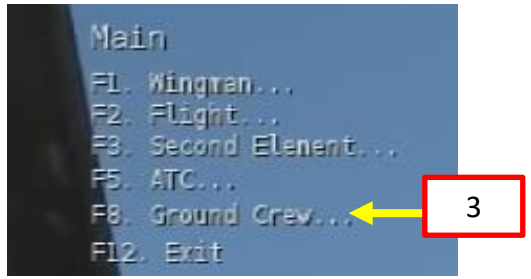
1) PRB-46 Radar Altimeter Power Switch
2) Height Scale Indicator
3) Height Range Selector (0-120 m vs 120-1200 m)

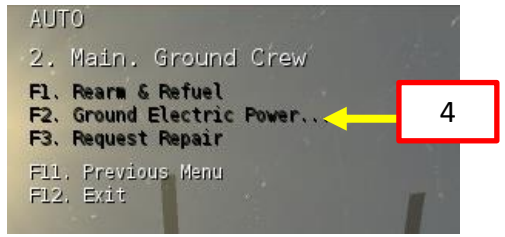


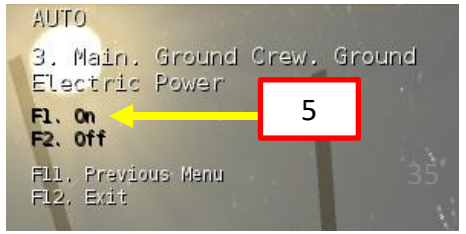
1. Battery
2. Oxygen bottles
3. ASP-3N automatic gunsight
4. Armoured windshield
5. Pilot's ejection seat
6. Sliding portion of the canopy
7. Pitot tube
8. Radio antenna
9. Hydraulic fluid tank
10. VK-1 engine and gearbox
11. Rear fuel tank
12. Vertical stabilizer
13. Rudder
14. Tail navigation light
15. Elevator trim tab
16. Elevator
17. Speed break
18. Flap
19. Aileron trim tab
20. Aileron
21. Left wingtip navigation light
22. Main landing gear
23. Wing fence
24. Forward fuel tank
25. Extendable armament undercarriage
26. Nose landing gear
27. Nose cone with headlight

PART 3 – START-UP

1. АККУМ / Battery/Accumulator Switch OFF (AFT)
2. ГЕНЕР / Generator Switch ON (FWD)
3. Select your ground crew by pressing “\” AND F8.
4. Select “GROUND ELECTRIC POWER” by pressing F2
5. Select “ON” by pressing F1 to turn on ground power



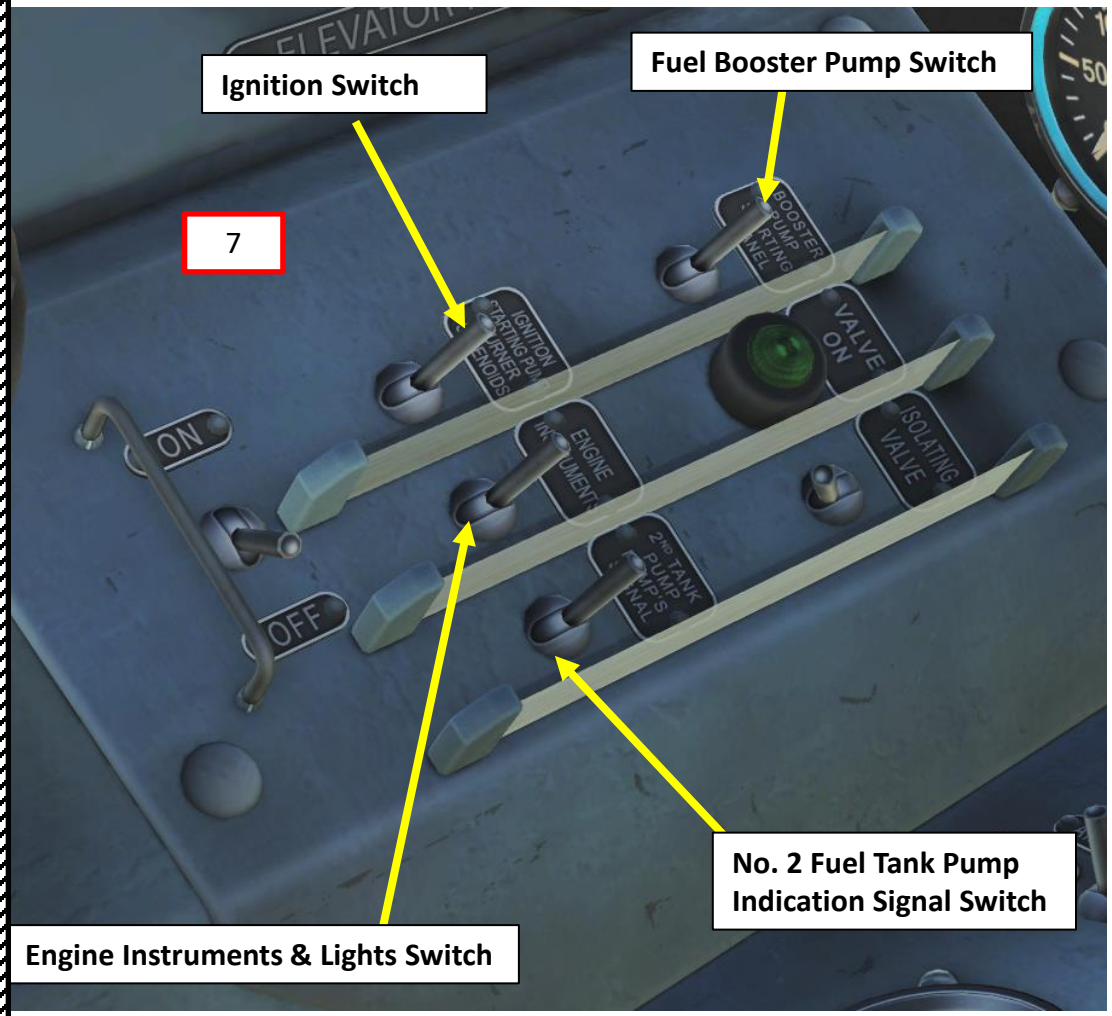


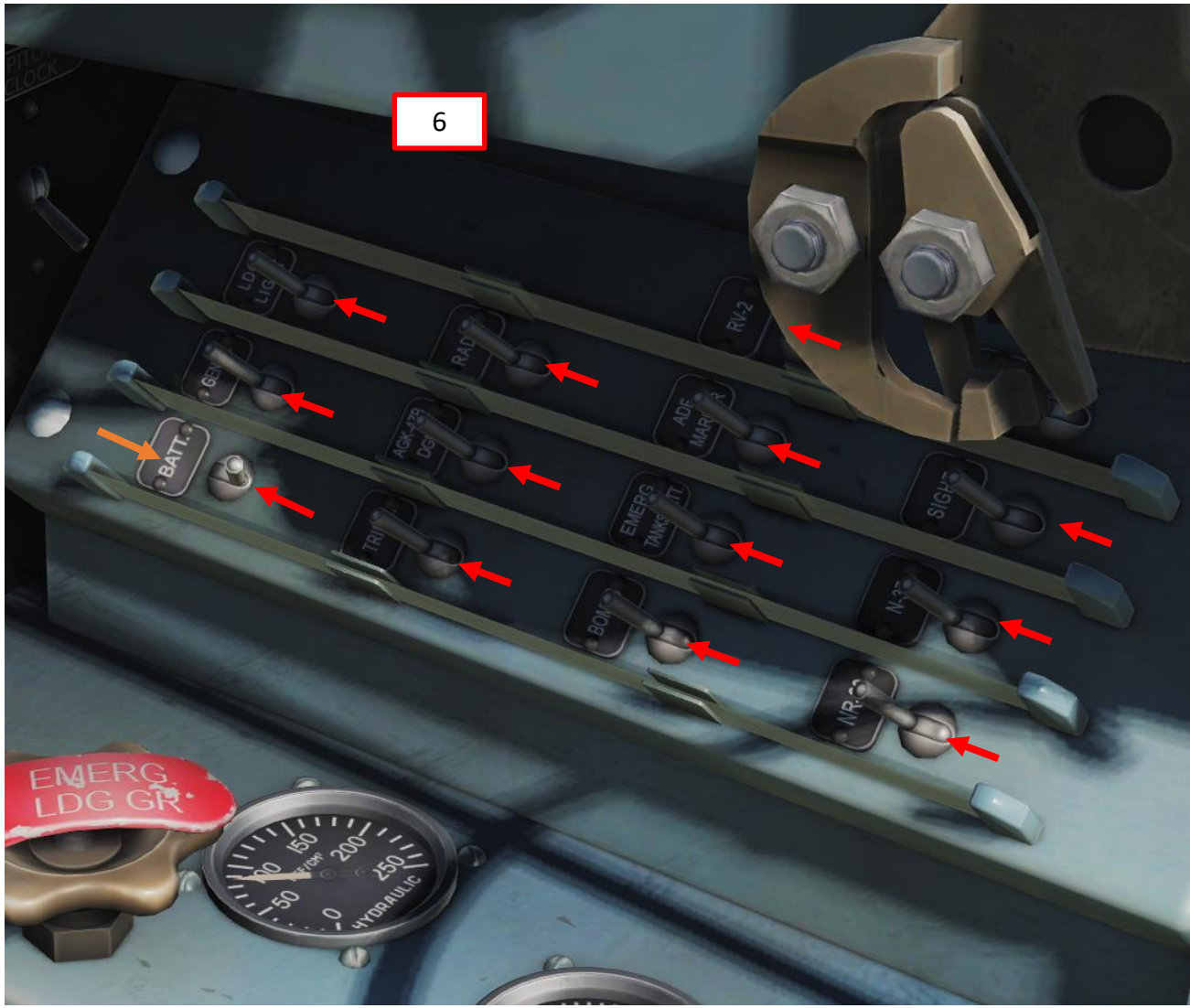


PART 3 – START-UP

6. Turn ON (FWD) all switches on the right circuit breaker panel except the Battery/Accumulator (АККУМ) Switch

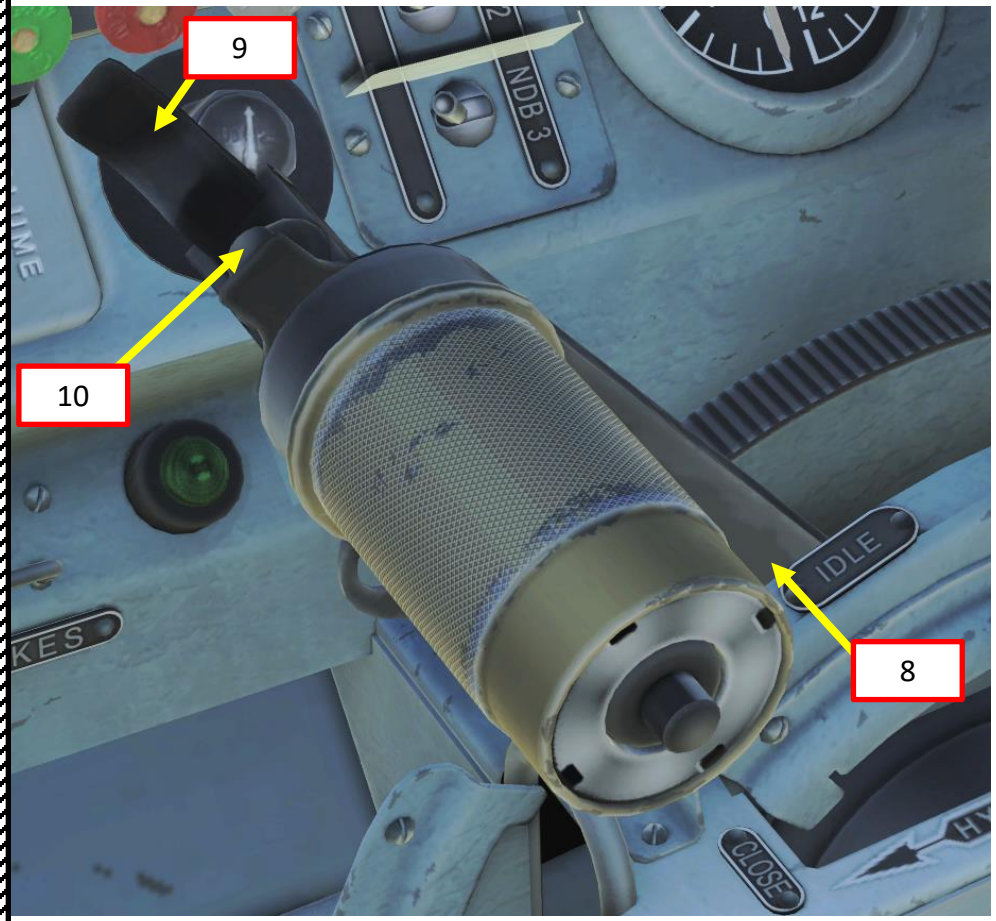
7. Turn ON (FWD) the Fuel Boost Pump Switch, the Ignition Switch, the Fuel Transfer Pump Switch and the Instruments/Lights Switch.

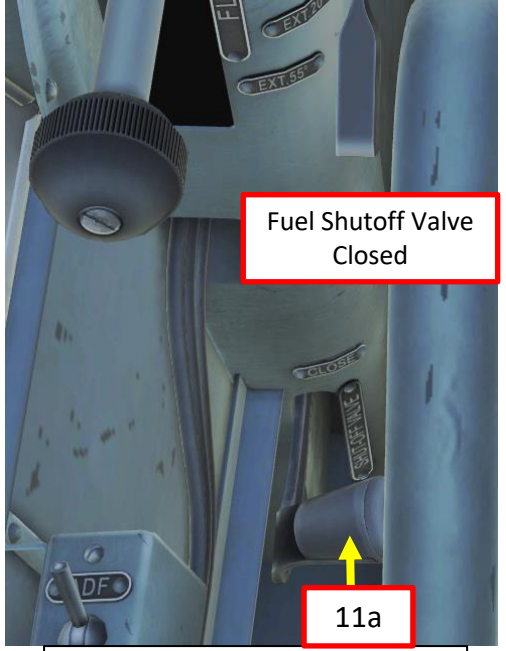




PART 3 – START-UP

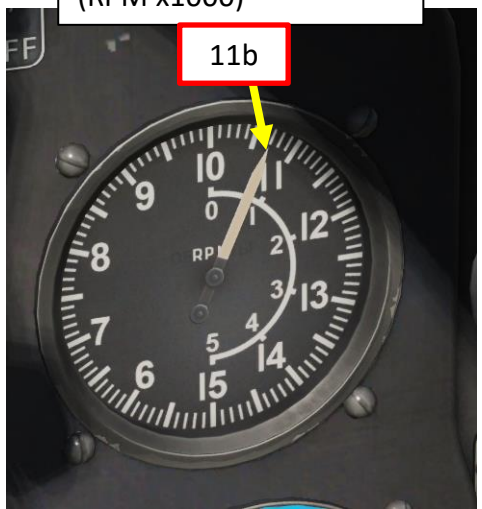
8. Set Throttle to IDLE (Fully Aft)
9. Lift the Starter safety cover (Left Click)
10. Hold the Starter Switch for 1-2 seconds to engage the Engine Starter
11. Open Fuel Shutoff Valve to 50 % (HOME key binding) when engine reaches 600 RPM. When engine reaches 900-1200 RPM, fully open the valve by either scrolling the mousewheel or holding RSHIFT+HOME. During this whole process, the Fuel Shutoff Valve should open up by setting the lever from UP to DOWN.





Fuel Shutoff Valve
CLOSED = UP
OPEN = DOWN
BEFORE IGNITION – UP
DURING IGNITION – DOWN

Engine RPM Indicator
(RPM x1000)



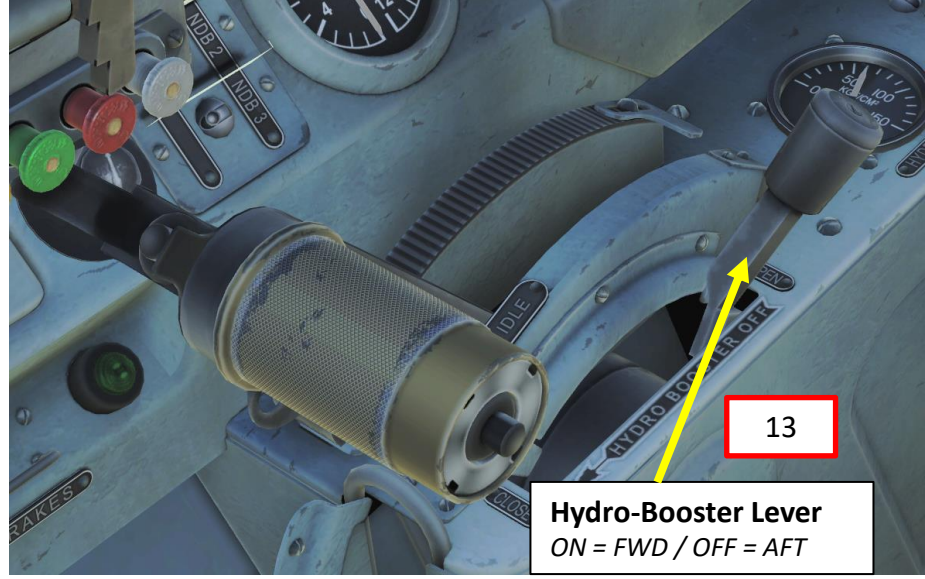
PART 3 – START-UP

12. Wait until IDLE engine RPM stabilizes around 2400-2600 RPM and EGT (Exhaust Gas Temperature) is no greater than 650 deg C.

13. Make sure Hydro-Booster Lever is ON (FWD)

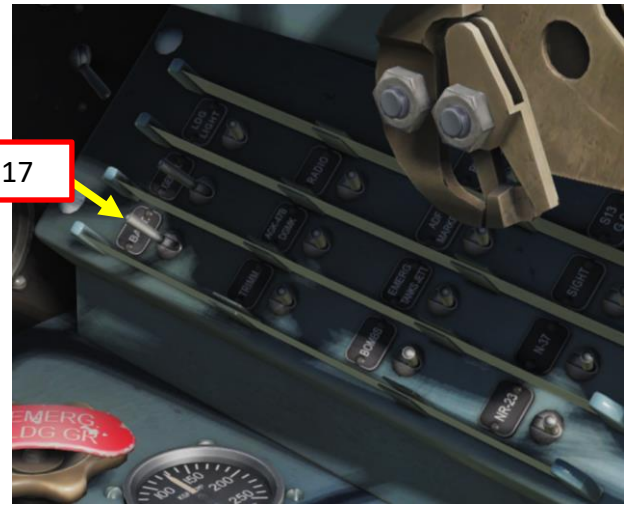
14. Increase Engine Power to 5000 RPM.

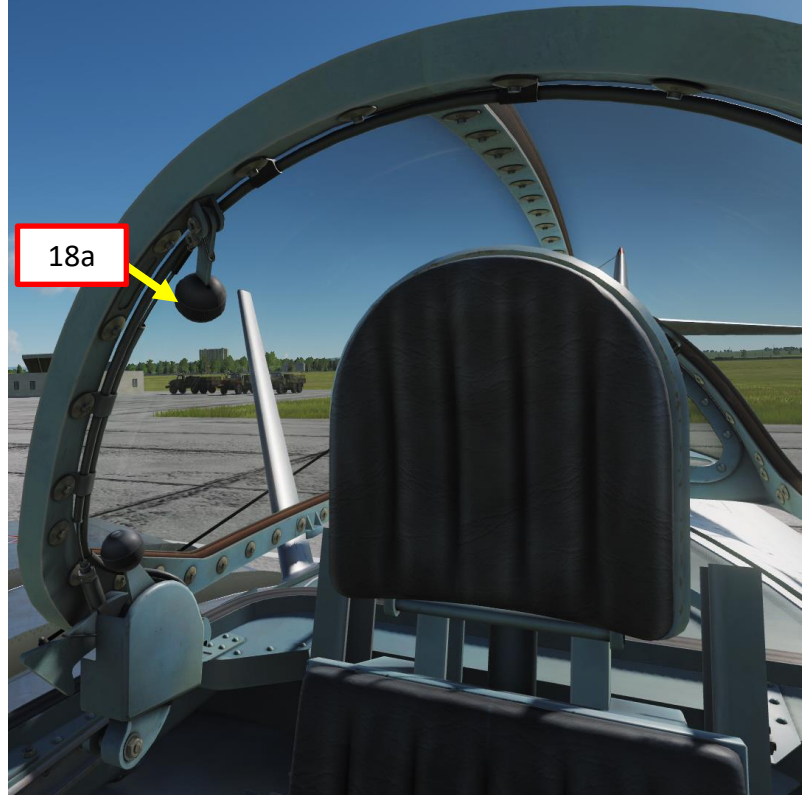
15. Make sure the “GENERATOR OFF” (ГЕНЕРАТОР ВЫКЛЮЧЕН) Warning Light extinguishes once engine reaches 4500 RPM or higher.

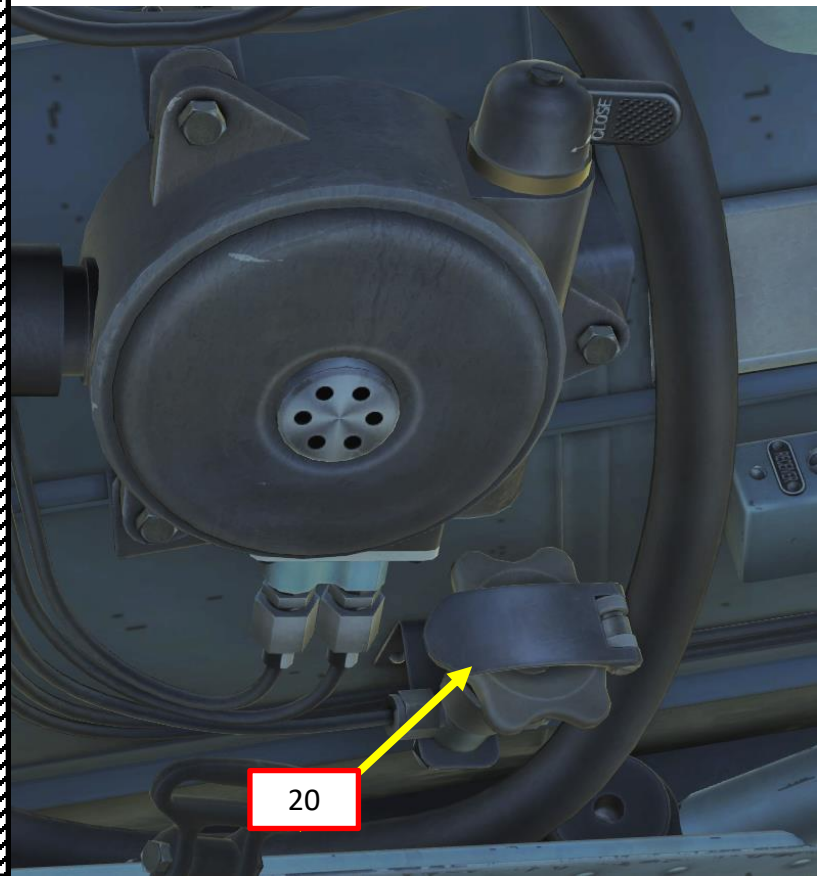


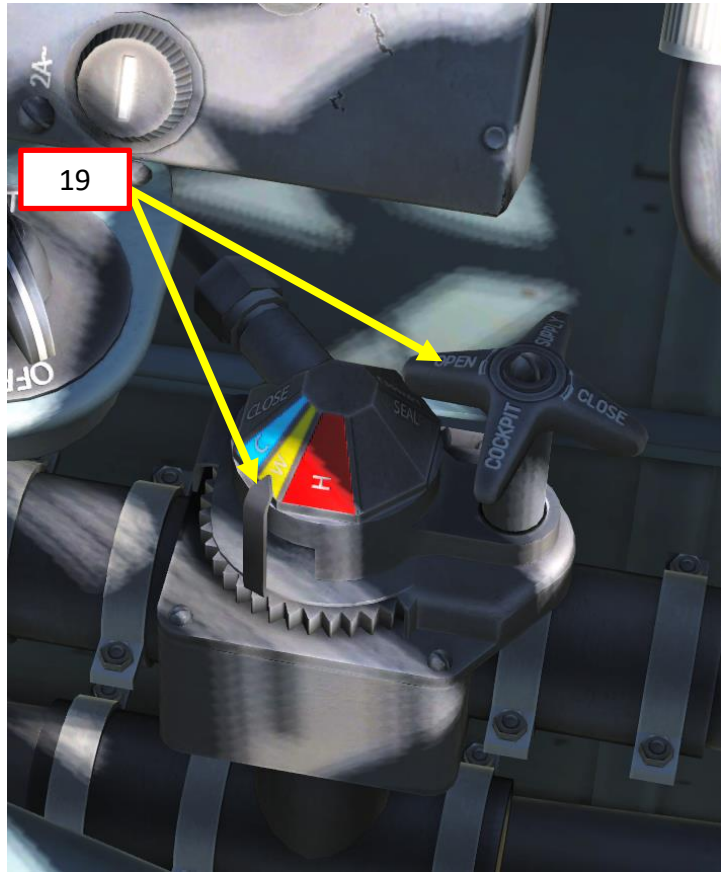
PART 3 – START-UP

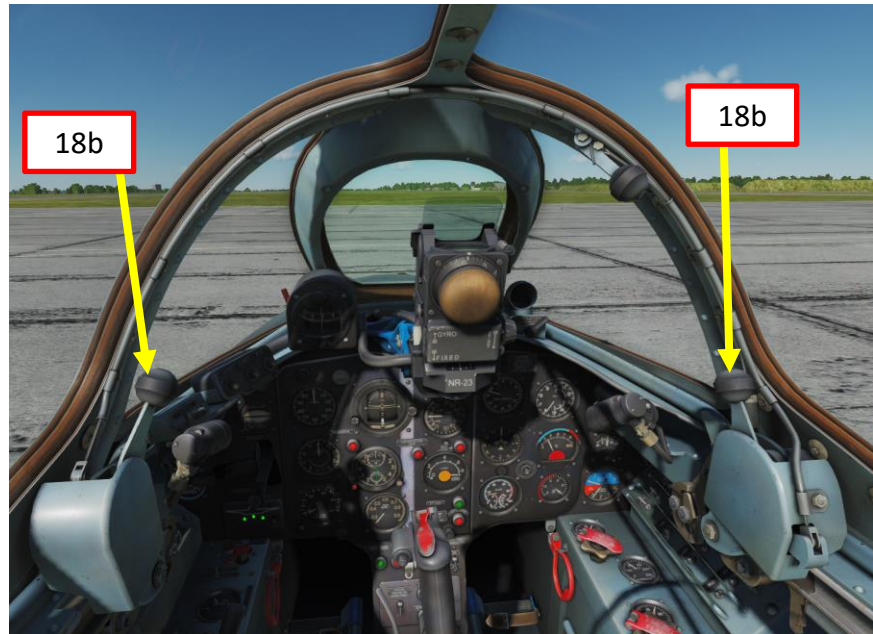
16. Turn OFF ground electrical power as shown in steps 3 to 5
17. AKKYM / Battery/Accumulator Switch ON (FWD)
18. Close Canopy (LCTRL + C by default). If cockpit pressurization is ON, a locking mechanism will prevent the canopy from closing.
19. Pressurize the Cockpit using the Pressurization Control Valve (Index must be set to Blue, Yellow or Red)
20. Turn Oxygen ON by rotating the valve Counter-Clockwise











