F-4E
PHANTOM II

PART 4 – START-UP PROCEDURE

COLD START PROCEDURE OVERVIEW

- A – Before Start-Up
- B – Engine Start
- C – INS (Inertial Navigation System) Alignment
- D – Before Taxi (Pilot)
- E – Before Taxi (WSO)

A – BEFORE START-UP

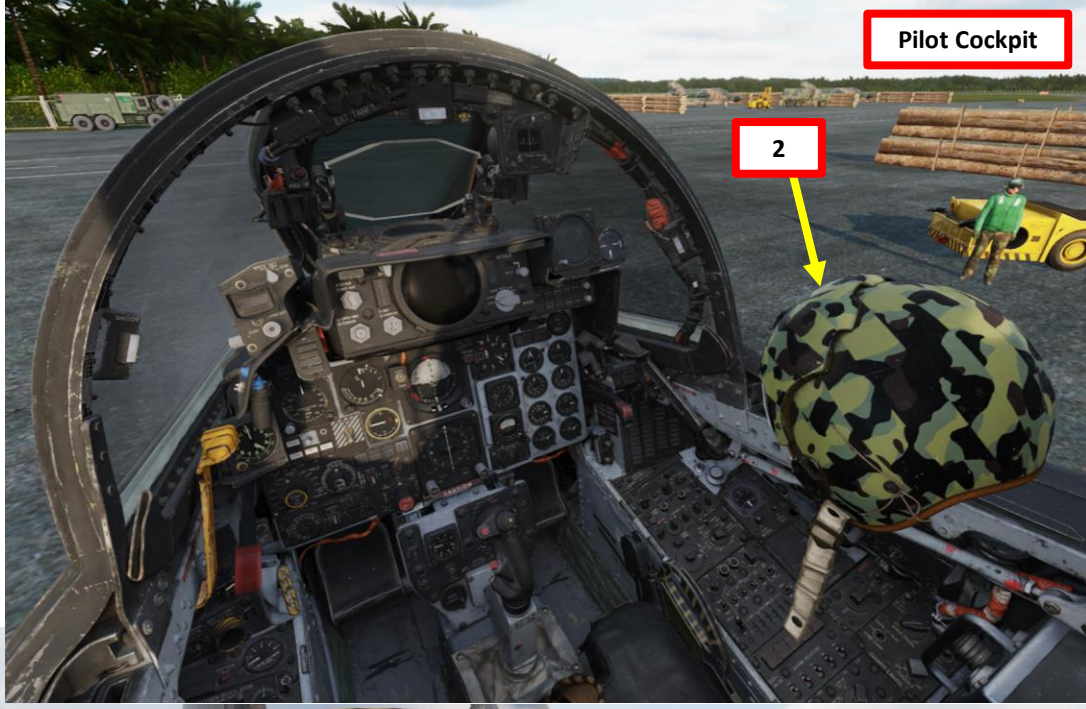
A – BEFORE START-UP

- *Steps preceded by [P] are performed by the Pilot.*
- *Steps preceded by [WSO] are performed by the Weapon Systems Officer (or the JESTER AI if no player is manning the rear cockpit).*
- *Steps preceded by [P+WSO] are performed by both the Pilot **and** the Weapon Systems Officer (or the JESTER AI if no player is manning the rear cockpit).*
- *Steps preceded by an asterisk * are **optional** for an expedited start-up or should already be set up correctly for a cold & dark start-up.*

A – BEFORE START-UP

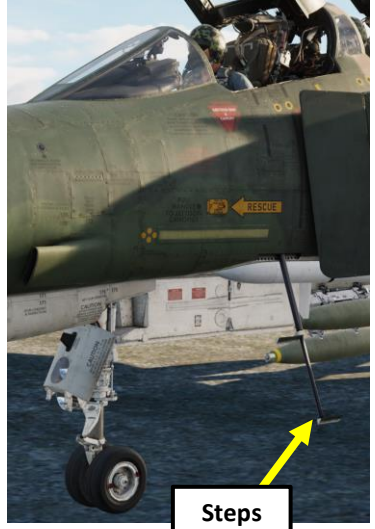
- *Note: Some steps will be omitted to keep the procedure concise and practical. We will assume that the jet is in pristine condition and that the ground crew did their job properly.*
- *If operating during night, you can use the flashlight by using the "LALT+L" control.*

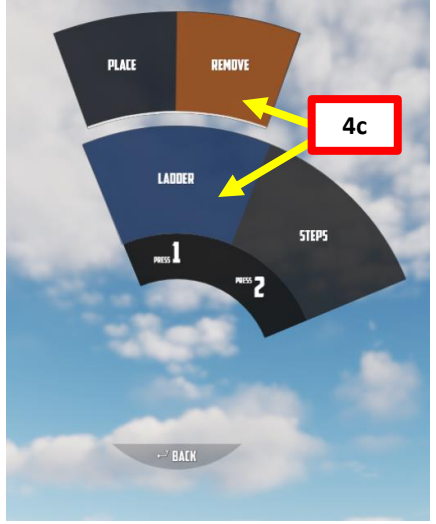
1. *[P+WSO]* Embark on the aircraft using the steps or the boarding ladder.
2. *[P+WSO]* Put on helmet by clicking on it. Ground crew will then remove ladder after a short delay.

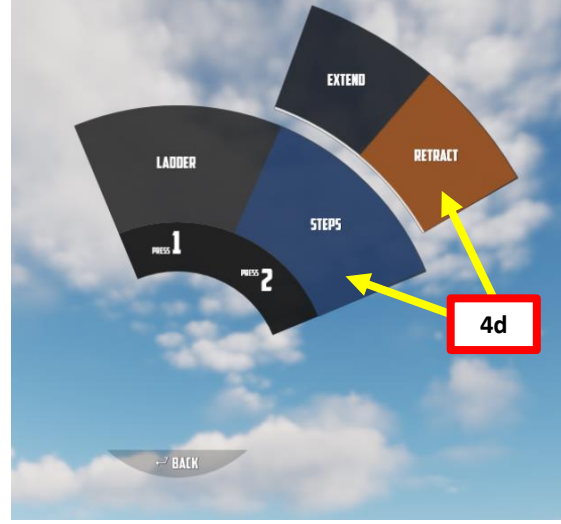


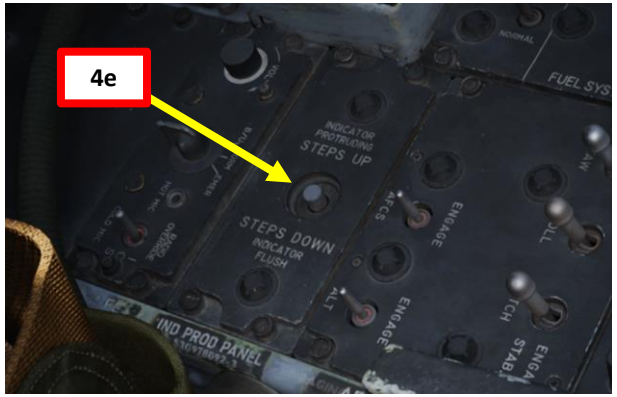
A – BEFORE START-UP

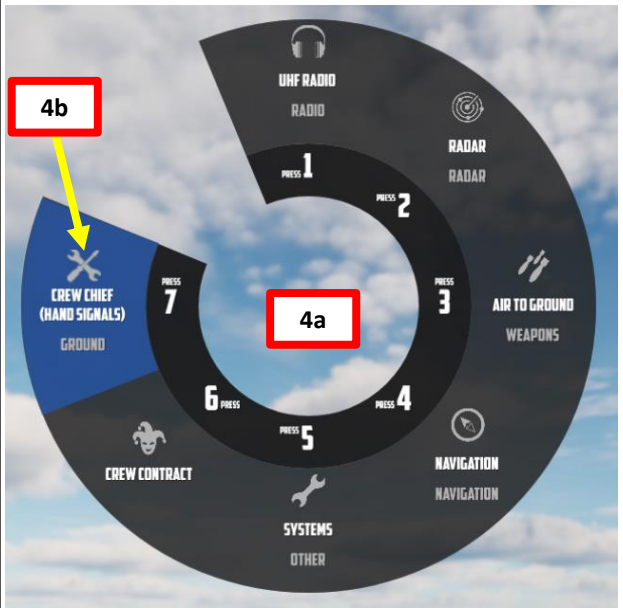
3. There is no parking brake in the Phantom. Wheel chocks should already be placed by default.
4. *[P]* If installed, remove boarding ladder or retract steps.
   a) Open JESTER AI wheel by short-pressing “A”.
   b) Click on CREW CHIEF (HAND SIGNALS)
   c) To remove boarding ladder, click on LADDER, then REMOVE.
   d) To remove steps, click on STEPS, then RETRACT.
   e) Check that boarding steps position Indicator is protruding, indicating the steps are in the RETRACTED position.
   f) Close JESTER AI wheel by long-pressing “A”.