PART 3 – START-UP

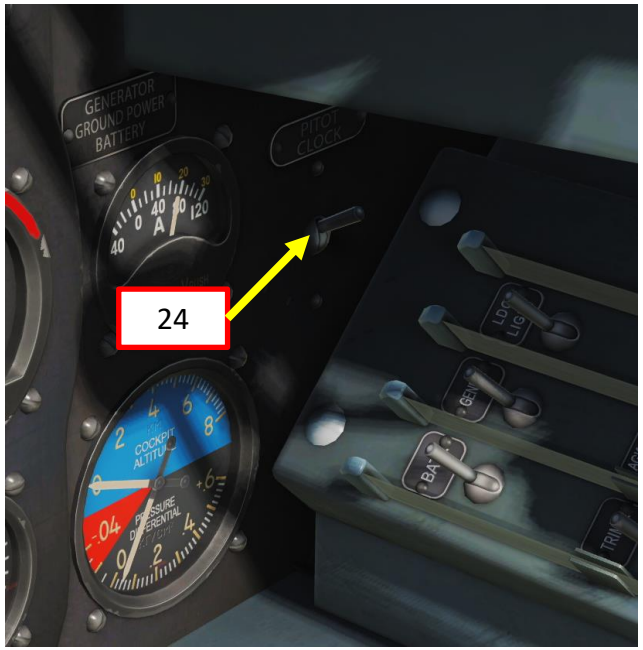
21. Unlock your landing gear lever

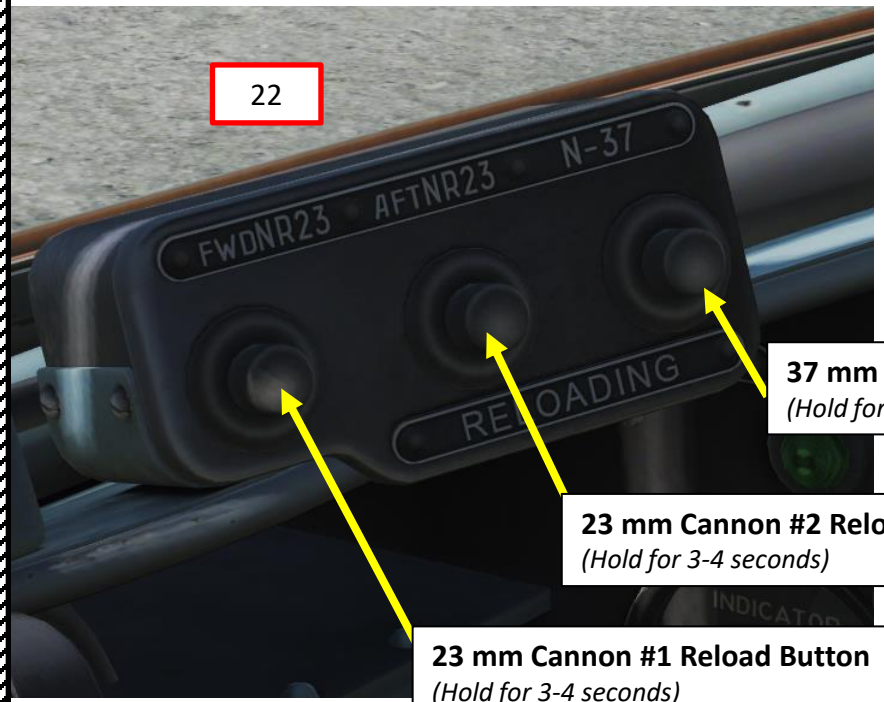
22. Arm your 23 mm and 37 mm Cannons by holding 3-4 seconds the reload switches, which control the explosive pyrotechnical charges.

23. Confirm that your “GUNS ARMED” Lights are illuminated.

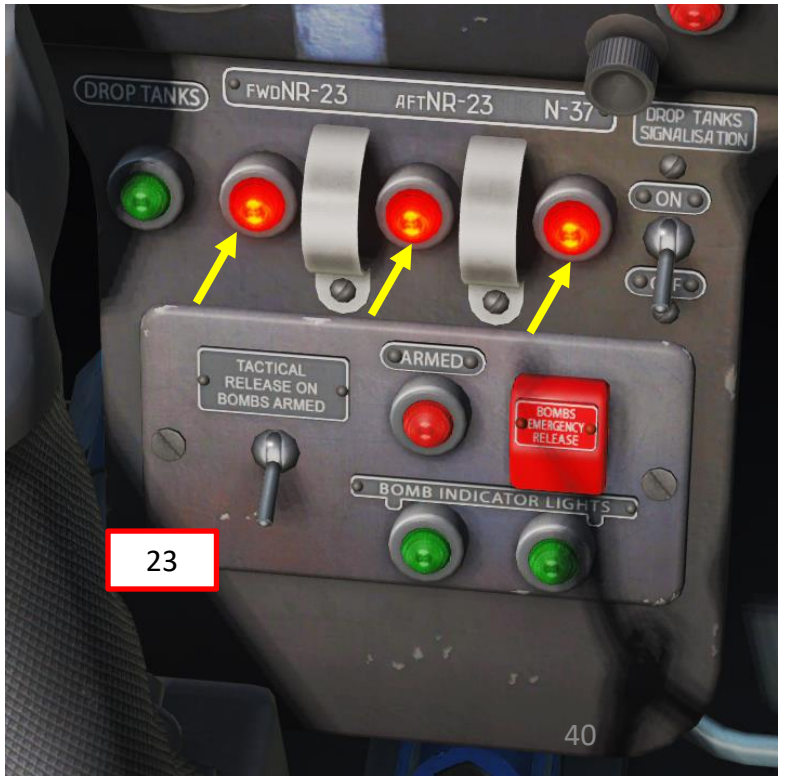
24. Turn on your Pitot & Clock Heater Switch (UP)

25. You may now start taxiing. Use your wheel brake lever and rudder pedals to steer the aircraft.





Note
Russian cannons of this era use a “pyrotechnical” reload system, which means that a cassette equipped with a pyrocartridge will detonate a charge to “reload” a gun. The MiG-21bis, MiG-19 and the L-39ZA use a similar system.

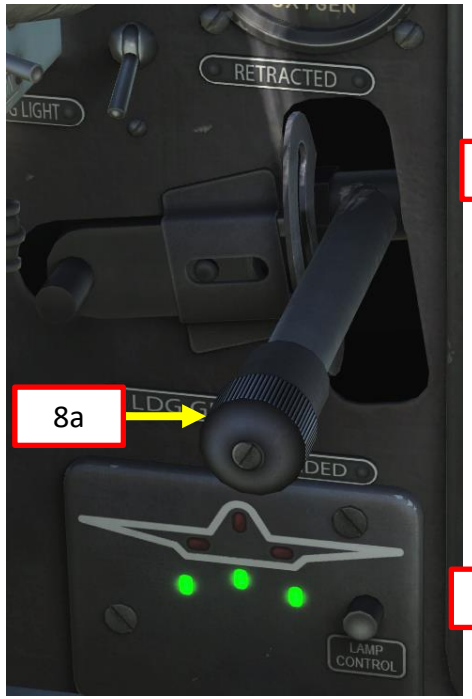


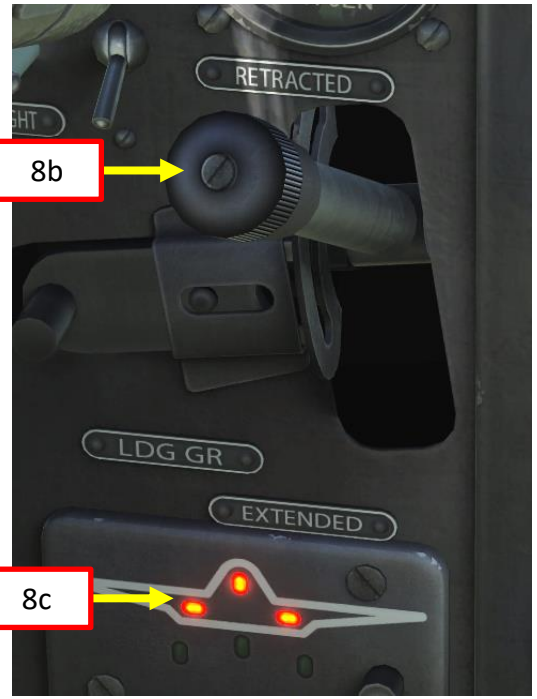
PART 3 – START-UP

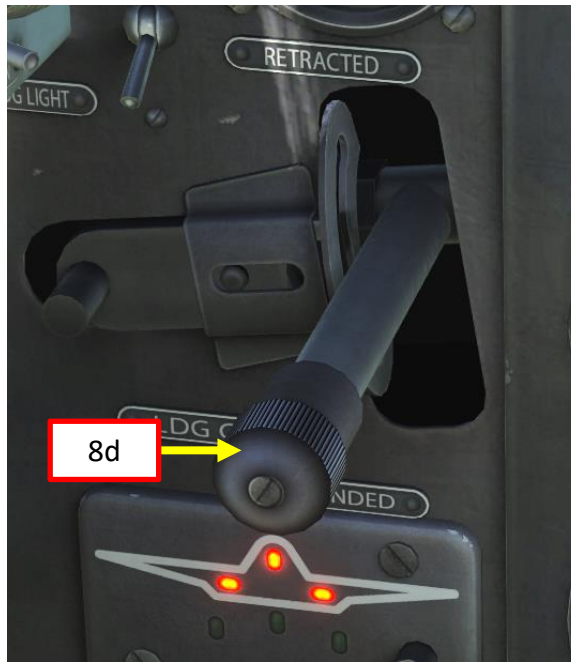
PART 3 – START-UP

PART 4 – TAKEOFF

1. Line up on the runway using your wheel brake lever and rudder pedals to steer the aircraft.
2. Make sure your flaps are up and your airbrakes are retracted. If you have a short runway, you can use 20 degrees of flaps.
3. Hold wheel brake lever and throttle up to 8000-9000 RPM.
4. Release brake and throttle up to Maximum RPM.
5. From 0 to 80 km/h, use your brake and rudder pedals to steer the aircraft. Your rudder alone is ineffective at these low speeds. Use your rudder to steer once you reach 80 km/h or higher.
6. Pull your stick slightly back when you reach 180-190 km/h to gently lift the nosewheel.
7. Rotate at 220-230 km/h. Take special care not to pull too hard on the stick on you will stall, crash and burn.
8. Set your landing gear lever UP, wait for the indicator lights to go from green to red, then set the landing gear lever to NEUTRAL.
9. Once airborne, make sure your flaps are retracted (if they were deployed) and set the flaps lever to NEUTRAL. Failing to do so will keep consuming air pressure and can cause you issues if all available air pressure is expended during the flight.
10. Maintain a vertical speed of around 7 to 8 m/s initially. Recommended climb speed is 500 km/h.







PART 4 – TAKEOFF

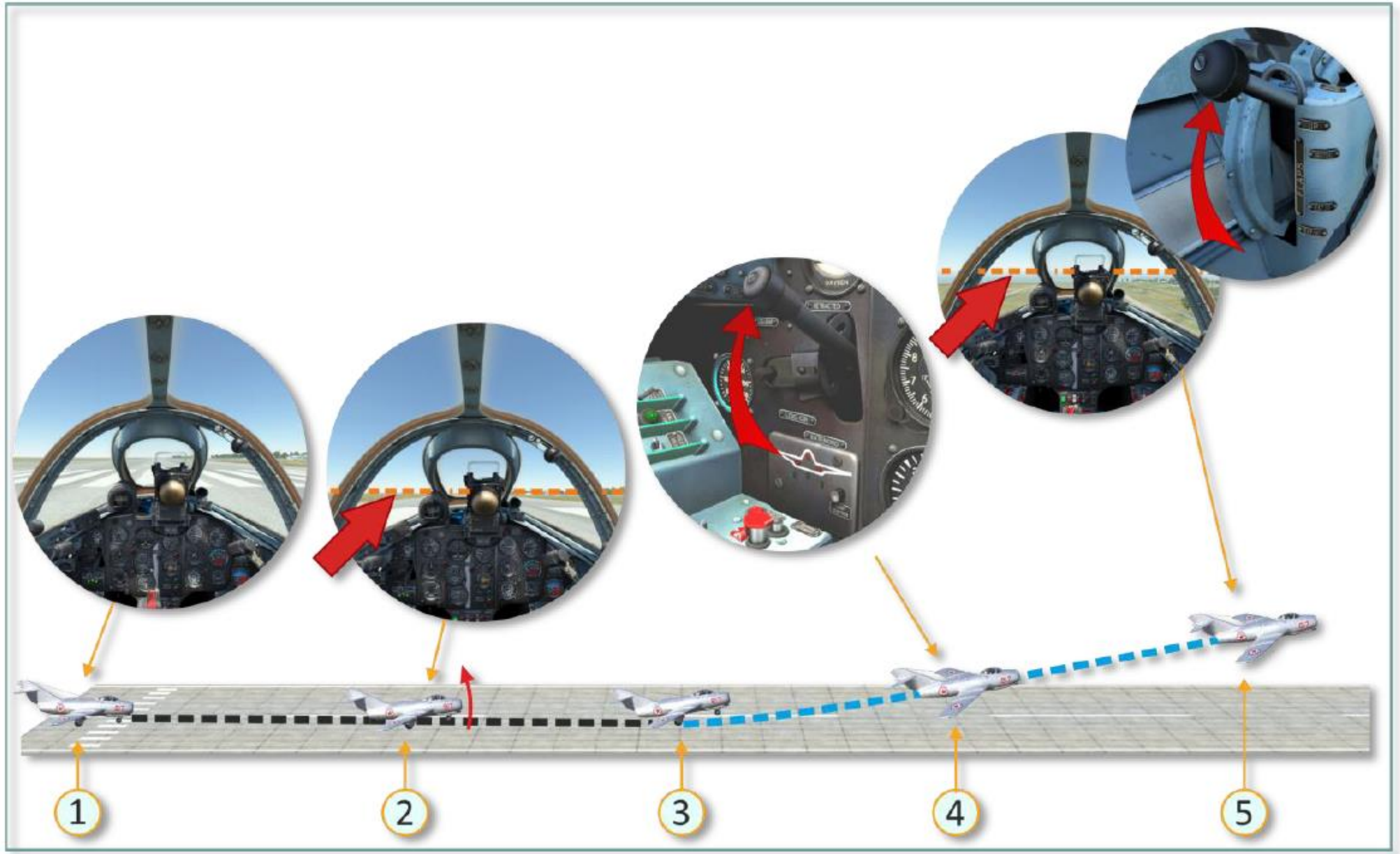


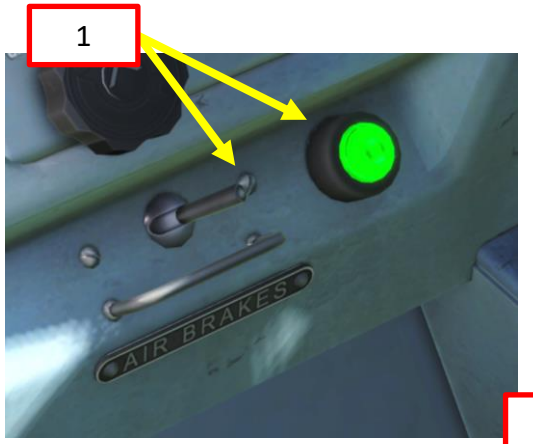
Figure 7.1. Takeoff procedure (orange dash line shows position of the horizon)

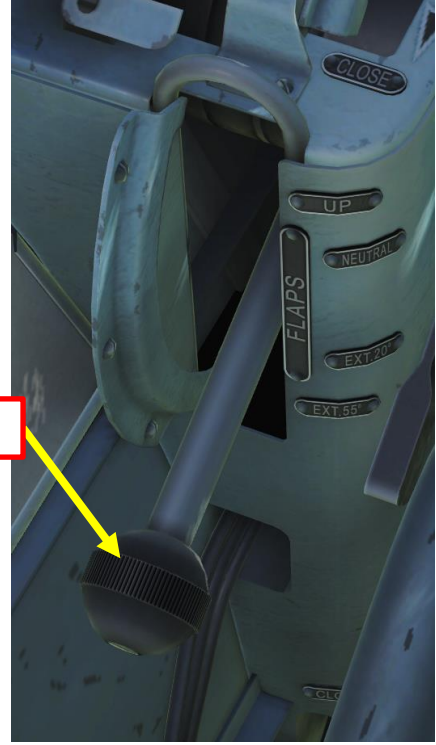
PART 4 – TAKEOFF

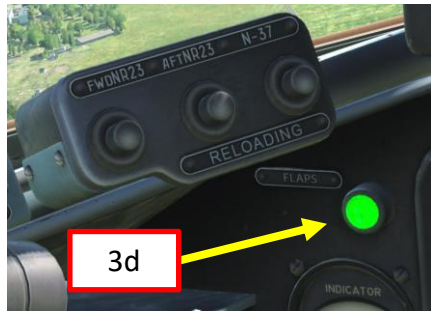
PART 4 – TAKEOFF

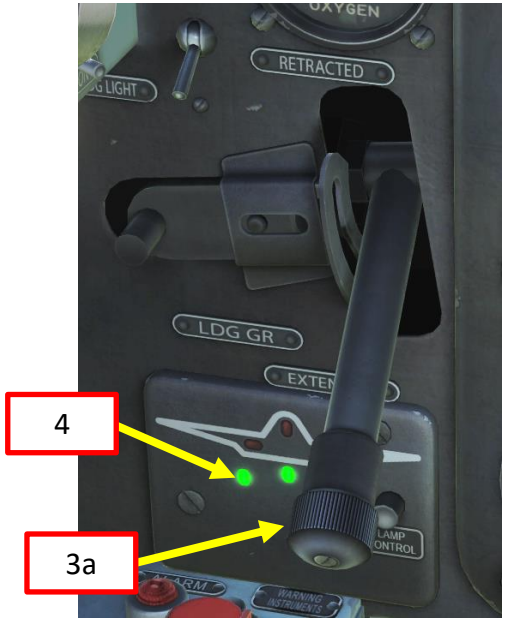
PART 5 – LANDING

1. Deploy airbrakes and line up on the runway. Confirm that the Airbrake light illuminates
2. Reduce airspeed to 400-450 km/h.
3. Deploy flaps to 20 deg and deploy landing gear once you reach 320-350 km/h. Wait for 2-3 seconds, then set flaps lever to 55 deg.
4. Confirm that the Flaps light is illuminated, and that the Landing Gear indicator lights are green. Confirm flaps and landing gear deployment by checking the flaps, main gear and nose gear pins on the wing and aircraft nose.
5. Final approach is at 250-270 km/h.
6. Set engine power around 7000-9000 RPM. Avoid reducing power below 6000 RPM and keep your airspeed higher than 200 km/h at all times during the approach. This will reduce the risk of inducing a nasty stall.
7. With a speed of 260-270 km/h (engine RPM at least 6000, descent rate of 7-8 m/s), glide to the beginning of the landing flare.
8. At an altitude of 6-7 m, slightly pull back the stick to start decreasing the descent rate in such a way that the aircraft stops descending at an altitude of not more than 1 m. During the flare, decrease engine RPM to the minimum and maintain constant pitch and roll.
9. Touchdown speed is 200-220 km/h.
10. During the flare, speed gradually decreases to 180-200 km/h. As the speed decreases, the pilot increases pitch by pulling the stick towards him and thus deflecting the elevators upwards to keep the lift force counteracting the aircraft's weight constant. The airplane gradually and smoothly descends from 1 m altitude to touchdown.
11. Set throttle to IDLE after touchdown.
12. Gently press the wheel brake lever to slow down.
13. Once runway is cleared, retract flaps and airbrakes. Taxi to parking area, then perform aircraft shutdown.