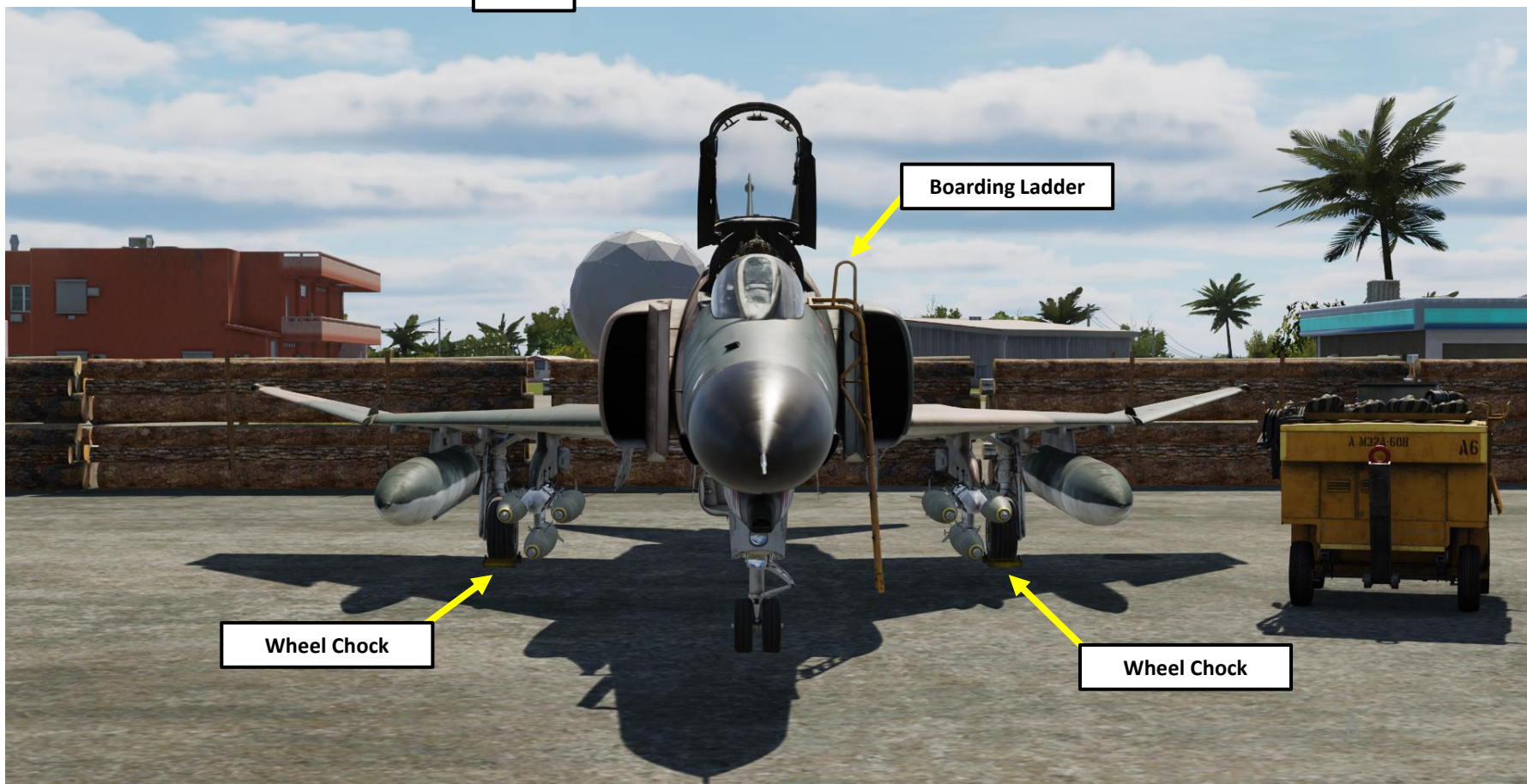






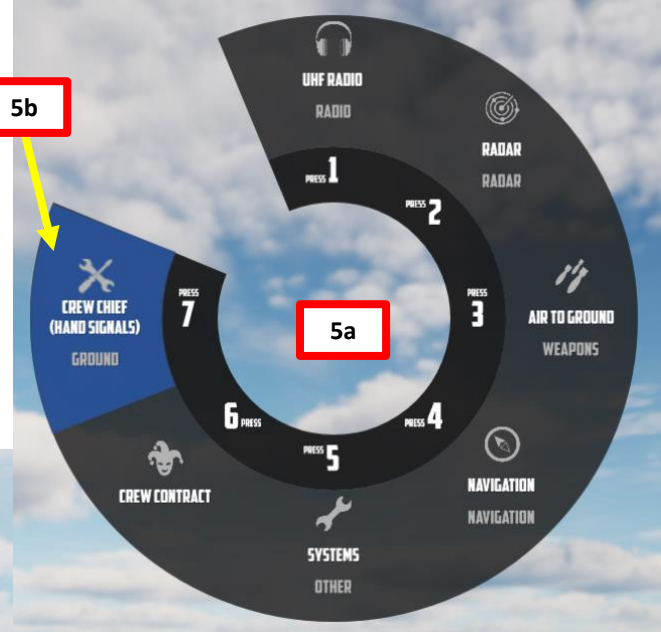