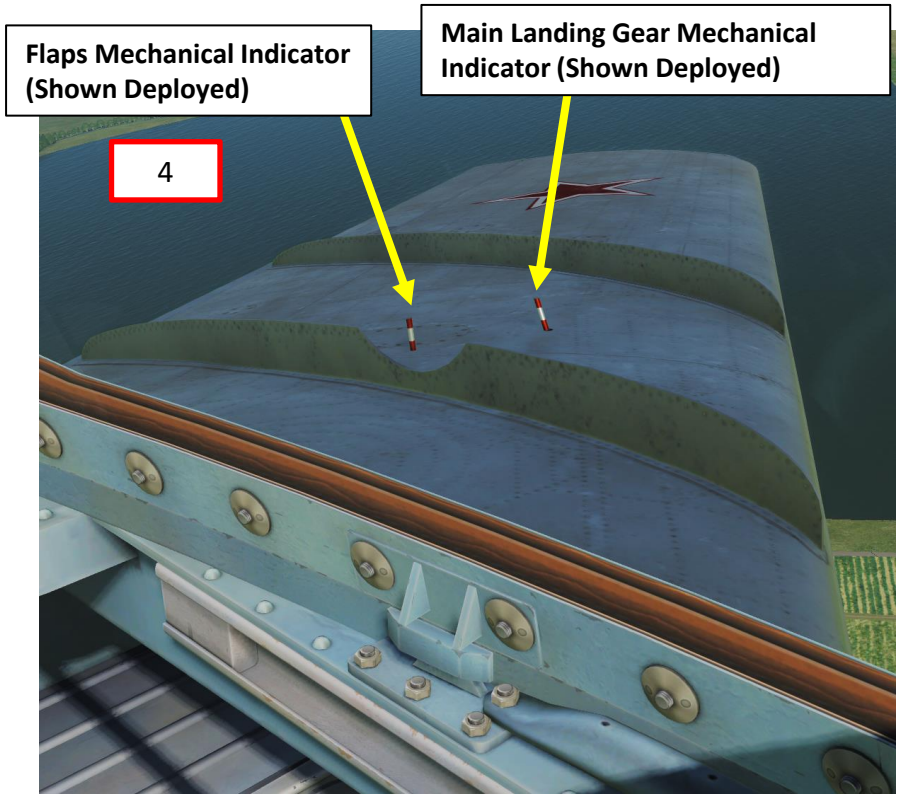


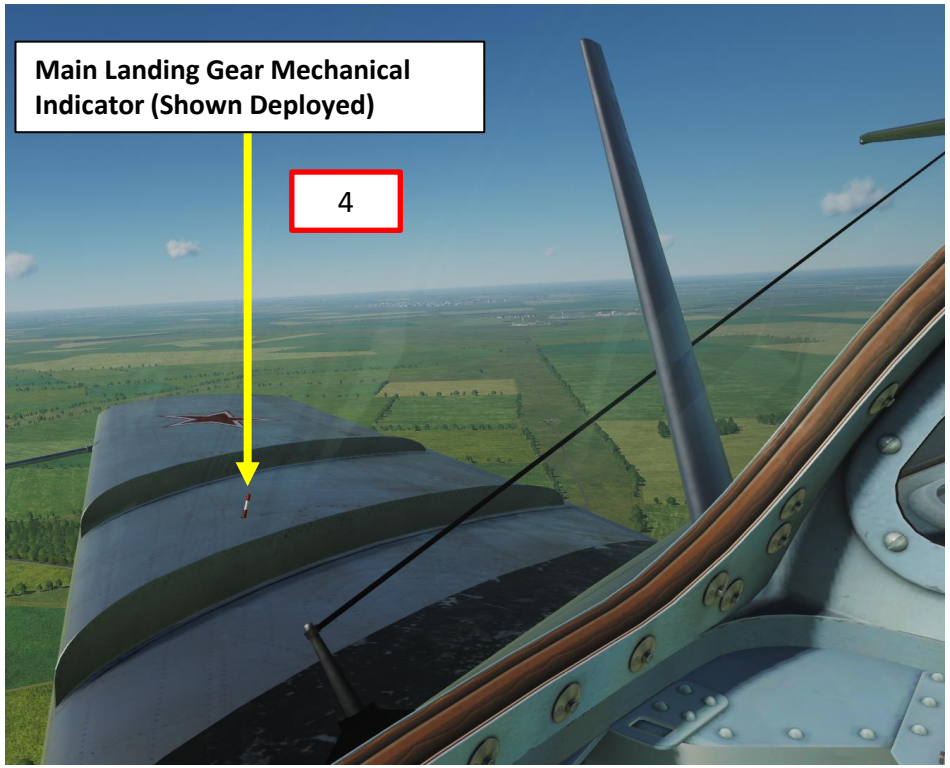






PART 5 – LANDING



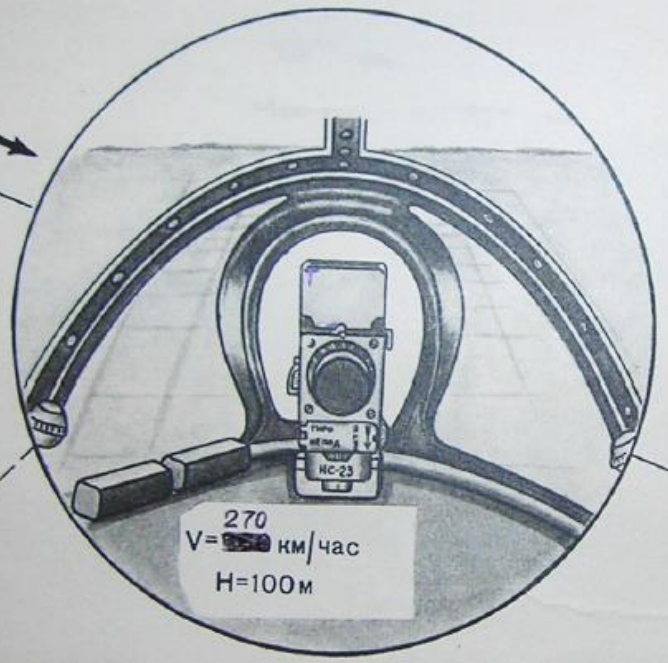


PART 5 – LANDING

ЧЕТВЕРТЫЙ РАЗВОРОТ И ДЕЙСТВИЯ ПОСЛЕ РАЗВОРОТА

1. Четвертый разворот выполнять на скорости не менее [redacted] км/час и увеличенных оборотах двигателя.

Вывод из разворота закончить с таким расчетом, чтобы вывести самолет точно на линию посадочных знаков на высоте 300 м. Куп = 0° ± 4с ; ик = ПК ± 4с



2. После разворота установить скорость [redacted]—270 км/час при оборотах не менее 6000 в минуту, планировать на этой скорости до начала выравнивания.

При правильном расчете посадочный знак Т будет проектироваться в бронестекле фонаря кабины так, как показано на рисунке. КУР = 0 ± 4с · ПК = 267 ± 4с

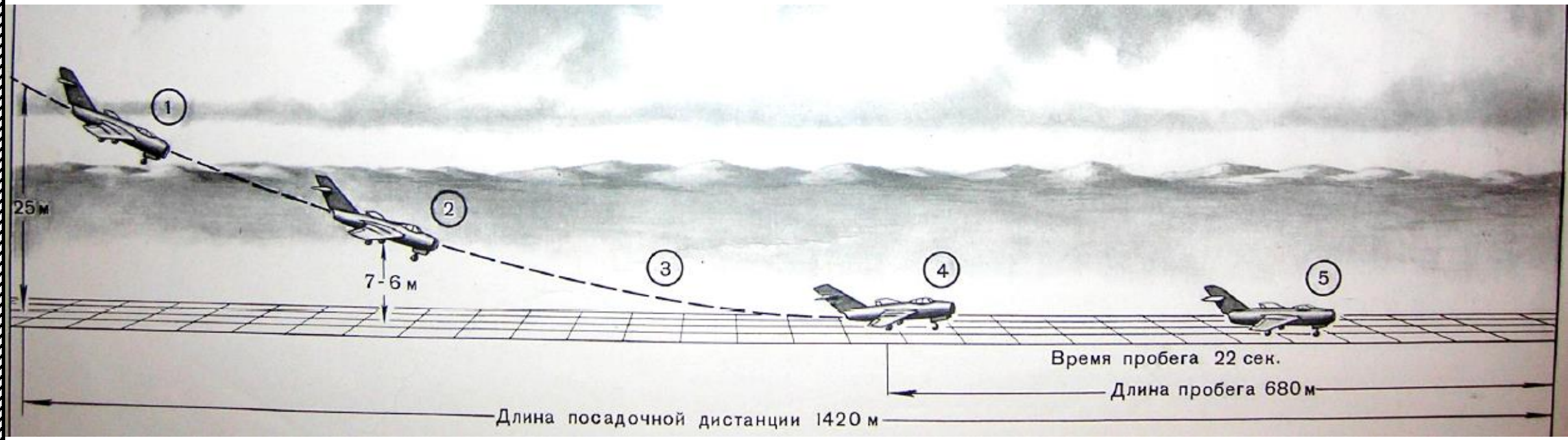
3. До высоты 50—[redacted] м убедиться:
— нет ли препятствий на посадочной полосе;
— точен ли расчет и заход по посадочным знакам;
— нет ли кренов и сносов.

На высоте 30 м проверить скорость по прибору и, сохраняя постоянный угол планирования, перенести взгляд на землю в место снижения самолета.

H=300 м

H=30 м

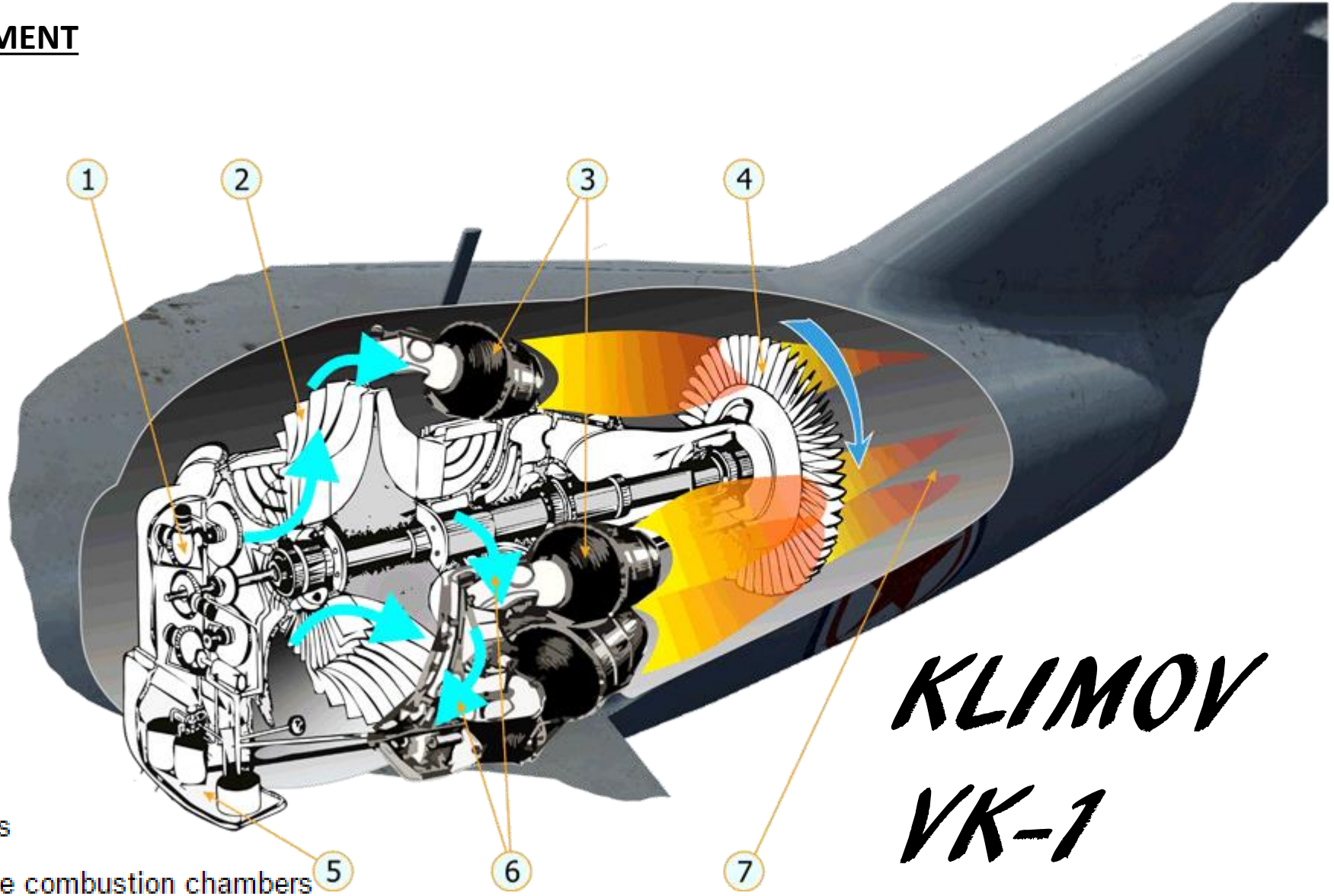
PART 5 – LANDING




GYRO
FIXED
NR-23

PART 5 – LANDING

PART 6 – ENGINE MANAGEMENT

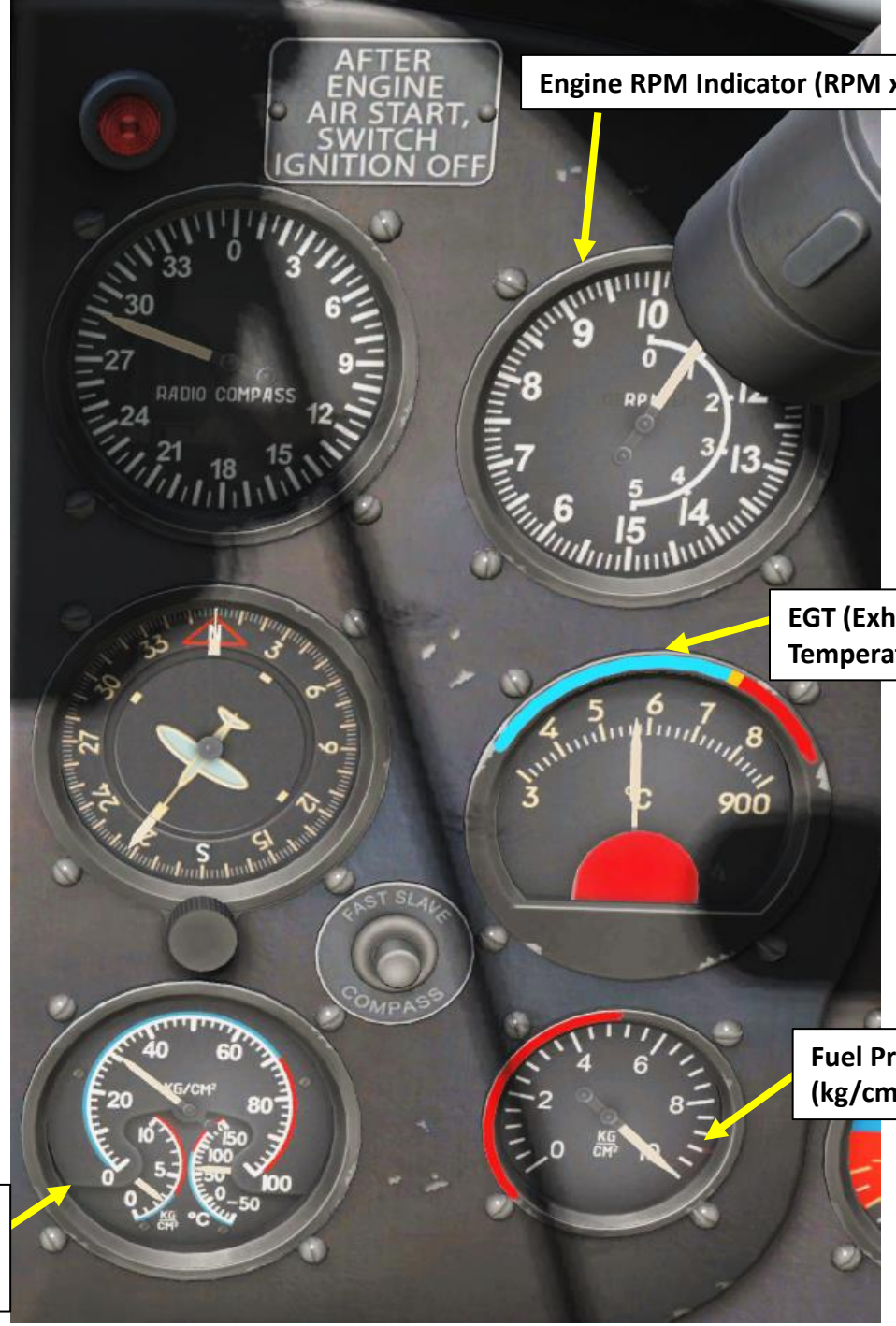


KLIMOV VK-1

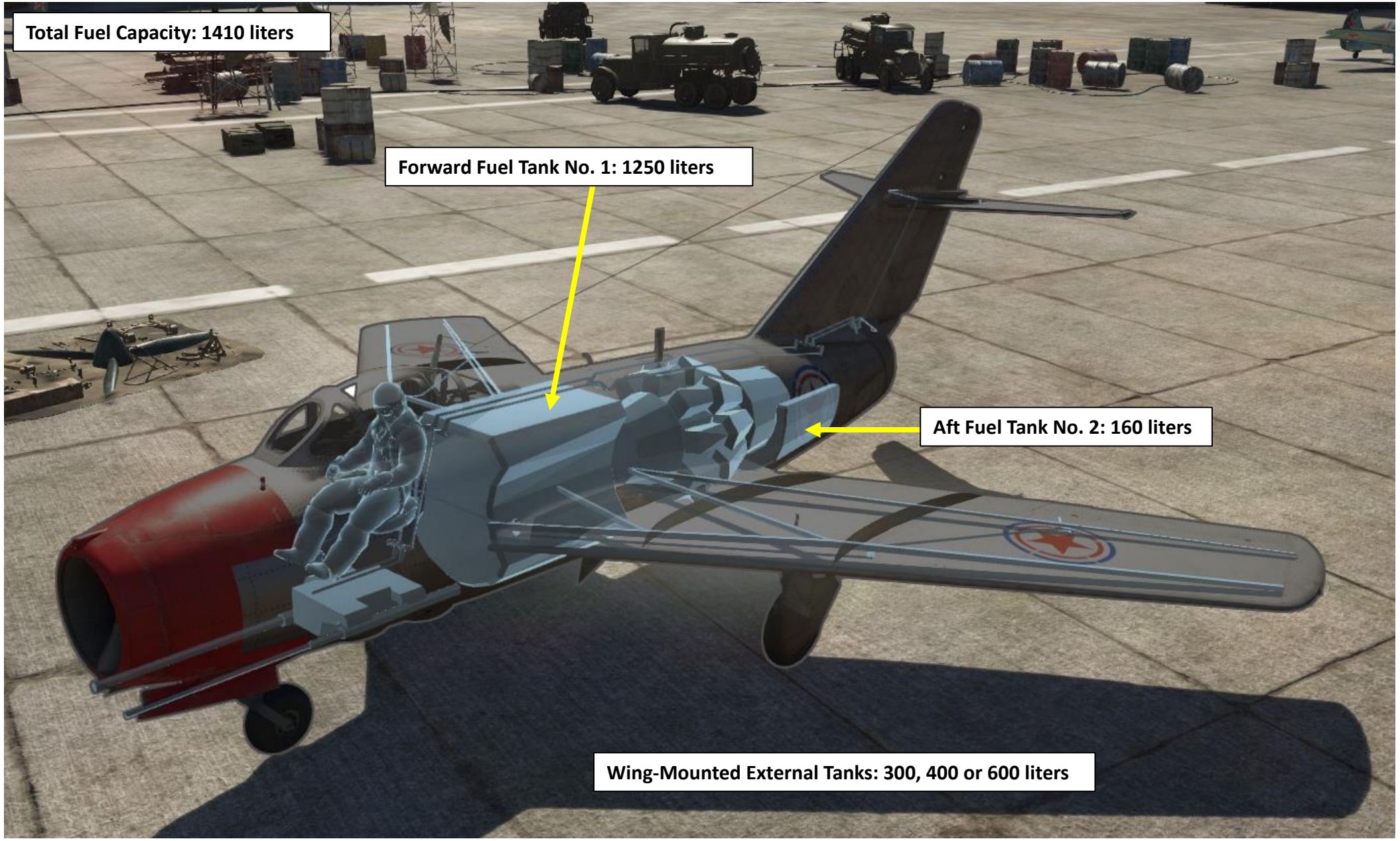
1. Gearbox
2. Centrifugal compressor
3. 9 can combustion chambers
4. Compressor turbine
5. Engine oil system components
6. Compressed air supplied to the combustion chambers
7. Jet pipe and exhaust nozzle (not shown)

PART 6 – ENGINE MANAGEMENT

- The **Klimov VK-1** was the first Soviet jet engine to see significant production and was first produced by the GAZ 116 works. It was derived from the British Rolls-Royce Nene.
- The only temperature you need to keep an eye on is the EGT (Exhaust Gas Temperature). Make sure the temperature is within serviceability and safety limits (blue zone). Engine temperature can only be controlled by reducing or augmenting engine RPM with the throttle.
- Max Engine EGT should be no more than **650-700 deg C** at all times
- Compressor stall may occur when you move the throttle too quickly. You will notice a sudden loss in engine RPM and hear a loud “BANG”. The VK-1 engine is slow to respond to throttle input, so it should be treated gently. In case of compressor stall, pull throttle to back IDLE and slowly throttle up. Major compressor failure may result in an engine flameout.
- A **compressor stall** is a local disruption of the airflow in the compressor of a gas turbine or turbocharger. A stall that results in the complete disruption of the airflow through the compressor is referred to as a **compressor surge**. The severity of the phenomenon ranges from a momentary power drop barely registered by the engine instruments to a complete loss of compression in case of a surge, requiring adjustments in the fuel flow to recover normal operation.
- Compressor stall was a common problem on early jet engines with simple aerodynamics and manual or mechanical fuel control units, but has been virtually eliminated by better design and the use of hydromechanical and electronic control systems such as Full Authority Digital Engine Control (FADEC). Modern compressors are carefully designed and controlled to avoid or limit stall within an engine's operating range.



PART 6 – FUEL MANAGEMENT



PART 6 – FUEL MANAGEMENT

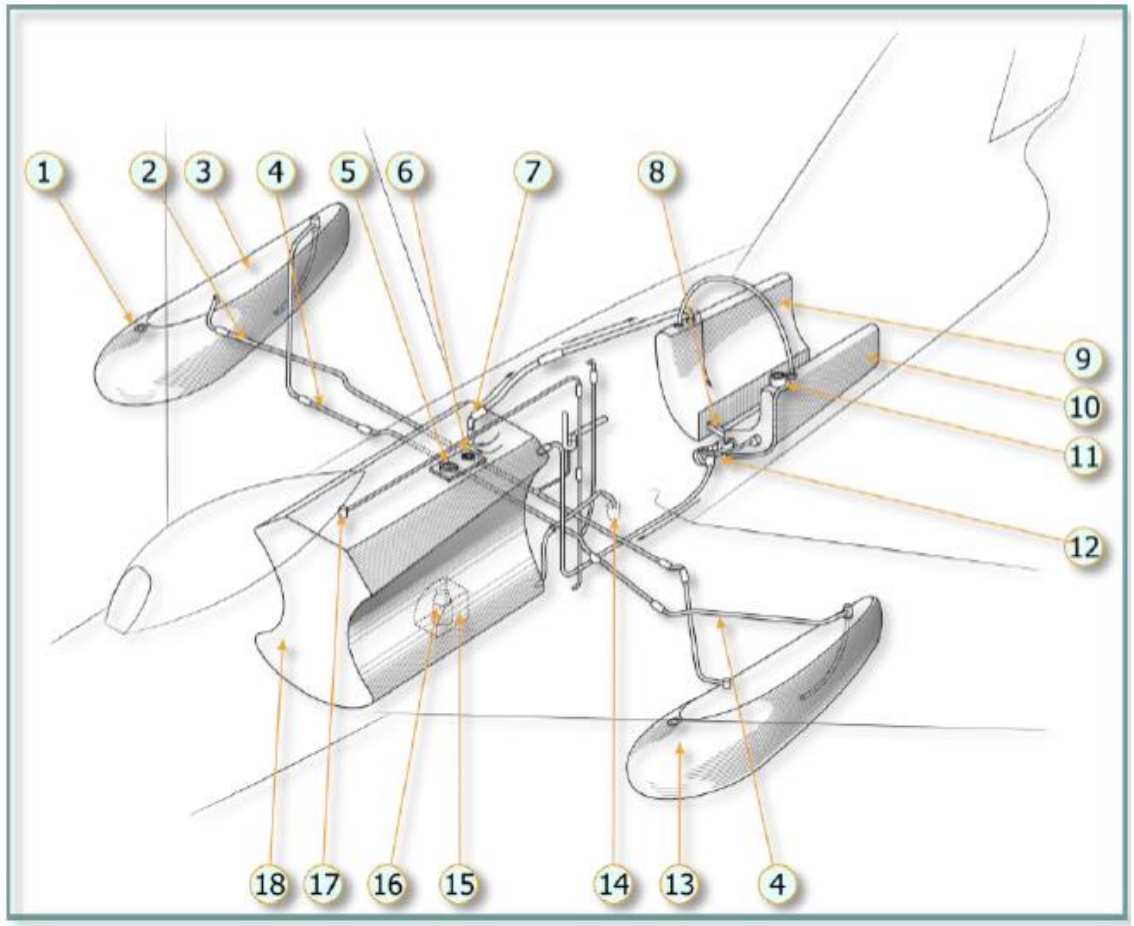
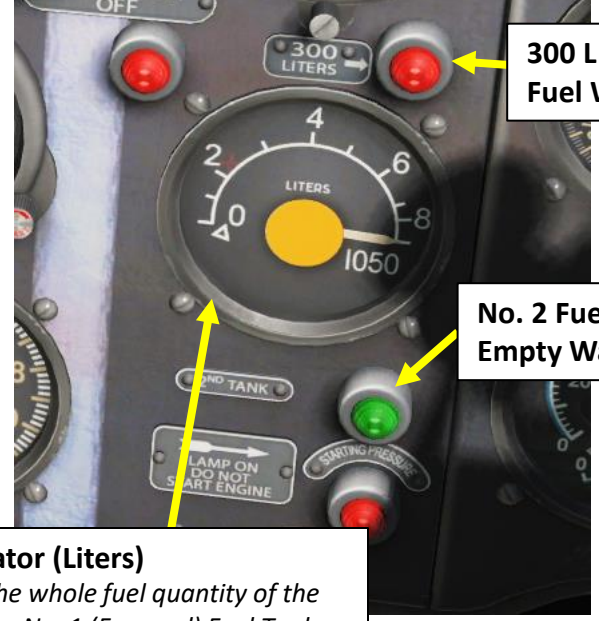


Figure 5.3. MiG-15bis fuel system

1. Drop tank fueling inlet
2. Pressurized air line
3. Right drop tank
4. Fuel line to forward tank
5. Forward tank fueling inlet
6. Fuel quantity probe
7. Forward tank fuel return line
8. Rear left and right fuel tank connecting line
9. Rear right fuel tank
10. Rear left fuel tank
11. Rear left fuel tank filling inlet
12. PTsR-1 fuel pump (rear tank to forward tank)
13. Left drop tank
14. Engine filter
15. Negative G compartment
16. PNV-2 booster pump
17. Drain line nozzle
18. Forward main tank



300 L Remaining Fuel Warning Light

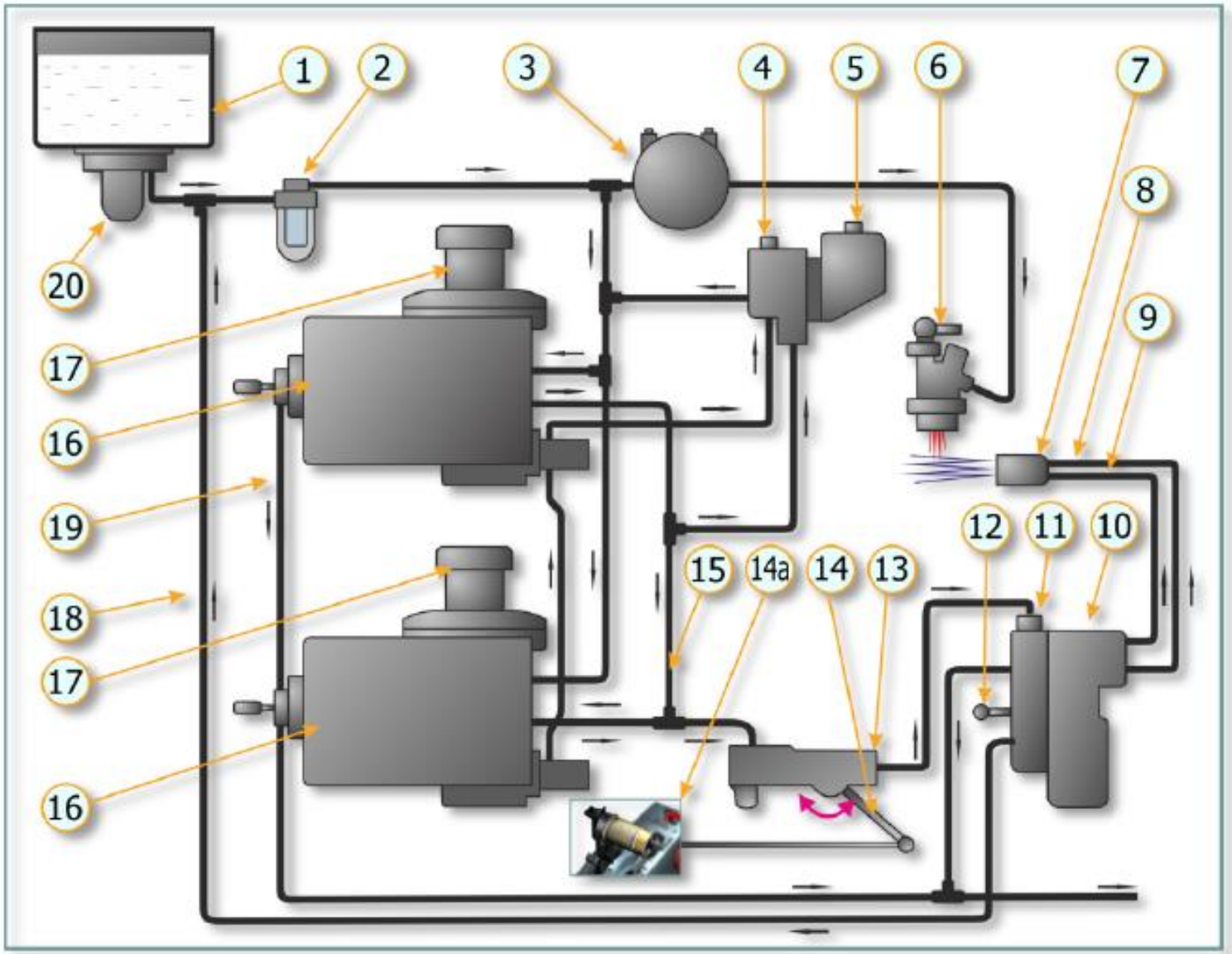
No. 2 Fuel Tank Empty Warning Light

No. 1 Fuel Tank Quantity Indicator (Liters)

Note: this gauge does not monitor the whole fuel quantity of the aircraft. This gauge only monitors the No. 1 (Forward) Fuel Tank from 0 to 1050 liters. The forward fuel tank (No. 1) contains 1250 liters while the aft fuel tank (No. 2) contains 160 liters.

Wing Drop Tank Empty Light

PART 6 – FUEL MANAGEMENT

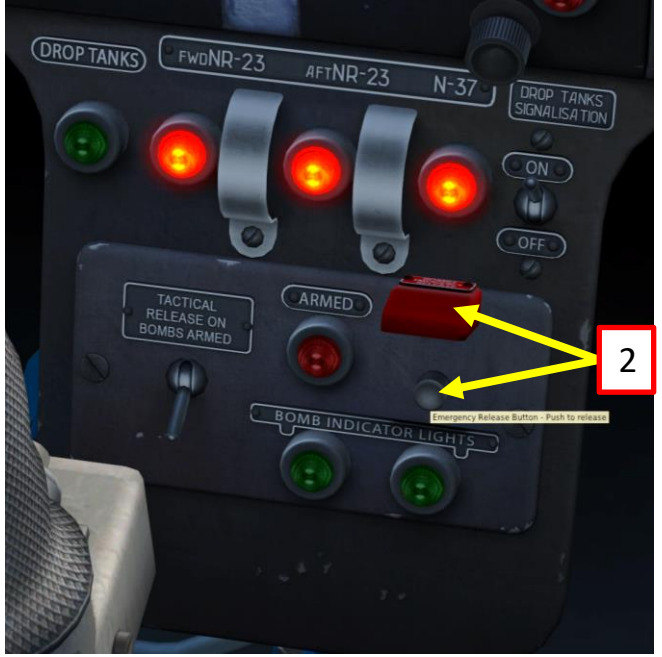


1. Fuel tank
2. Filter
3. Starting fuel pump
4. Barostat isolation valve (servo)
5. Barostatic regulator
6. Igniter
7. Fuel nozzle
8. Large slot manifold (operating)
9. Small slot manifold (starting and operating)
10. Flow divider
11. Shut-off valve
12. Shut-off valve lever
13. Fuel control valve
14. Main fuel regulator
14a. Throttle
15. High pressure line
16. High pressure pump
17. RPM governor
18. Fuel bypass line
19. Fuel drain line
20. Fuel tank boost pump (forward tank)

Figure 3.17. VK-1 fuel automatics

HOW TO JETTISON FUEL TANKS

1. Turn on the “EMERGENCY JETTISON” switch (FWD)
2. Flip the safety cover UP and press the “BOMBS EMERGENCY RELEASE” button



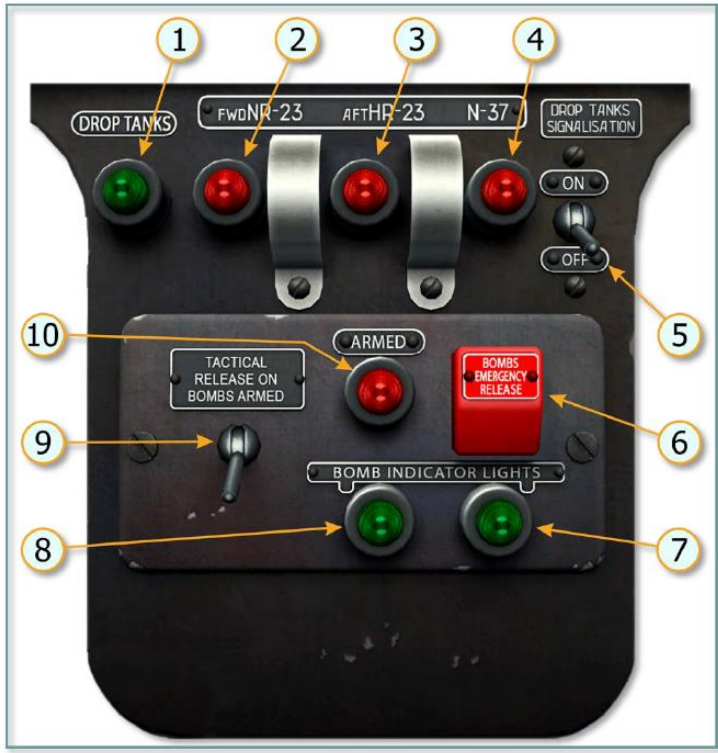
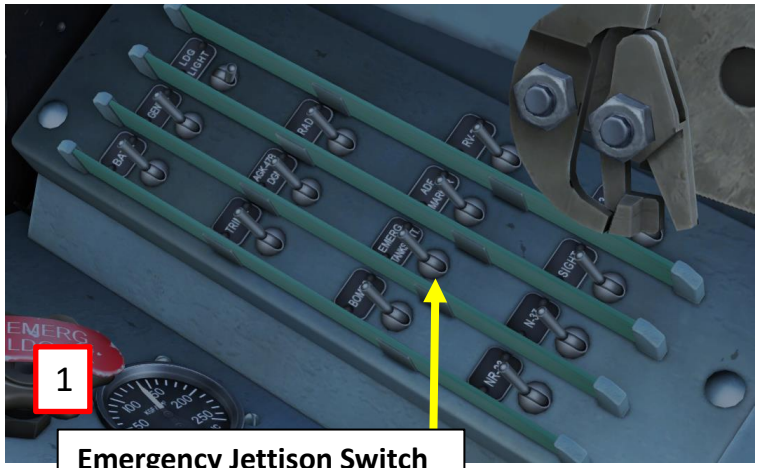


Figure 4.11. MiG-15bis armament control panel

1. Empty drop tank indication light
2-4. Gun ready lights
5. Empty drop tank indication switch (turns on/off signalization)
6. Emergency release button
7. Load presence lamp (right pylon)
8. Load presence lamp (left pylon)
9. Bombs arming circuit switch
10. Bombs armed lamp



PART 7 – AIRCRAFT LIMITATIONS

Operational characteristics	Unit	Value
Max allowable gross	lbs / kg	13459 / 6105
Basic weight	lbs / kg	7892 / 3580
Useful load (with pilot 100kg)	lbs / kg	2983 / 1353
Weight with payload for normal mission	lbs / kg	11120 / 5044
Fuel usable capacity internal (0.83 kg/l)	lbs/gal // kg/l	2584/373 // 1172 / 1412
Normal cruise speed (for max range at 10,000m, gross weight 4,600-4,900kg)	indicated air speed (IAS) kts / km/h	243-254 / 450-470
Fuel consumption rate (for loiter at 10,000m, 350 km/h IAS, gross weight 4,600-4,900kg, fuel density 0.83 kg/l)	lbs/h // kg/h	1464 // 664
Maximum speed at sea level, true air speed (TAS)	kts / km/h	581 / 1076
Maximum speed at 10.000m (33.000 feet)	TAS kts / km/h	535 / 990
Service ceiling (for take-off weight 5044kg)	ft / m	51016 / 15550
Time of climb altitude up to 5000m (at 11.560rpm and 680-560 km/h TAS)	m/min	around 2min
Maximum rate-of-climb (at 11.560rpm): at 1000m altitude at 5000m altitude	m/min // maximum lift-to-drag ratio airspeed, TAS km/h	 2790 // 710 2100 // 710
Maximum range (w/o drop tank), altitude 10.000m, 450-470 km/h IAS	nm / km	648 / 1200
Maximum range (with drop tank 300L), altitude 10.000m, 460-480 km/h IAS	nm / km	944 / 1749
Maximum range (with drop tank 600L), altitude 10.000m, 440-460 km/h IAS	nm / km	1199 / 2220
Maximum endurance (w/o drop tank): altitude 10.000m, 330-350 km/h IAS altitude 5.000m, 330-350 km/h IAS	hour.min	 2.05 1.45
Maximum maneuvering load factor	G	8
Ultimate load factor	G	12

PART 7 – AIRCRAFT LIMITATIONS

- **SERVICE CEILING**
  - 15500 m (50850 ft)
- **MAX AIRSPEED LIMITATIONS**
  - @ LOW ALT: 1070 km/h TAS, 1060 km/h IAS
  - @ SERVICE CEILING: 720 km/h TAS, 300 km/h IAS
- **MACH NUMBER LIMITATIONS**
  - IN LEVEL FLIGHT: 0.919 M
  - @ LOW ALTITUDES: 0.866 M
  - @ SERVICE CEILING : 0.7 M
- **FLAPS AIRSPEED LIMITATIONS**
  - MAX AIRSPEED WITH FLAPS FULLY EXTENDED: 400 km/h IAS
- **LANDING GEAR AIRSPEED LIMITATIONS**
  - MAX AIRSPEED WITH FLAPS FULLY EXTENDED: 500 hm/h IAS
- **DROP TANKS AIRSPEED LIMITATIONS**
  - 200 L DROP TANKS: 820 km/h TAS / 700 km/h IAS @ 3500m, 1015 km/h TAS @ 5000 m
  - 600 L DROP TANKS: 990 km/h TAS / 800 km/h IAS @ 4600m
- **AIRBRAKE AIRSPEED LIMITATIONS**
  - @ GROUND LEVEL: 750 km/h TAS / 750 km/h IAS
  - @ 10000 m: 790 km/h TAS / 482 km/h IAS
- **MINIMUM SPEEDS (STALL)**
  - @IDLE POWER, FLAPS + GEAR EXTENDED: 190 km/h
  - @IDLE POWER, FLAPS + GEAR RETRACTED: 200-220 km/h BELOW 10000m, 230-240 km/h ABOVE 10000m
  - @IDLE POWER, AIRBRAKES DEPLOYED: 200-210 km/h
  - @MAX POWER, CLIMBING: 200-210 km/h

NOTE: TAS means "True Airspeed" and IAS means "Indicated Airspeed". To learn more about the difference between IAS and TAS, please consult the following link:
http://en.wikipedia.org/wiki/Airspeed

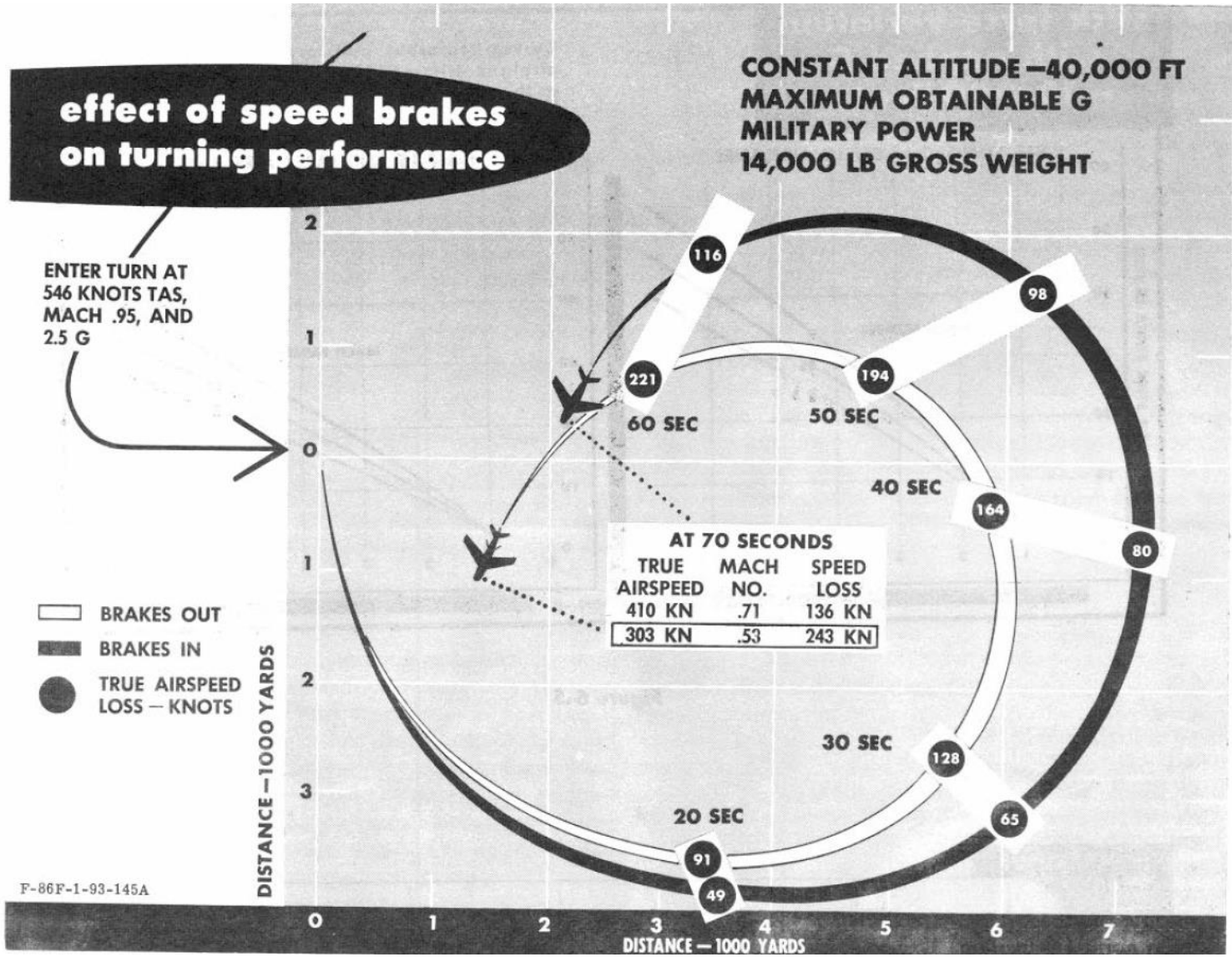
PART 8 – AIRCRAFT OPERATION

- Your aircraft can easily go more than 600 km/h in level flight, which means that you can very easily black out if you do not pay attention to your speed and accelerometer in turning manoeuvres. Be gentle with the stick.
- Speed is very important in combat, but also during landing. Pay attention to the yellow index on the airspeed indicator to know when you can safely deploy your flaps and landing gear. Deploying those at high speeds will make them jam in inconvenient positions, as shown in the picture on the right.
- During a normal patrol, you do not need to go full throttle all the time. It needlessly wears the engine down and can create problems with formation flying.
- At high Mach numbers (between Mach 0.86 and Mach 0.9) you can lock up your controls very easily (especially ailerons) due to compressibility effects. You also develop unwanted aerodynamic behaviours like uncontrolled roll or sudden loss of control in a dive. If you want to remain in full control of your plane at all times, it is better to fly a little bit slower (Mach 0.7 – 0.8) but keep full authority over your controls.
- Use your airbrakes if you are going too fast. Airbrakes are very useful to bleed off airspeed quickly and control your diving speed.

PART 8 – AIRCRAFT OPERATION

- Typically in World War II fighters, flaps were used to make tighter turns in combat. However, use of flaps during combat is strictly prohibited in the Sabre.
- Use of airbrakes can help you turn much tighter if you need to bleed airspeed quickly. They come in very handy in dive bombing and defensive manoeuvres, especially when you have a Sabre on your tail that you just can't shake off (Yes, I know, it's a chart for a Sabre… sue me!).
- Use airbrakes only when you need to. Bleed off too much speed in the MiG can quickly become fatal. Take note that:

1. The MiG-15 outclimbs the F-86
2. The F-86 outperforms the MiG-15 in a dive
3. The F-86 is generally slightly more maneuverable than the MiG-15
4. The F-86 is very vulnerable at low speeds
5. The MiG-15Bis has a slower roll rate than the Sabre.

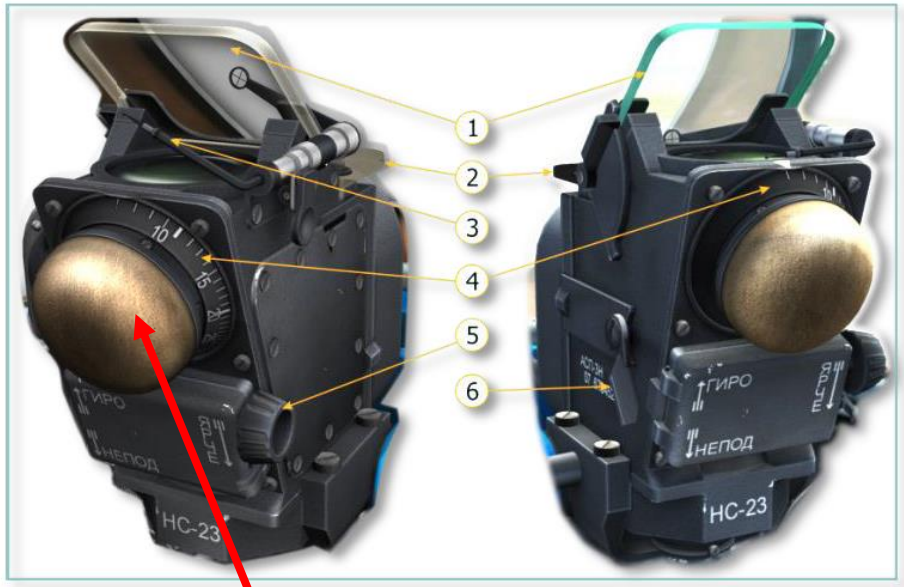


PART 8 – AIRCRAFT OPERATION

- Some tips when fighting the Sabre:
  - Good Sabre pilots will often use their superior dive speed to outrun you. Don't take the bait: do not follow them to the deck and maintain your high altitude advantage. Compressibility will affect your control surfaces earlier than the Sabre's, which means you can enter a nasty spin or deep stall if you try to keep up with him.
  - Sabre pilots had G suits, which allowed them to have a better tolerance to high-G manoeuvres. The MiG-15 pilots did not have access to G suits, which means that you are at a slight disadvantage when it comes to pulling Gs. This means that the MiG has to be flown like an energy fighter instead of a "turn and burn" fighter.
  - Do not fight a Sabre below 2000 m. He will eat you for breakfast. The MiG-15 was built to be a high-altitude interceptor, while the Sabre excels at low altitudes.
  - A good combat speed to maintain is anything higher than 400 km/h. If you go any slower than that, you will get in trouble.
  - Good Sabre pilots will often use their superior roll rate to get you into scissor fights. Avoid them like the plague. The MiG-15's roll rate is sluggish compared to the F-86; remember that it was built to be a high-altitude bomber interceptor, not a dogfighter.
  - Always use your airbrakes during a dive or a sharp turn. They will prevent you from overspeeding if you lose tracking of your airspeed.
  - The MiG-15 has a very low ammo capacity and a low cannon shell velocity compared to the Sabre's .50 cal ammunition. You can shoot down a Sabre with just a single well-placed cannon round or two.
  - Use your superior climbing speed to your advantage.
  - Be very wary of compressibility. Always keep an eye on your Mach indicator. It will save your life.
  - **Very important**: if you start losing control of your aircraft in a dive, deploy airbrakes as soon as possible and throttle back to around 50 ^ RPM. The airbrakes will slow you down and make the aircraft controllable again as your airspeed decreases. Once you gain back effective control on your flight control surfaces, throttle up and pull up simultaneously while keeping the airbrake deployed.

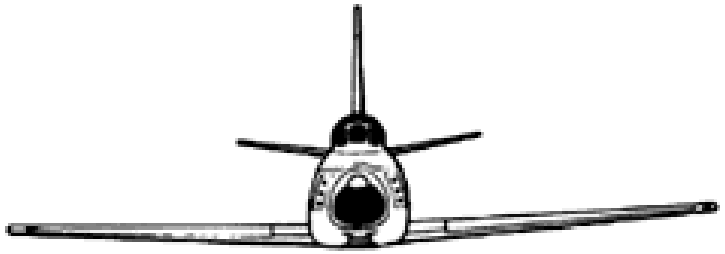
PART 9 – WEAPONS: INTRO

ASP-3H GUNSIGHT



1. Reflector glass
2. Sun filter glass
3. Standby mechanical reticle
4. Target wingspan dial
5. Reticle brightness knob
6. Caging lever (down for caged mode, up for gyro mode)

Target Wingspan Setting Control (m)



WINGSPAN OF A F-86F SABRE: 11 m
(Value to enter in gunsight wingspan)

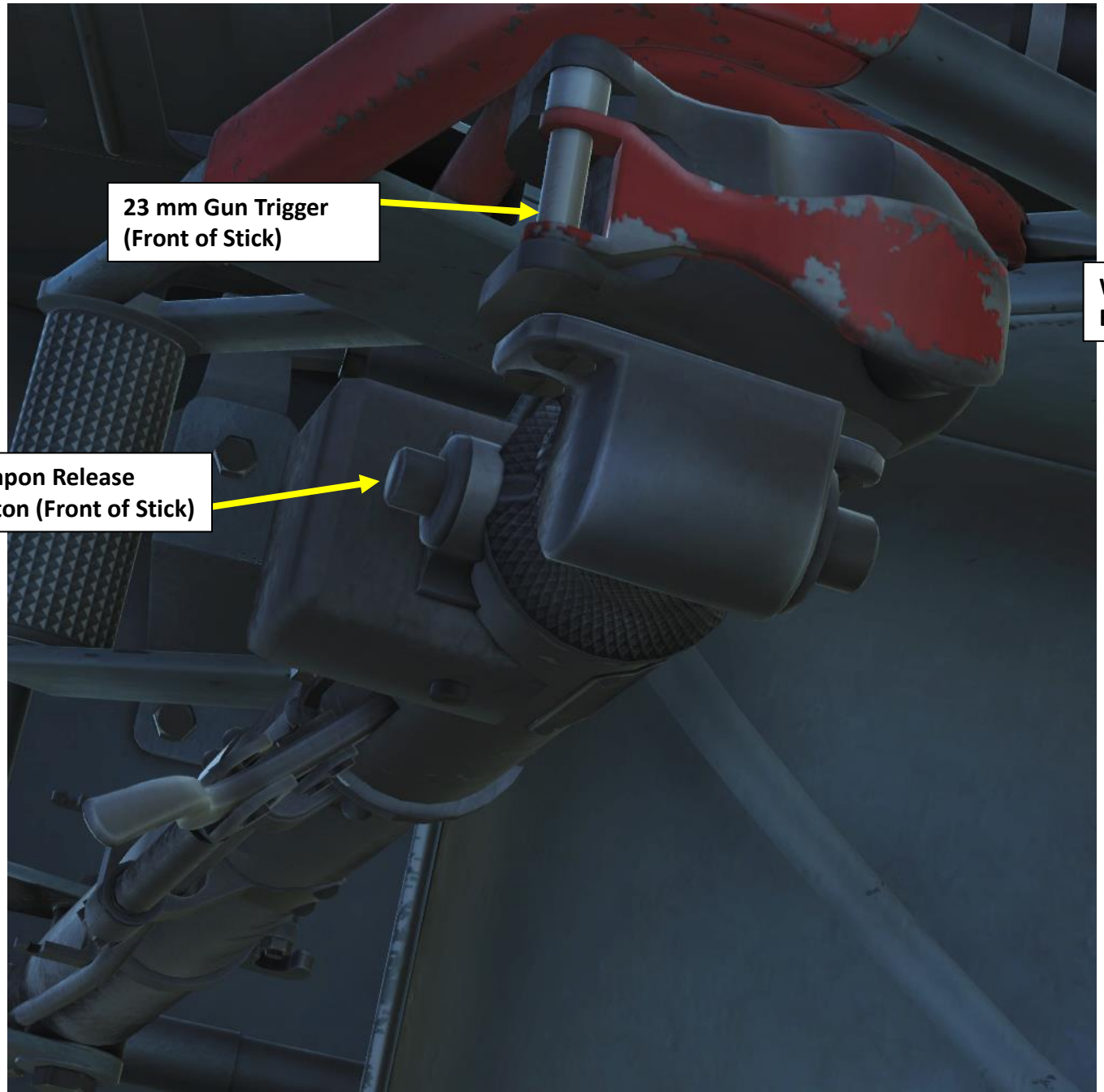
Throttle Twist Grip controls target range on gunsight

Target Range (X100 m)

Gun Safety OFF

Gun Safety ON

PART 9 – WEAPONS: INTRO



PART 9 – WEAPONS: GUNS

1) Make sure the Gunsight Power switch and Gun Power switch are turned ON (FWD). The Gun Camera Power switch is optional.

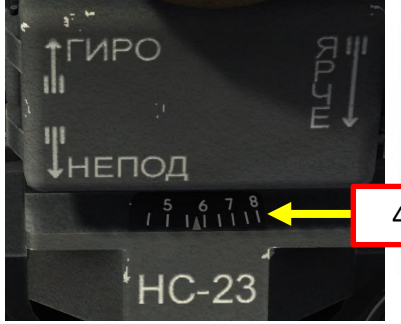
2) Make sure your guns are loaded by checking the RELOAD Lights (should be done on the ground prior to takeoff). The Lights should be illuminated in red. The guns are armed by pressing the Gun Reload buttons for 3-4 seconds.

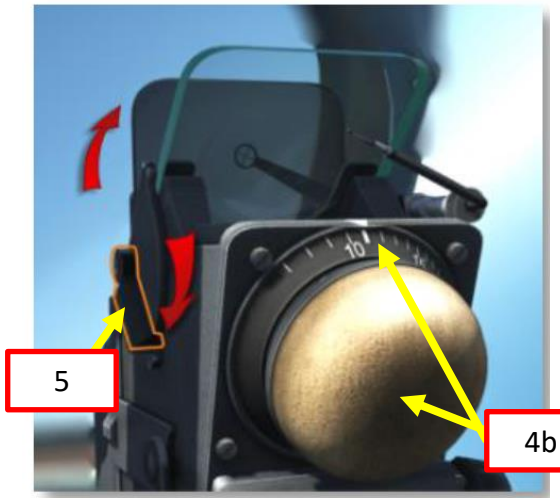
3) Set Gun Safety OFF. ("LCTRL + SPACE" by default)

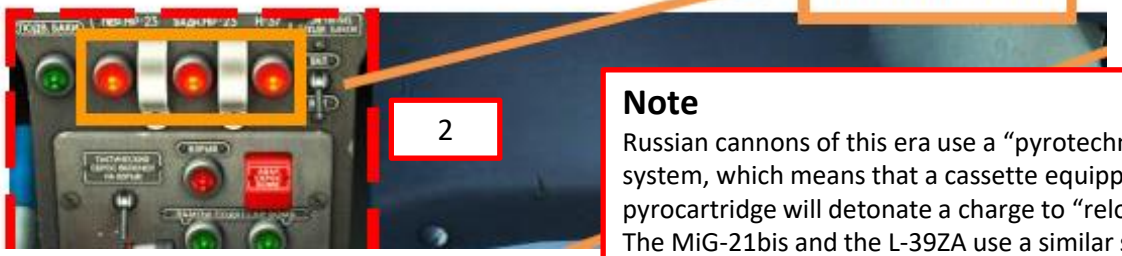
4) Set Target Range and wingspan as required (11 m for Sabre) on gunsight using the twist grip on the throttle (4a) for the target range and the Target Wingspan Setting Control (4b) for the target's wingspan. These controls are mentioned in the previous page.

5) Set gunsight to Gyro Mode (set Caging Lever UP) when you have the target in sight. Otherwise, keep gunsight Mode set to Fixed Mode (DOWN).

6) Fire when ready by pressing the

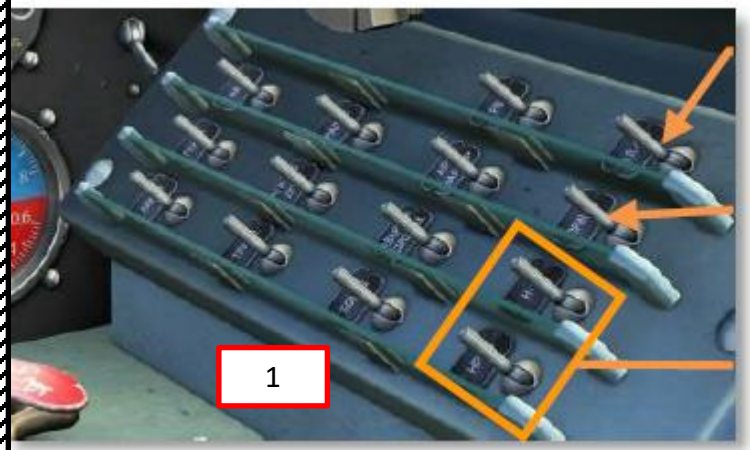






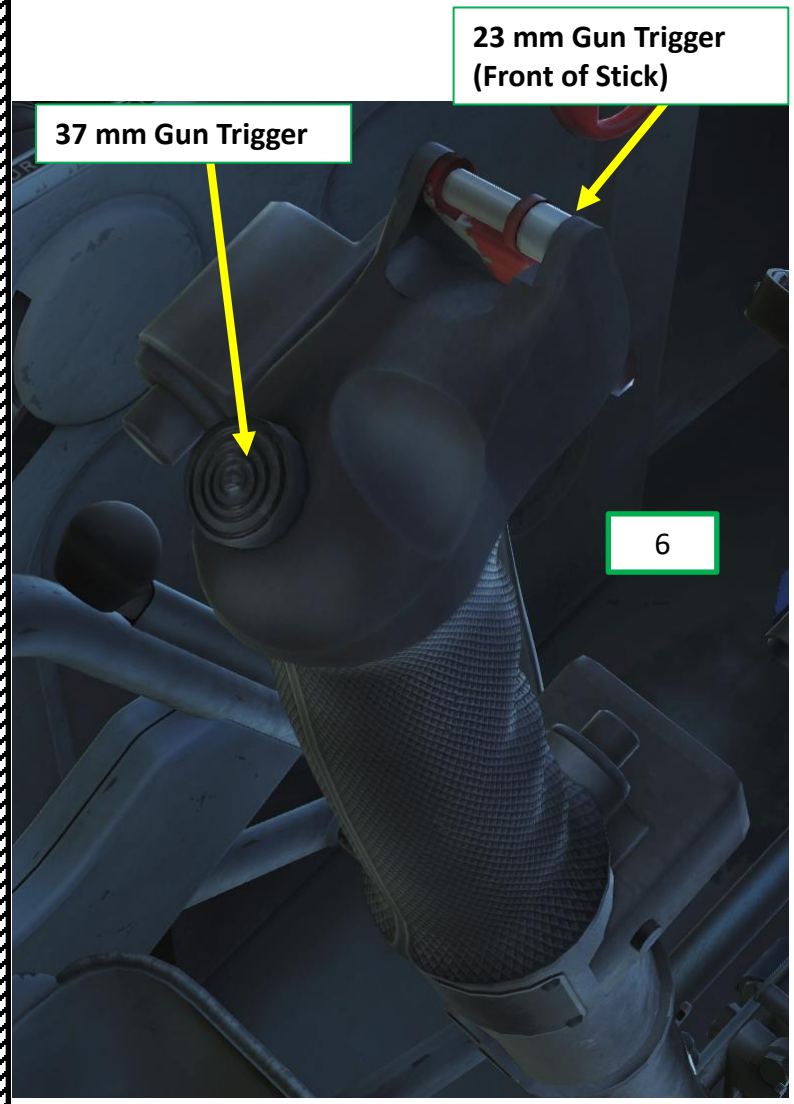
Note

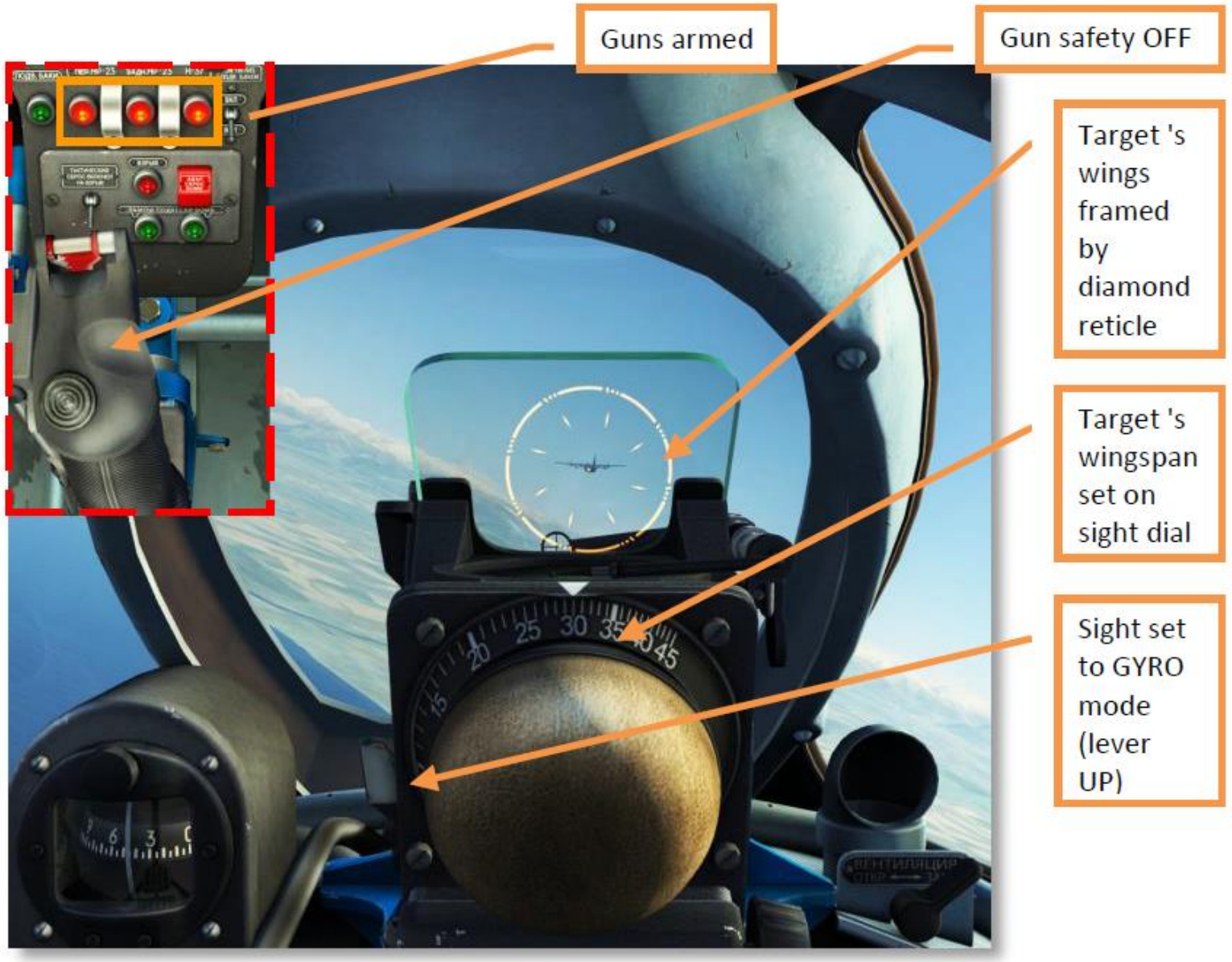
Russian cannons of this era use a "pyrotechnical" reload system, which means that a cassette equipped with a pyrocartridge will detonate a charge to "reload" a gun. The MiG-21bis and the L-39ZA use a similar system.



The arming button must be pressed until the corresponding signal lamp on the armament panel, indicating that gun ready to fire, lights on (2-4 seconds).

PART 9 – WEAPONS: GUNS





PART 9 – WEAPONS: GUNS

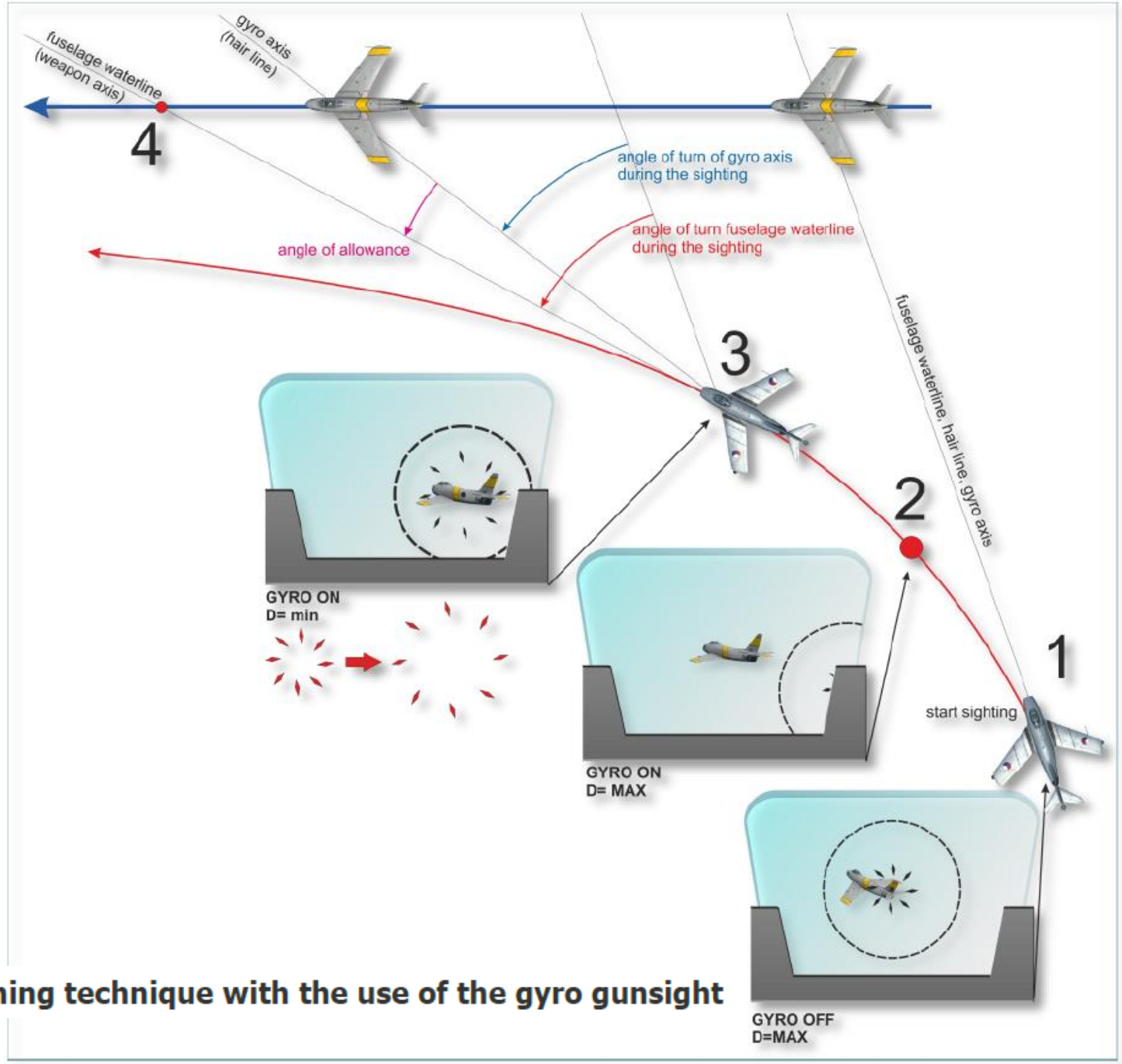


Figure 5.15. Aiming technique with the use of the gyro gunsight

PART 9 – WEAPONS: GUNS

PART 9 – WEAPONS: DIVE BOMBING

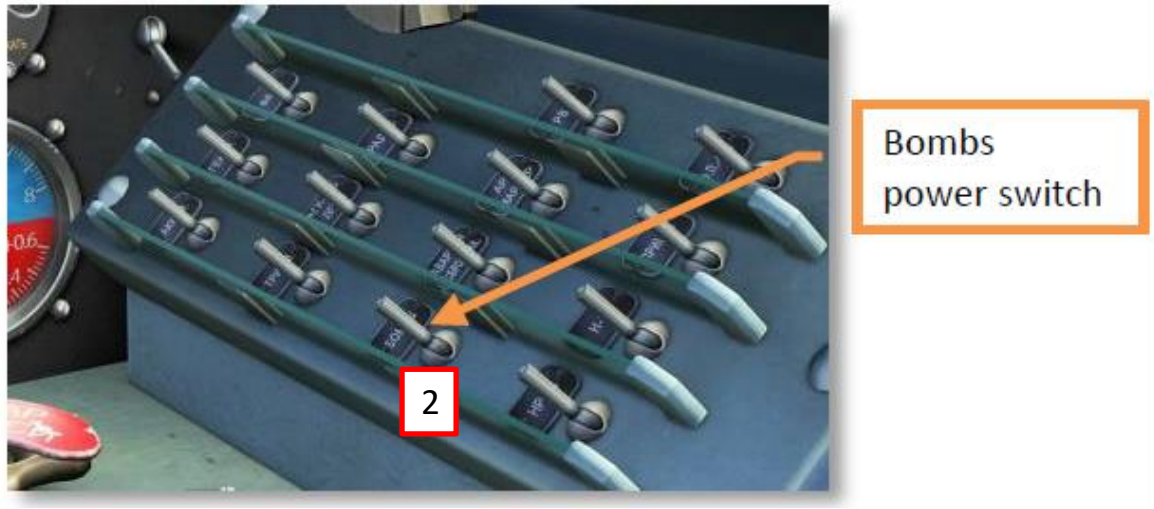
Dive Bombing (from 2000 m @ 40 deg dive)

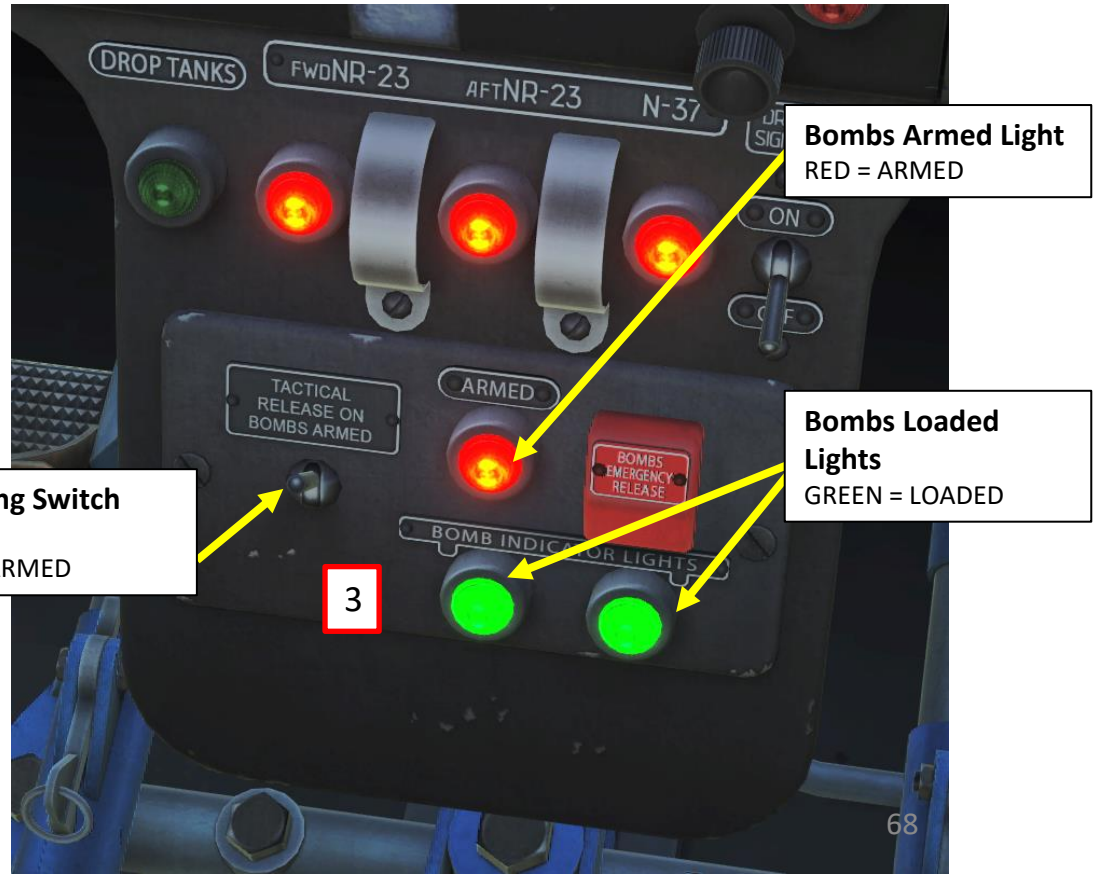
1) Set Gunsight Mode to Fixed (Caged, Switch DOWN)

2) Set Bombs Power Switch to ON (FWD)

3) Arm Bombs using the Bomb Arming Switch (UP). You should see a red light and two green lights illuminated, confirming that the bombs are loaded and armed.

4) Deploy airbrakes and set engine RPM to 6000 or less.





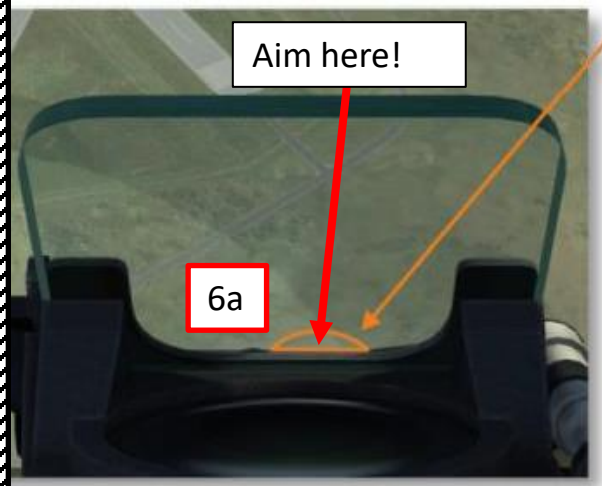
PART 9 – WEAPONS: DIVE BOMBING

5) Start a 40-50 deg dive.

6) Release bomb using the WEAPONS RELEASE button at 800-1200 m. Use the lower line of the gunsight as a reference.

6b

Weapons Release Button



Bombs armed

Bombs are on pylons

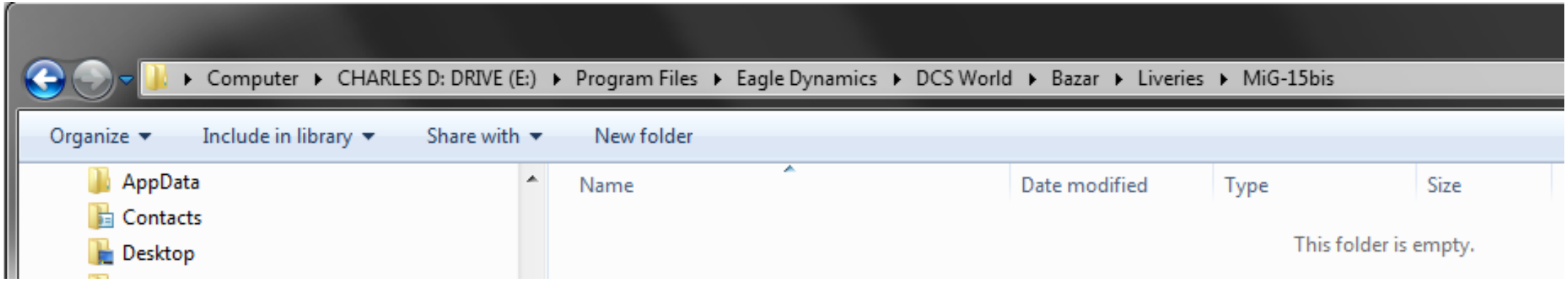
Dive angle -40°

Altitude 2000 m

PART 9 – WEAPONS: DIVE BOMBING

PART 10 – SKINS

- Skins must be installed in the directory shown in the picture below.
- Sometimes the folder is not there. Create one manually called “MiG-15bis” to be able to stock these sweet skins.



PART 11 – RSI-6K HF RADIO TUTORIAL

Note: the term “Frequency” used here actually refers to the “Wave Number” mentioned in the next slide. The term “Frequency” is used for the sake of simplicity.

1. Radio Transmitter Frequency Scale
2. Radio Transmitter Frequency Tuner
3. Radio Transmitter Frequency Intensity Indicator
4. Radio Transmitter Frequency Selector Lock
5. Antenna Tuner
6. КВАРЦА Jack (not functional in game)
7. Antenna Lock
8. УМФОРМЕРА Converter Cable Jack (not functional in game)

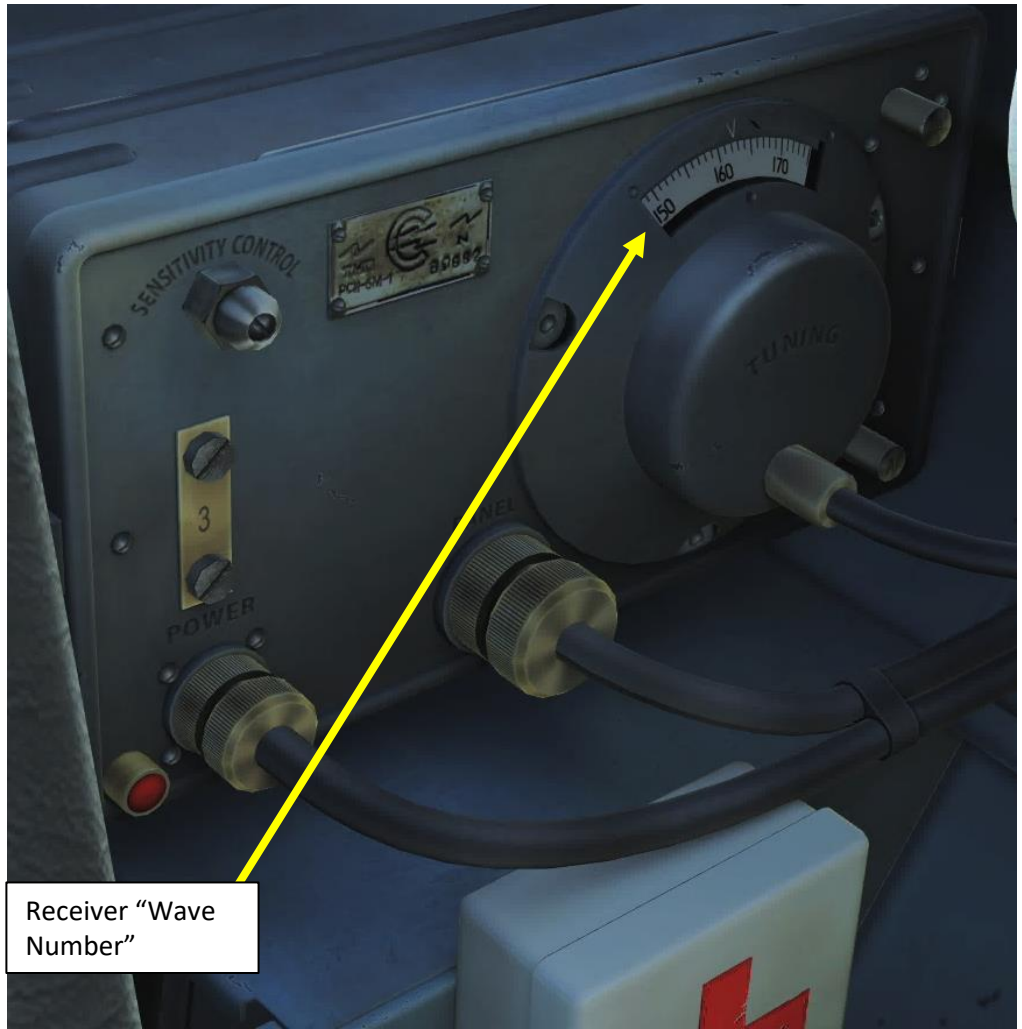
This is the frequency we will want to communicate on with the Kobuleti Control Tower.

PART 11 – RSI-6K HF RADIO TUTORIAL

Notes:

You can tune the radio transmitter, receiver and antenna separately.

The frequency range of the RSI-6 receiver goes from 3.750 MHz to 5.000 MHz. However, what you see on your receiver is not the frequencies themselves. The “Wave Numbers” are distinct numerical identification codes for each MHz frequency going from 150 to 200. For instance, 3.750 MHz is translated into a Wave ID Code of 150. A wave ID code of 151 would mean a frequency of 3.775 MHz (increment of 25 KHz), and 152 would be 7.780 MHz. The conversion table is available to your right.



RSI-6K FREQUENCY / WAVE NUMBER CONVERSION TABLE					
FREQUENCY MHz	*WAVE #*	*FREQUENCY MHz*	*WAVE #*	*FREQUENCY MHz*	*WAVE #*
3.750	150	**4.250**	170	**4.750**	190
3.775	151	**4.275**	171	**4.775**	191
3.800	152	**4.300**	172	**4.800**	192
3.825	153	**4.325**	173	**4.825**	193
3.850	154	**4.350**	174	**4.850**	194
3.875	155	**4.375**	175	**4.875**	195
3.900	156	**4.400**	176	**4.900**	196
3.925	157	**4.425**	177	**4.925**	197
3.950	158	**4.450**	178	**4.950**	198
3.975	159	**4.475**	179	**4.975**	199
4.000	160	**4.500**	180	**5.000**	200
4.025	161	**4.525**	181		
4.050	162	**4.550**	182		
4.075	163	**4.575**	183		
4.100	164	**4.600**	184		
4.125	165	**4.625**	185		
4.150	166	**4.650**	186		
4.175	167	**4.675**	187		
4.200	168	**4.700**	188		
4.225	169	**4.725**	189		

MiG-15bis Default ATC Channel List (Russia)

Airfield	ATC Stations (MHz)	ATC Wave Number	NDB Stations (Inner)	NDB Stations (Outer)
Anapa	3.75	150	215.0 kHz ·– –·	443.0 kHz ·– –·
Beslan	4.75	190	250.0 kHz –·–·	1050.0 kHz –·–· ····
Gelendzhik	4.00	160		
Krasnodar-C	3.80	152	303.0 kHz –––	625.0 kHz ––– –––
Krasnodar-P	4.10	164	240.0 kHz –·–	493.0 kHz –·– ·–·
Krymsk	3.90	156	830.0 kHz ·––	408.0 kHz –·– ·––
Maykop	3.95	158	591.0 kHz –·–·	288.0 kHz ·–· –·–
Min Vody	4.45	178	283.0 kHz –· ·–·	583.0 kHz –· ·–·
Mozdok	4.55	182	1065.0 kHz	525.0 kHz –·· –––
Nalchik	4.50	180	350.0 kHz –– ·–··	718.0 kHz –– ·–··
Sochi	4.05	162	761.0 kHz ··· –––	761.0 kHz ··· –––

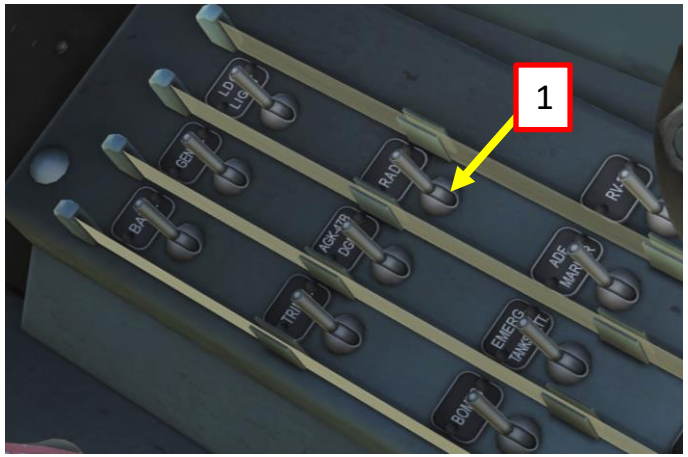
MiG-15bis Default ATC Channel List (Georgia)

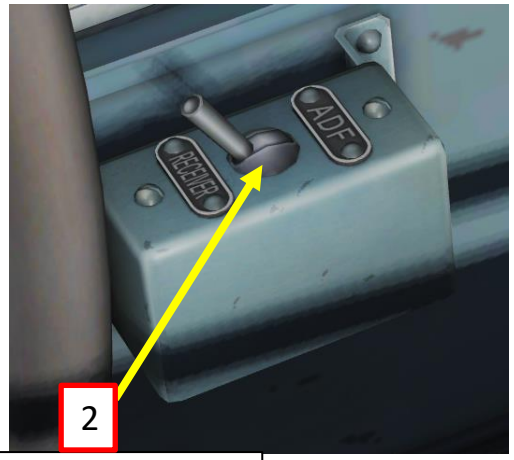
Airfield	ATC Stations (MHz)	ATC Wave Number	NDB Stations (Inner)	NDB Stations (Outer)
Batumi	4.25	170		
Gudauta	4.20	168	395.0 kHz ––·· –·–·	395.0 kHz ––·· –·–·
Kobuleti	4.35	174	490.0 kHz –·– –	870.0 kHz –·– –
Kutaisi	4.40	176	477.0 kHz – ·· ––·	477.0 kHz – ·· ––·
Senaki	4.30	172	129.0 kHz – ··	156.0 kHz – ··
Soganlug	4.65	186		
Sukhumi	4.15	166	489.0 kHz ·– ···–	489.0 kHz ·– ···–
Tbilisi	4.60	184	435.0 kHz –· ·–	211.0 kHz –· ·–
Vaziani	4.70	188		

List of Airfield Air Traffic Controller (ATC) frequencies and wave numbers. Thanks, Uboats!
http://forums.eagle.ru/showthread.php?t=139775

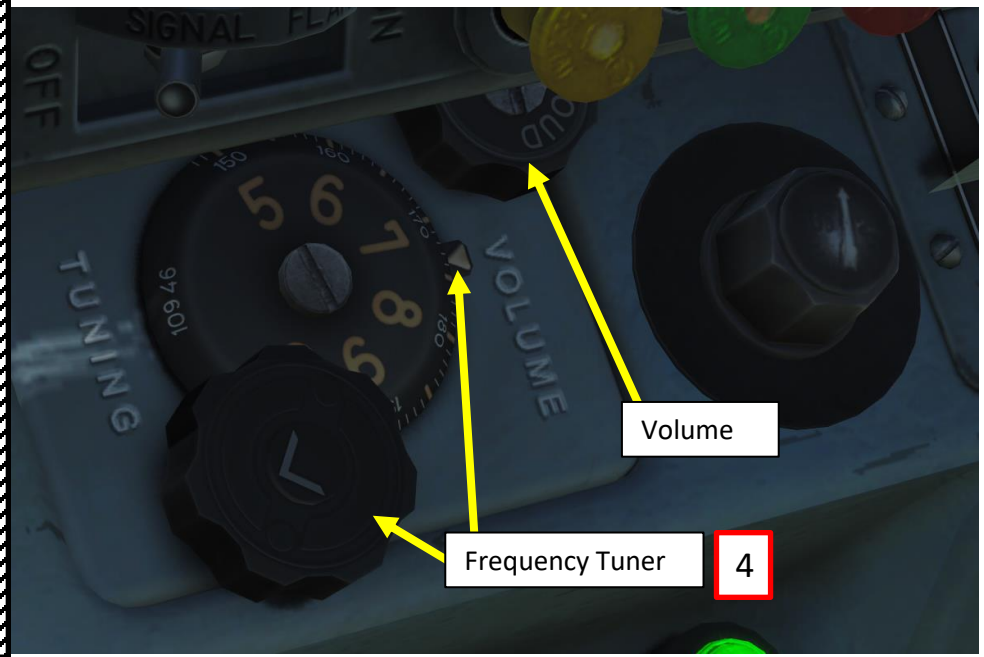
PART 11 – RSI-6K HF RADIO TUTORIAL

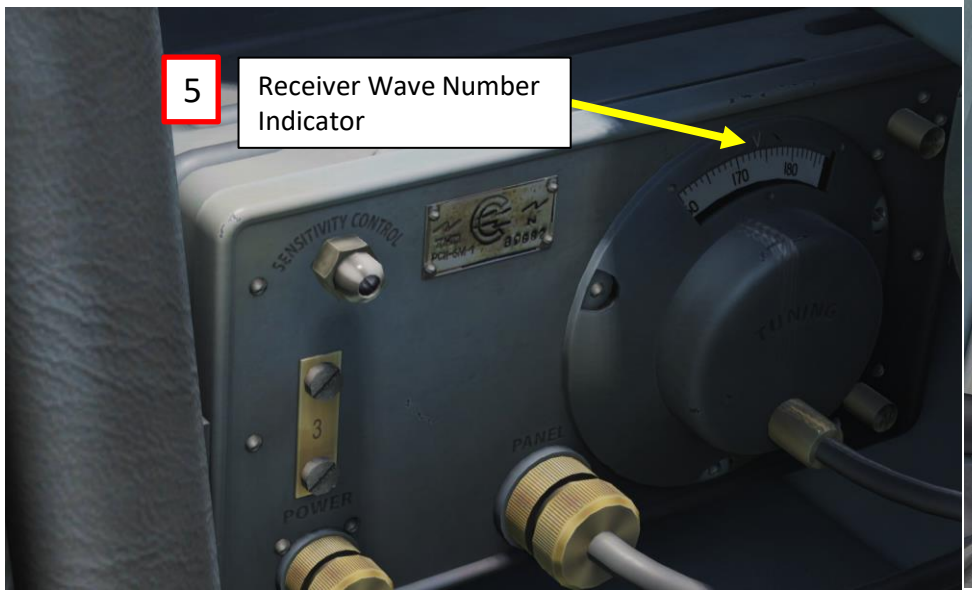
1. Turn on the Radio Switch (FWD)
2. Set the Radio Selector Switch to ПРИЕМ / “RECEIVER” (AFT)
3. Use the Conversion Table to find the correct Wave Number as shown in the previous page. For example, Kobuleti has a frequency of 4.35 MHz, which gives a Wave Number of 174.
4. Tune receiver to desired radio frequency using the Receiver Knob on the cockpit left hand side next to the flare buttons.
5. You can check the receiver “Wave Number” using the indicator.
6. Excellent! You can now receive transmissions from Kobuleti or whoever is transmitting on this frequency! However, you can’t transmit anything yet. Hold on, we’ll come to that in a second.

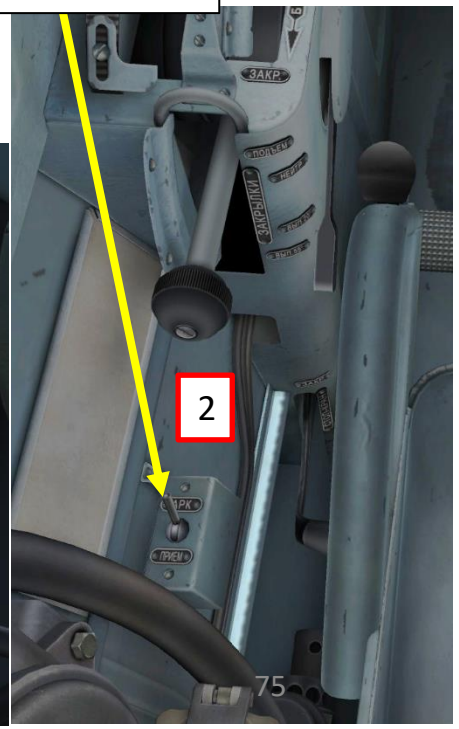




Radio Receiver / ARK Selector







PART 11 – RSI-6K HF RADIO TUTORIAL

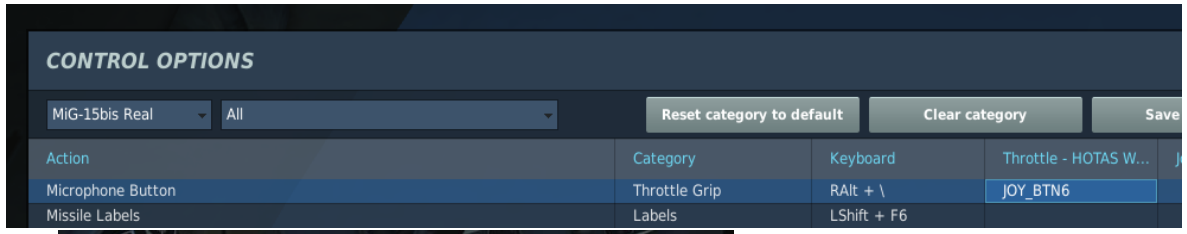
7. Choose between “NORMAL” (DOWN) and “FORCED” (UP) Transmitter Mode. “FORCED” transmitter mode will give you extra transmitting range but you risk damaging your equipment. I recommend you stick to “NORMAL” mode.

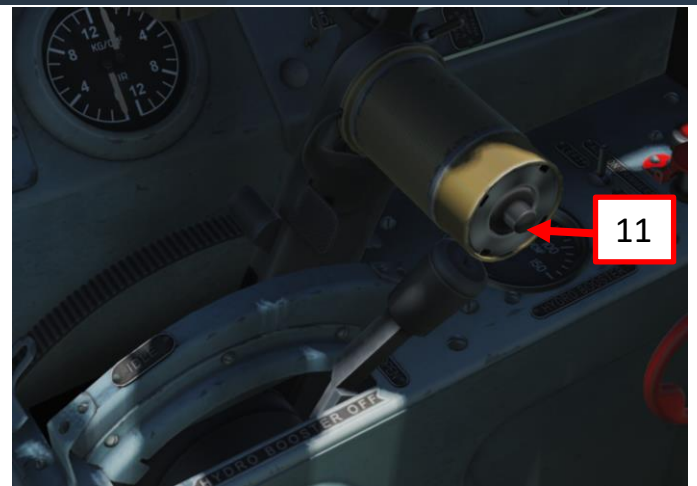
8. Set your transmitter tuning knob to the desired transmitting frequency. Generally, you use the same “Wave Number” (Frequency ID that you set in Step #3, which is Wave Number 174 for Kobuleti) that you receive on if you want to communicate with, say, a control tower.

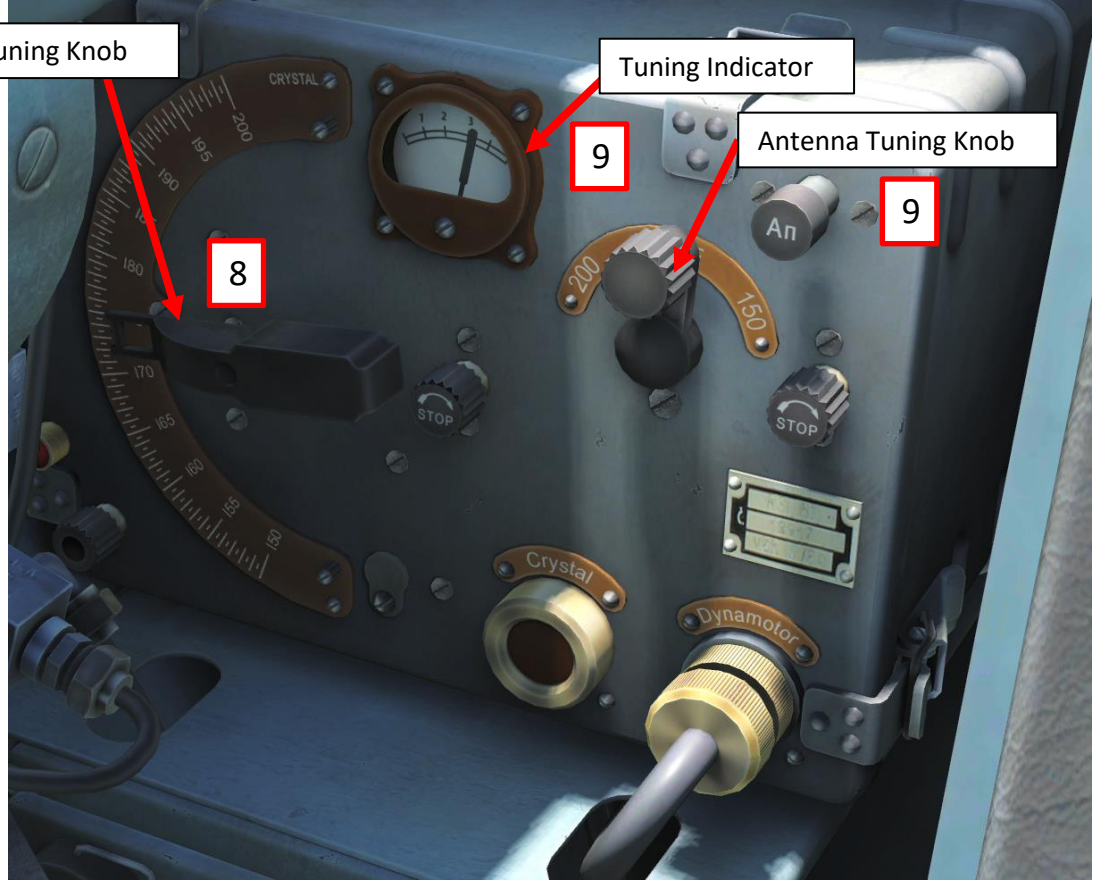
9. You need to tune your antenna in order to make sure you are transmitting in the right direction in relationship to whoever you are transmitting to. Use your Antenna Tuning Knob to gain a maximum intensity on the tuning indicator. It’s just like the old-school radios where you needed to unfold the antenna and toy with it during hours to be able to receive anything.

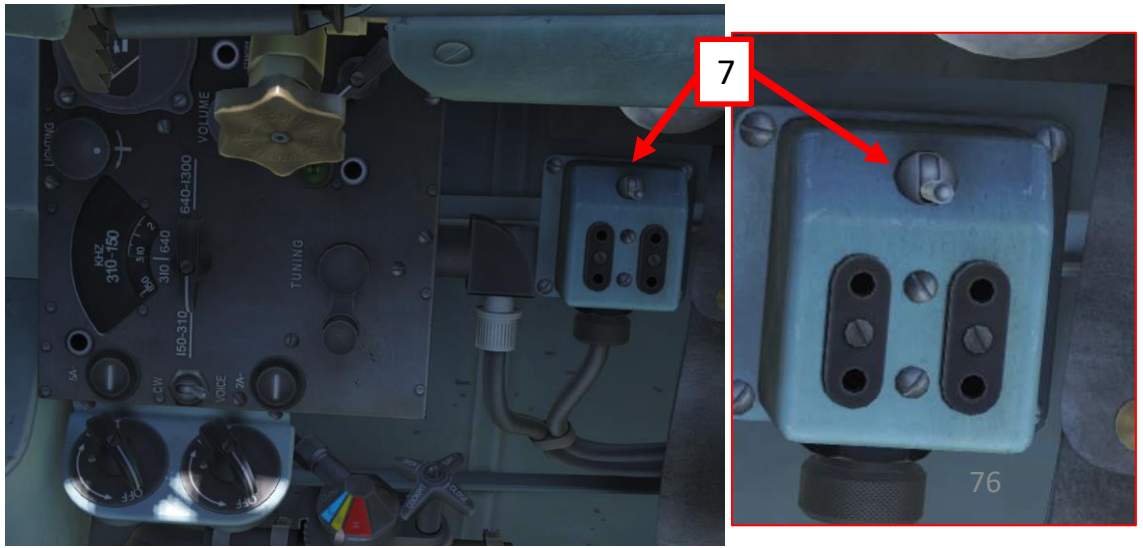
10. Once you have an acceptable tuning intensity, you can lock the antenna and transmitter knobs. However, this step is not mandatory.

11. You can now transmit using the “MICROPHONE” switch on your throttle.









UNDERSTANDING THE ARK-5 AUTOMATIC DIRECTION FINDER

Navigation is an extensive subject. You can check chapter 15 of FAA manual for more details on navigation.

LINK: http://www.faa.gov/regulations_policies/handbooks_manuals/aviation/pilot_handbook/media/PHAK%20-%20Chapter%2015.pdf

- "NDB" is what we call a non-directional beacon. It transmits radio waves on a certain frequency on long distances. These waves are read by an ADF (automatic direction finder). NDBs are typically used for radio navigation and provide a bearing to the station but no actual range.
- "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, can be used for radio navigation.
- NDB and VOR are used just like lighthouses were used to guide ships. This way, air corridors and airways are created to help control an increasingly crowded sky.
- The ARK or ARC (Automated Radio Compass) is the russian equivalent of an ADF (Automatic Direction Finder), which can help you track NDB stations. ARC stations are basically NDB navigation aids and have a max range of approximately 120 km.

Before Russian VOR (RSBN) beacons were installed as navigation aids by the Soviet Union, NDBs were routinely used to get a bearing towards a specific station (mostly placed near airports). However, from the 1960s NDBs have become increasingly limited in comparison to ILS (Instrument Landing System) approach installations. NDBs are now very gradually being phased out of service. In our tutorial, we will do an old school approach using two NDBs, referred to as an Outer Marker and an Inner Marker. A switch in the cockpit allows us to toggle between the Outer (FAR) marker and the Inner (NEAR) marker.

The Outer Marker, which normally identifies the final approach fix (FAF), is located on the same course/track as the runway center-line, four to seven nautical miles before the runway threshold. The Inner Marker is located at the beginning (threshold) of the runway on some ILS approach systems having decision heights of less than 200 ft (60 m) above ground level.

ARK (NDB) RANGE IN FUNCTION OF MINIMUM ALTITUDE						
Distance from station (km)	20	40	60	80	100	120
Minimum altitude (m)	350	700	1050	1400	1750	2100

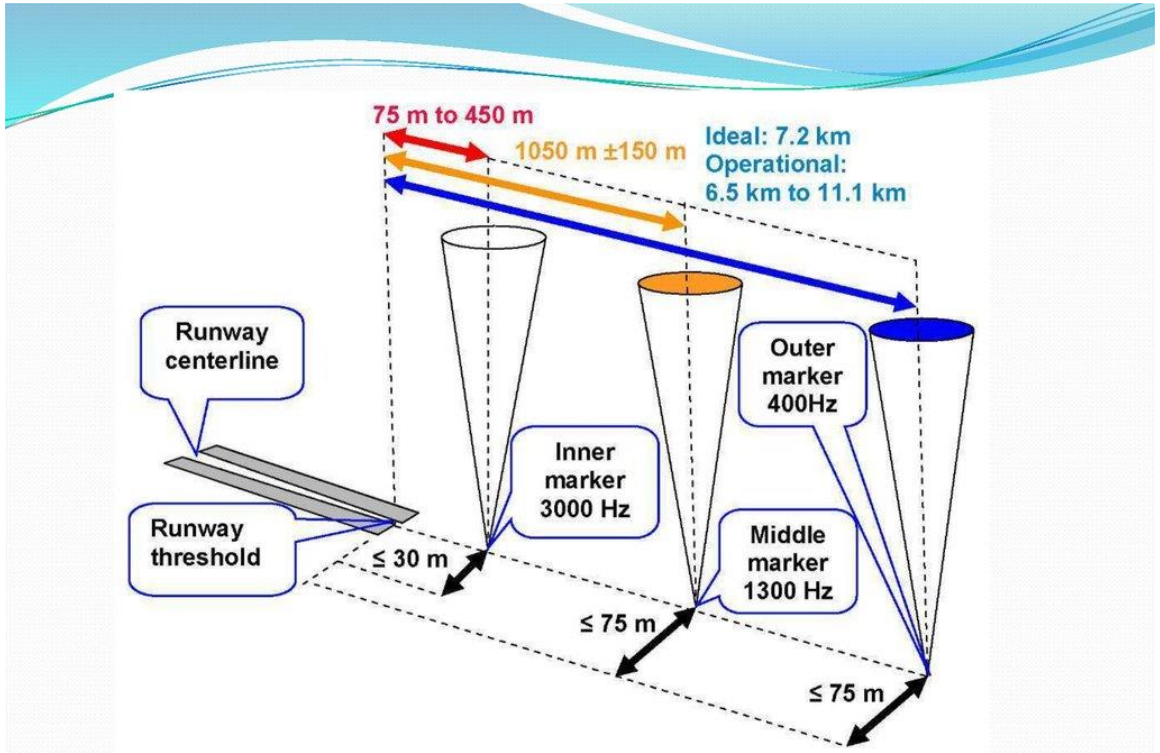


Figure 14: Marker beacon placement with respect to runway

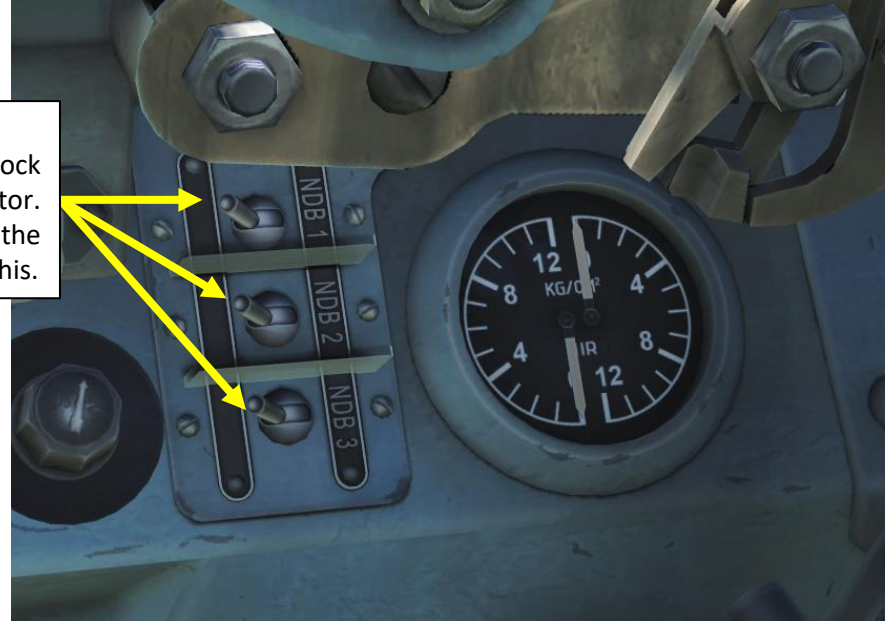
PART 12 - K-7 ARK-5 COMPONENTS

1. Receiver Mode Switch
   ТЛГ-ТЛФ/TLG-TLF
   (Telegraph/Telephony)
2. 3-position frequency range selector switch
3. Frequency Range Indicator
4. Panel illumination dimmer
5. Volume knob
6. Frequency Intensity Indicator
7. Antenna Mode
8. Radio Compass Mode Selector
   КОМП = COMP (Auto Compass mode)
9. ARK-5 ON/OFF Light
10. Frequency Fine Tuning Handle

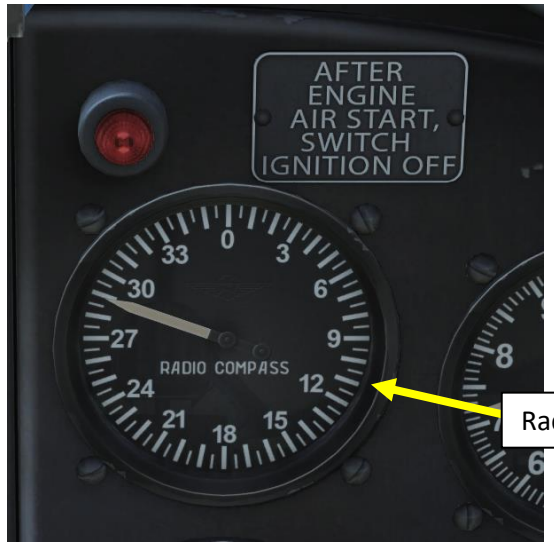
ARK-5 PANEL OVERVIEW

PART 12 - K-7 ARK-5 COMPONENTS

No Function in DCS.
In previous versions, these switches were used to stock preset NDB frequencies set through the Mission Editor. The functionality has been changed since, but the Belsimtek Manual has not been updated yet to reflect this.

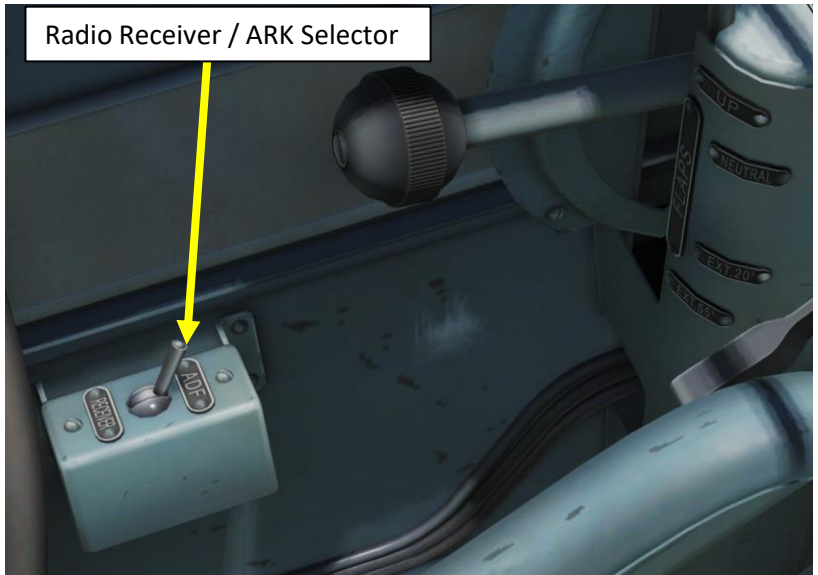


ARK-5 Radio Navigation System NEAR/FAR Frequency Homing Selector Switch

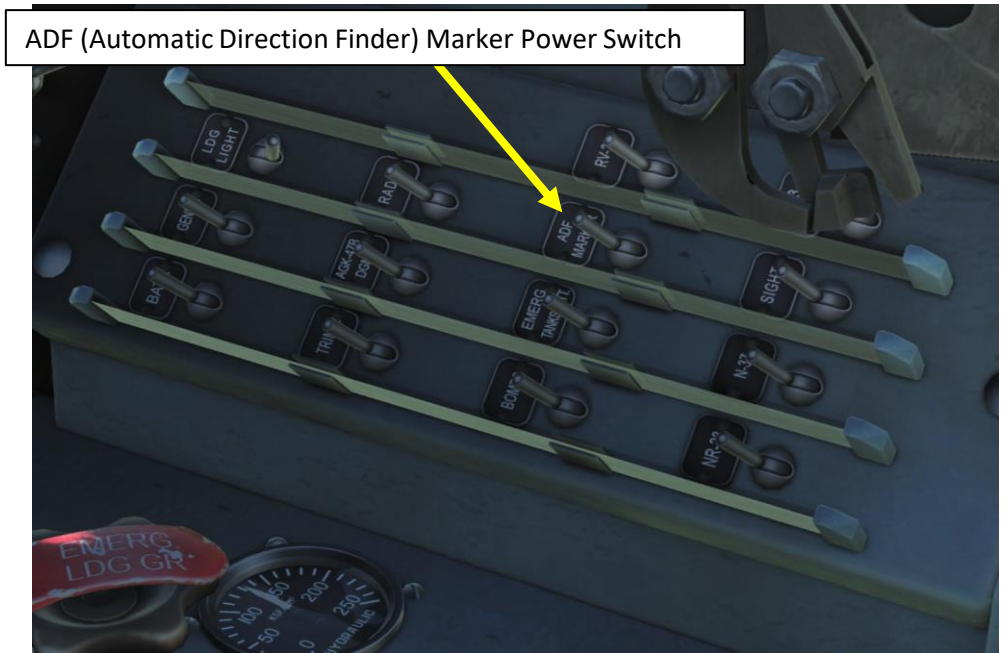


Radio-Compass

Radio Receiver / ARK Selector



ADF (Automatic Direction Finder) Marker Power Switch



PART 12 - K-7 ARK-5 RADIO NAVIGATION

- We will use a “NDB” (Non-Directional Beacon) for radio compass navigation. These NDBs are located at various airfields and certain places. Take note that they are hardcoded in the map.
- A NDB Frequencies List is available in the next page
- NDBs transmit a morse code on a set frequency that can be heard with the ARK (Automatic Radio Compass). The source of the signal can be detected with the radio compass on the main instrument panel (its arrow will tell you where the signal you are receiving is coming from).
- There can be many NDBs transmitting at frequencies that are very close to one another, so it can be easy to follow another signal by mistake.
- Radio tuning is very precise and sensitive. The only reliable way to know if you are tracking the good signal is to listen to the morse code signal emitted by the beacon and verify that it matches.
- All Beacons and their respective morse codes are listed in **LINO GERMANY’S BEACON MAP** available here:

DIRECT DOWNLOAD: https://drive.google.com/open?id=0B-uSpZROuEd3YWJBUmZTazBGajQ&authuser=0

- In the following example, I will fly from the West of the airfield at Kutaisi (which already has two NDBs next to it transmitting other signals on their own frequencies).
- The signal I will track is a NDB near the small town of Kutaisi. The beacon map tells us that the beacon is transmitting on **a frequency of 477.00 MHz and the Morse Code is – . . – – .**
- I can associate the morse code with one long beep, followed by a pause, followed by two short beeps, followed by a pause, followed by two long beeps and followed by a short beep.
- Takeof note that if you fly under 2000 meters, there might be interferences from ground clutter.
- **IMPORTANT NOTE**: The ARK-5 Radio-Navigation kit can track two frequencies: one for the Outer (FAR) Marker and one for the Inner (NEAR) Marker. These frequencies can also be preset in the Mission Editor or tuned manually.

MiG-15bis Default ATC Channel List (Russia)

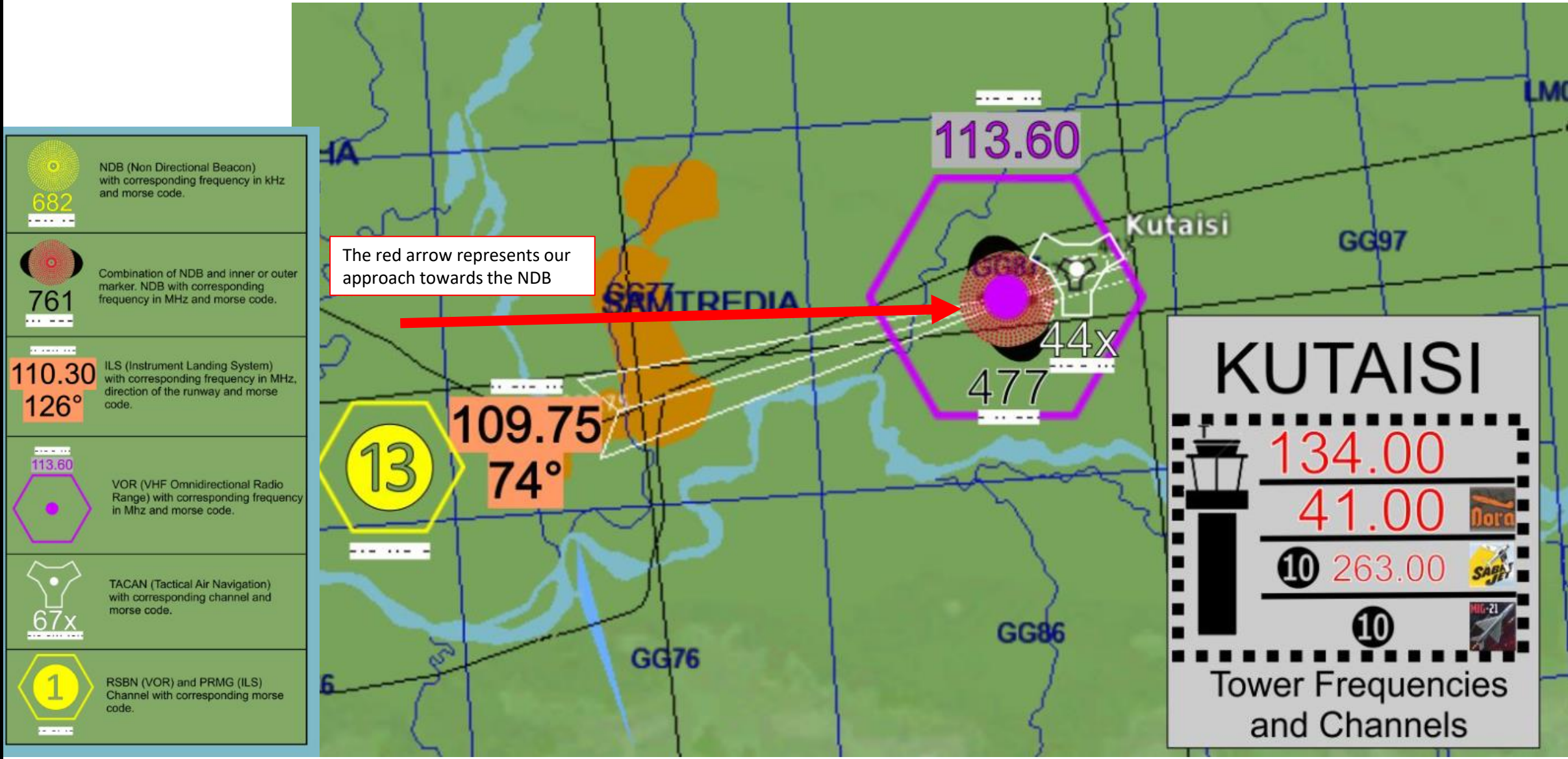
Airfield	ATC Stations (MHz)	ATC Wave Number	NDB Stations (Inner)	NDB Stations (Outer)
Anapa	3.75	150	215.0 kHz ·– –·	443.0 kHz ·– –·
Beslan	4.75	190	250.0 kHz –·–·	1050.0 kHz –·–· ····
Gelendzhik	4.00	160		
Krasnodar-C	3.80	152	303.0 kHz ––– –––	625.0 kHz ––– –––
Krasnodar-P	4.10	164	240.0 kHz –·– ·–·	493.0 kHz –·– ·–·
Krymsk	3.90	156	830.0 kHz –·– ·––	408.0 kHz –·– ·––
Maykop	3.95	158	591.0 kHz ·–· –·–	288.0 kHz ·–· –·–
Min Vody	4.45	178	283.0 kHz –· ·–·	583.0 kHz –· ·–·
Mozdok	4.55	182	1065.0 kHz	525.0 kHz –·· –––
Nalchik	4.50	180	350.0 kHz	718.0 kHz –– ·–··
Sochi	4.05	162	761.0 kHz	761.0 kHz ··· –––

MiG-15bis Default ATC Channel List (Georgia)

Airfield	ATC Stations (MHz)	ATC Wave Number	NDB Stations (Inner)	NDB Stations (Outer)
Batumi	4.25	170		
Gudauta	4.20	168	395.0 kHz	395.0 kHz ––·· –·–·
Kobuleti	4.35	174	490.0 kHz	870.0 kHz –·– –
Kutaisi	4.40	176	477.0 kHz	477.0 kHz – ··–·
Senaki	4.30	172	129.0 kHz	156.0 kHz – ··
Soganlug	4.65	186		
Sukhumi	4.15	166	489.0 kHz	489.0 kHz ·– ···–
Tbilisi	4.60	184	435.0 kHz	211.0 kHz –· ·–
Vaziani	4.70	188		

List of Airfield Air Traffic Controller (ATC) frequencies and wave numbers. Thanks, Uboats!
http://forums.eagle.ru/showthread.php?t=139775

PART 12 - K-7 ARK-5 RADIO NAVIGATION



PART 12 - K-7 ARK-5 RADIO NAVIGATION TUTORIAL

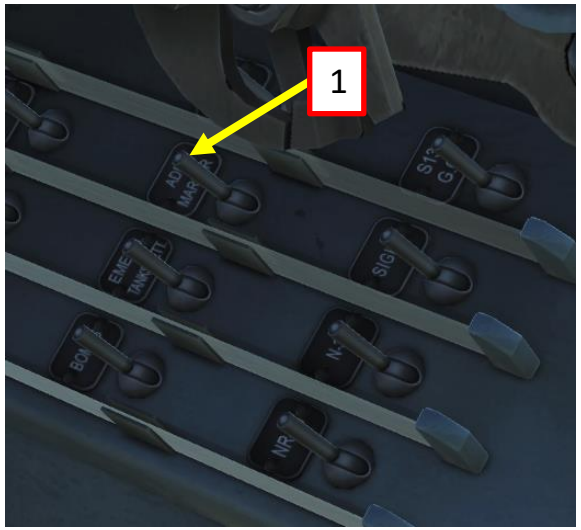
1. Turn on the ARK-5 ADF Marker Power Switch (FWD)

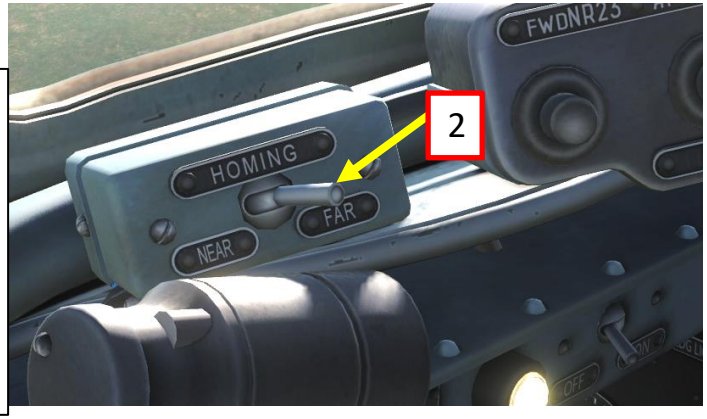
2. Set the ARK-5 Near/Far Homing Selector Switch to the desired NDB (NEAR = AFT, FAR = FWD). We will use “FAR” in this case since we will only track a single NDB. If we wanted to track two NDBs near an airport (an Outer and an Inner marker), we would tune the ARK-5 to the Outer Marker NDB frequency while the Homing Selector is set to FAR. After, we would tune the ARK-5 to the Inner Marker NDB frequency while the Homing Selector is set to NEAR. Both frequencies being saved, we can then switch between NEAR and FAR frequencies using the Homing selector instead of having to re-tune every time manually.

3. Set the ARK/RECEIVER switch to “ARK/ADF” (FWD).

4. Set the Antenna Mode to AHT (ANT).

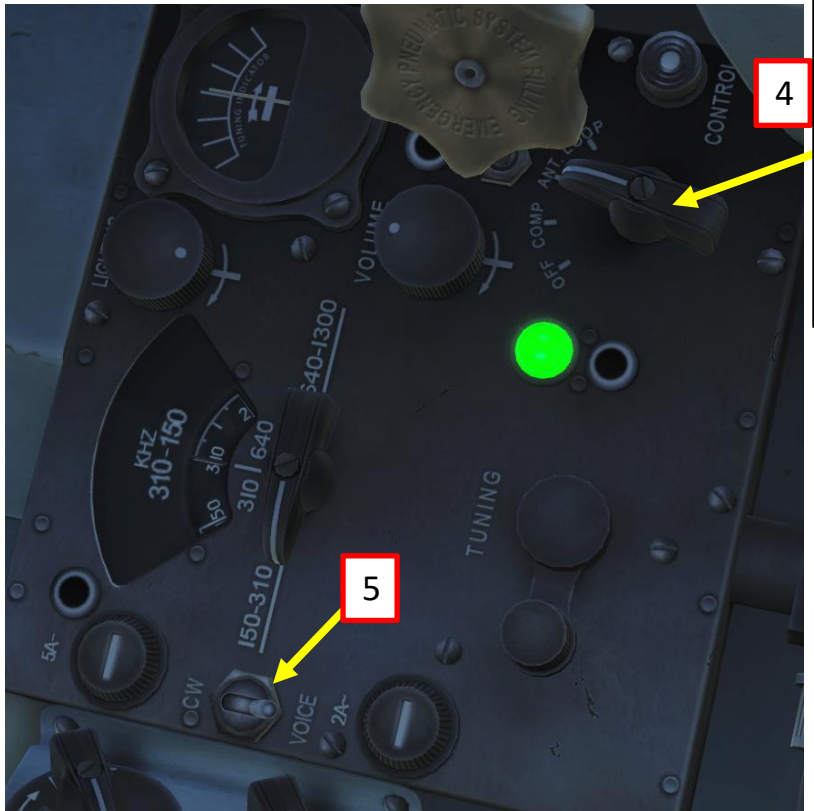
5. Set the ТЛГ-ТЛФ (TLG-TLF, or Telegraphy-Telephony) Receiver Mode to Telephony/Voice (ТЛФ) Mode (AFT). No NDBs in DCS require the ТЛГ/Telegraphy Mode so far.

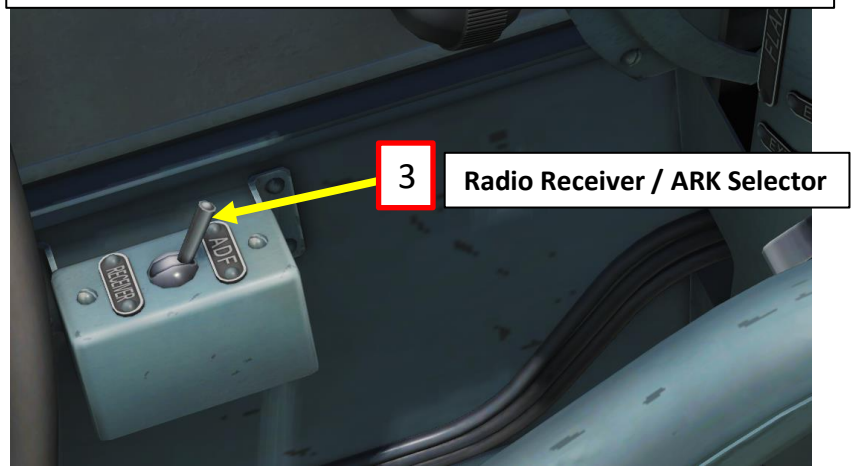




ARK-5 Radio Navigation System Function Selector Switch

- *OFF*
- *COMP: Compass Direction finder Mode. The ARK-5P will use the pre-set or manually tuned Frequencies to automatically indicate the NDB (Non-Directional Beacon) Bearing*
- *ANT: Antenna Mode enables the Audio of the NDB Morse Identifiers (using the Non-Directional Sense Antenna). In this Mode, the Morse Identifiers are heard more clearly than in COMP Mode.*
- *LOOP: Used to manually Rotate the Directional Loop Antenna Frame to the Null Signal Position.*





Radio Receiver / ARK Selector

PART 12 - K-7 ARK-5 RADIO NAVIGATION TUTORIAL

6. Adjust Volume as required

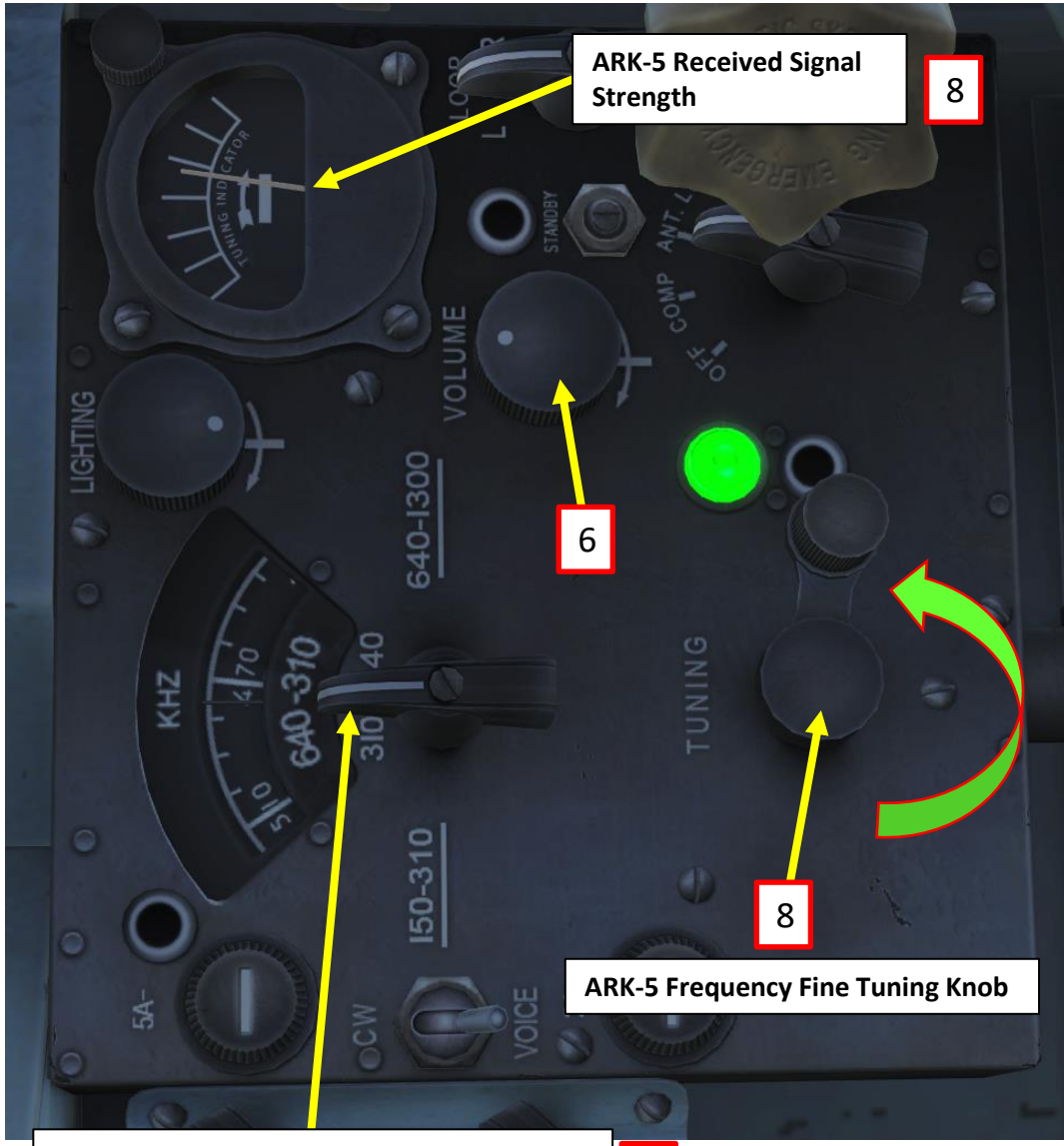
7. Set the NDB range according to the NDB frequency we are looking for. In our case, we want 477.0 KHz, which is in the 310-640 KHz range. The ranges go from 150-310 KHz, 310-640 KHz and 640-1300 KHz.

8. Fine tune the frequency and find the good frequency by listening to the audio tone and monitoring the signal strength gauge. You should keep tuning until you hear the correct morse code beeps. Take note that there are many NDBs with frequencies close to each other, so it can be difficult to find the correct one.

150–310kHz

310–640khz

640–1300khz



PART 12 - K-7 ARK-5 RADIO NAVIGATION TUTORIAL

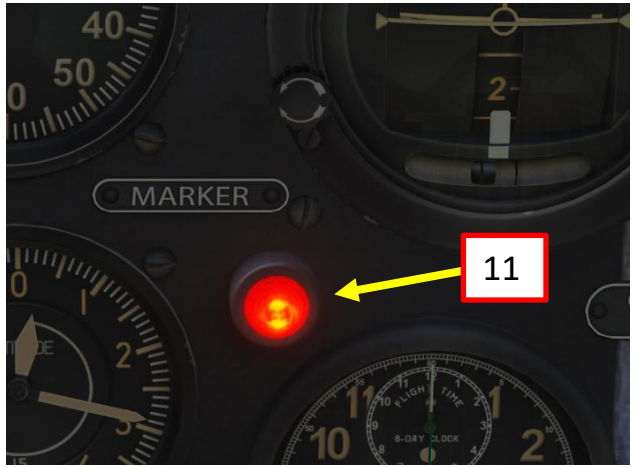
6. Once you found the correct frequency (good intensity + correct audio morse code), set the ARK Function mode to COMP (Compass). This will lock the frequency in place and display the bearing to the NDB on your Radio-Magnetic Indicator.

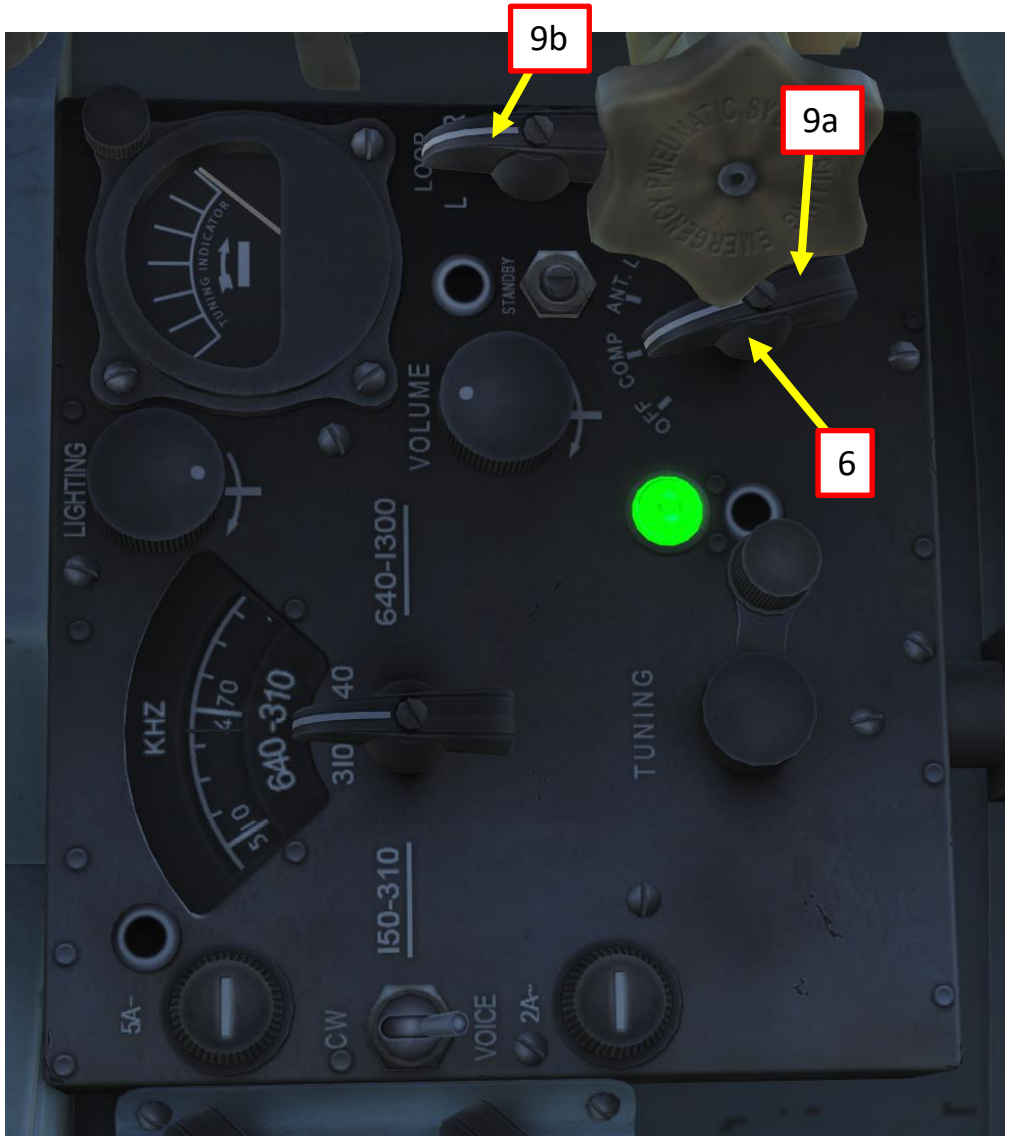
7. Confirm that the ARK-5 needle points in the correct direction.

9. (Optional) Test the Antenna “COMP” mode by holding the “Antenna Loop” Switch left or right. This will make the antenna twist left or right. Look to the rear to your right and make sure the antenna comes back when you release the loop switch.

10. Follow the NDB Bearing needle on the Radio-Magnetic Indicator.

11. Once you fly over the Outer Marker (477.000 KHz NDB) near Kutaisi, the BEACON lamp will illuminate, a ringing sound will be audible and the NDB Bearing needle will do a 180 deg as the navigation aid goes behind you.





MiG-15bis Default ATC Channel List (Georgia)

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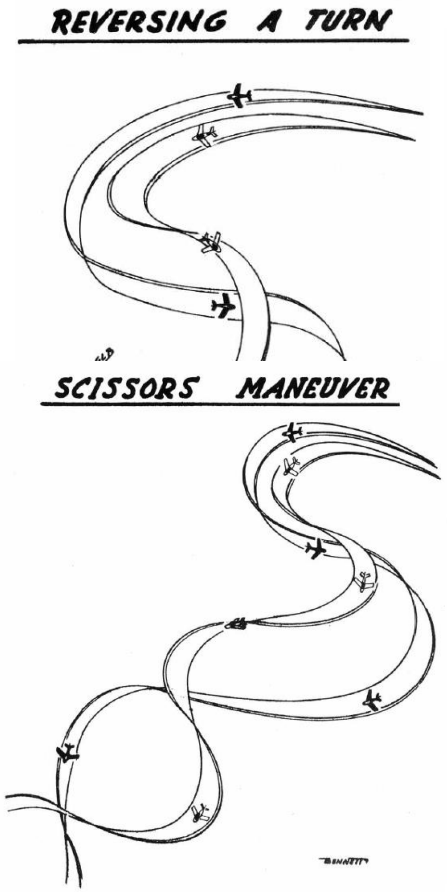
Gudauta	4.20	168	395.0 kHz	395.0 kHz --·· -·-·
Kobuleti	4.35	174	490.0 kHz	870.0 kHz -·-- -
Kutaisi	4.40	176	477.0 kHz	477.0 kHz - ·· --··
Senaki	4.30	172	129.0 kHz	356.0 kHz - ··
Soganlug	4.65	186		
Sukhumi	4.15			489.0 kHz ·- ···-
Tbilisi	4.60	184	435.0 kHz	211.0 kHz -· ·-
Vaziani	4.70	188		

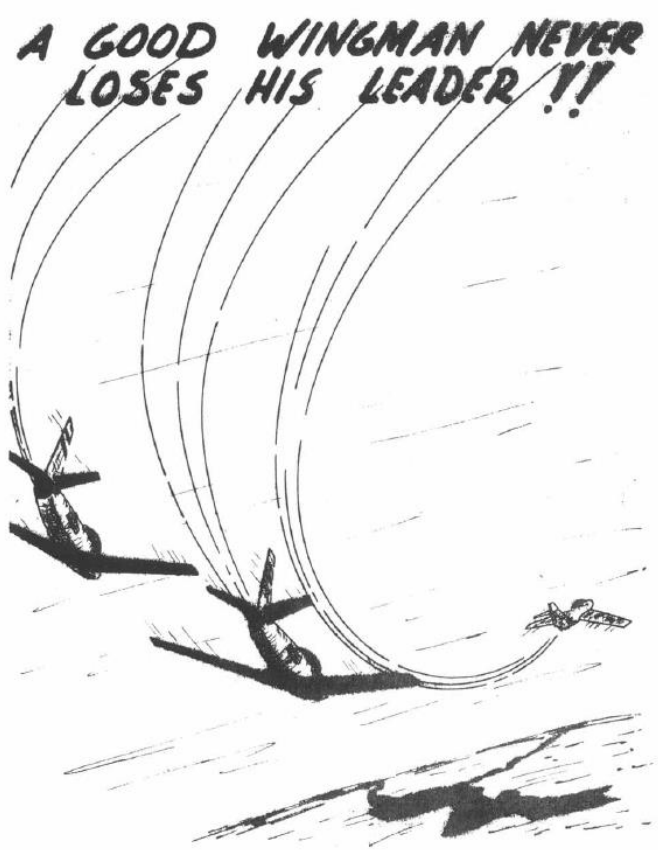
COMBAT TIPS & TRICKS AGAINST THE F-86F SABRE

COMBAT TIPS & TRICKS AGAINST THE F-86F SABRE

You should consult “No Guts, No Glory”, an excellent textbook written by USAF Major General Frederick C. Blesse (Ret.). It has excellent insight on how the Sabre should be flown in combat scenarios. It is also applicable to the MiG-15 as it gives you tricks on what to expect from competent Sabre pilots. The rules of wingmanship still apply all the same.

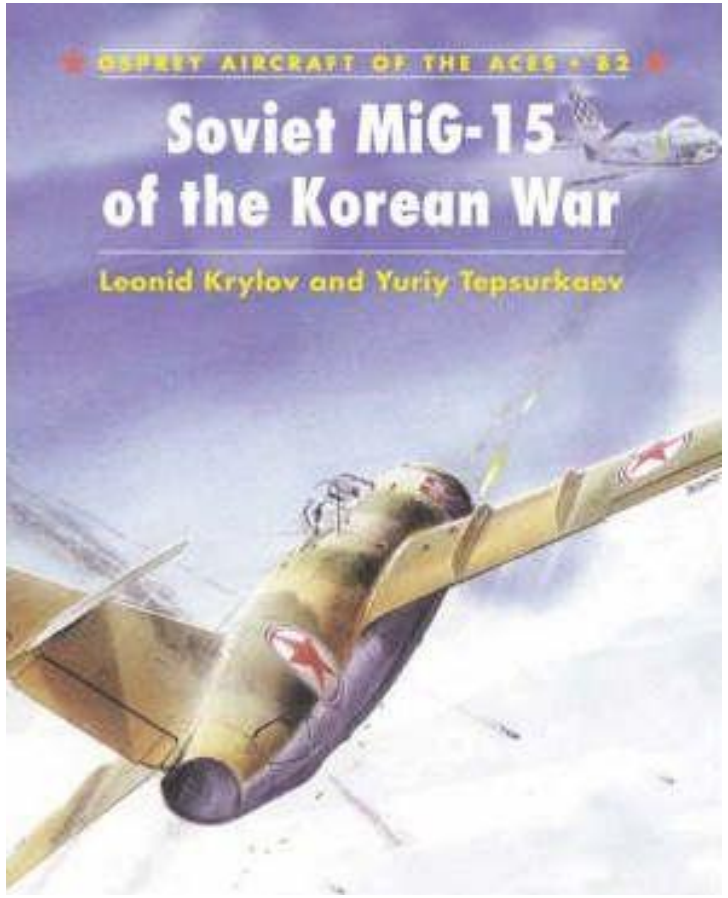
LINK: https://drive.google.com/open?id=0B-uSpZROuEd3T1RudnlMWGZ6OVE&authuser=0

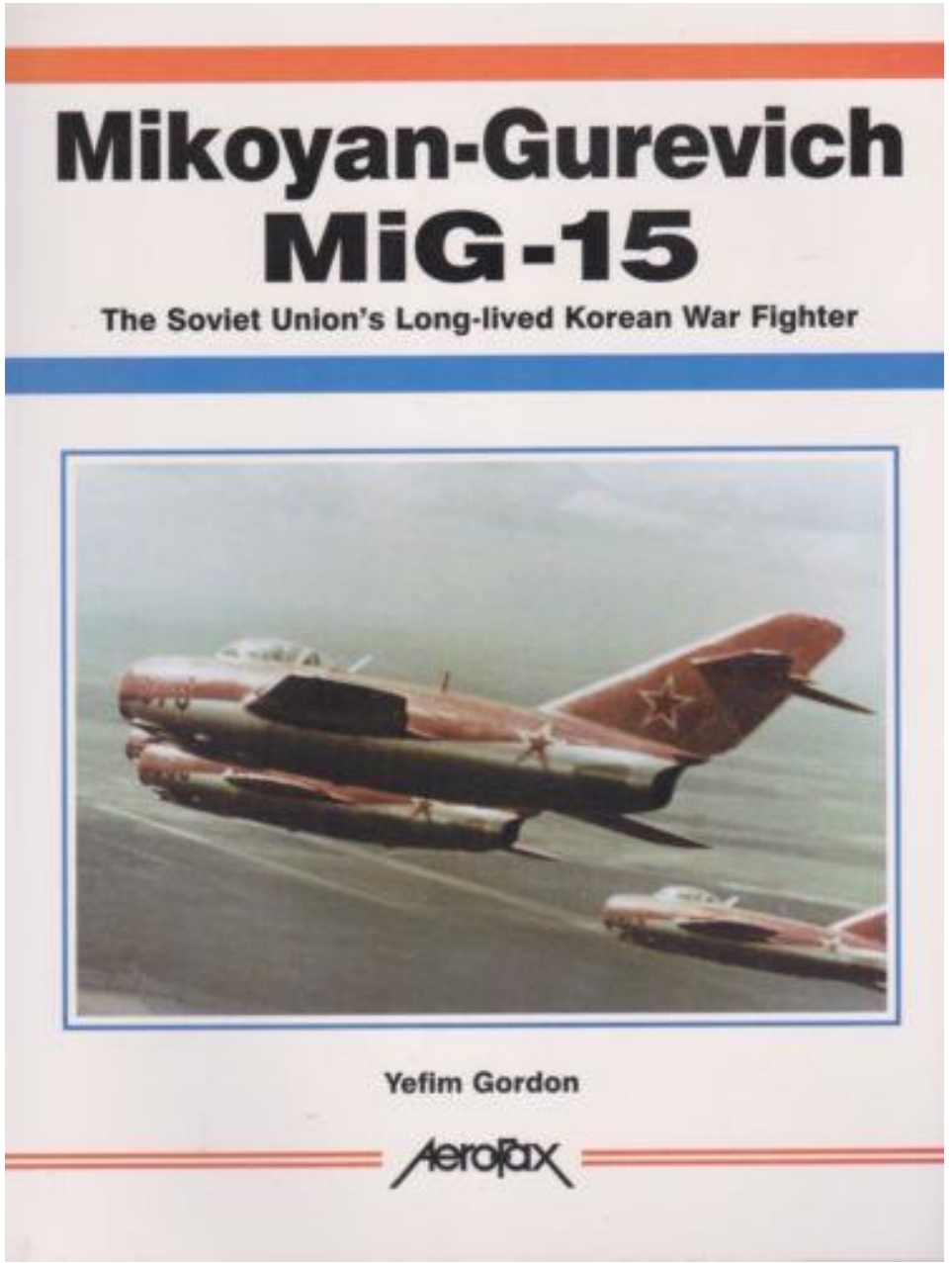




RESOURCES:

- **BUNYAP SIMS YOUTUBE CHANNEL**
  - MAIN CHANNEL: https://www.youtube.com/user/4023446/videos
- **LINO_GERMANY BEACON MAP**
  - https://drive.google.com/open?id=0B-uSpZROuEd3YWJBUmZTazBGajQ&authuser=0





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:

- ChazFlyz


DCS digital combat series
Chuck_Owl
MiG-15bis FAGOT
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CREATE FAST MISSION
MISSION
CAMPAIGN
MULTIPLAYER
LOGBOOK
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TRAINING
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CAMPAIGN BUILDER
EXIT
A-10C 1.5.5
Bf 109 K-4 1.5.5
C-101 1.5.5 Beta
CA 1.5.5
F-5E 1.5.5
F-86F 1.5.5
FC3 1.5.5
Fw 190 D-9 1.5.5
Hawk 1.5.5 Beta
Ka-50 1.5.5
L-39 1.5.5
M-2000C 1.5.5 Beta
Mi-8MTV2 1.5.5
MiG-15bis 1.5.5
MiG-21bis 1.5.4
P-40F 1.5.4 Beta
P-51D 1.5.5
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