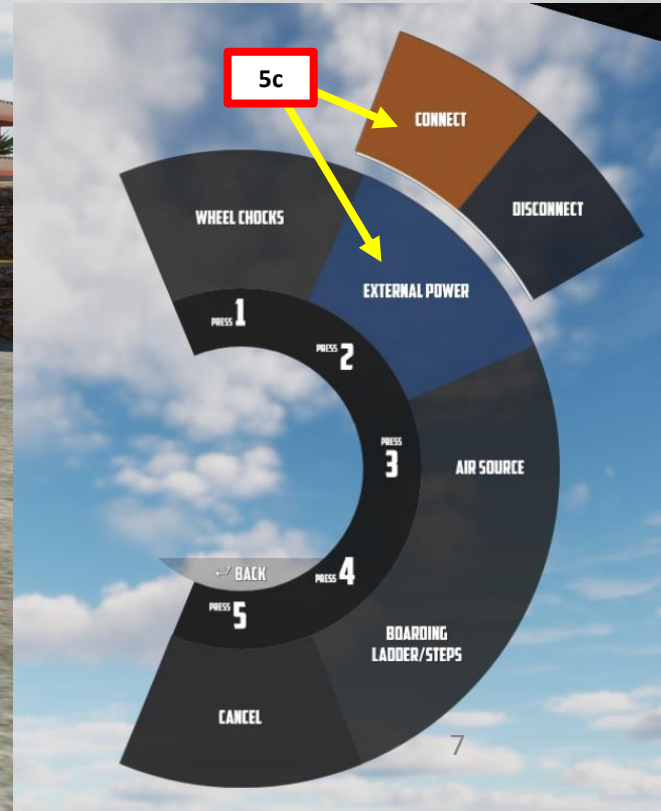




A – BEFORE START-UP

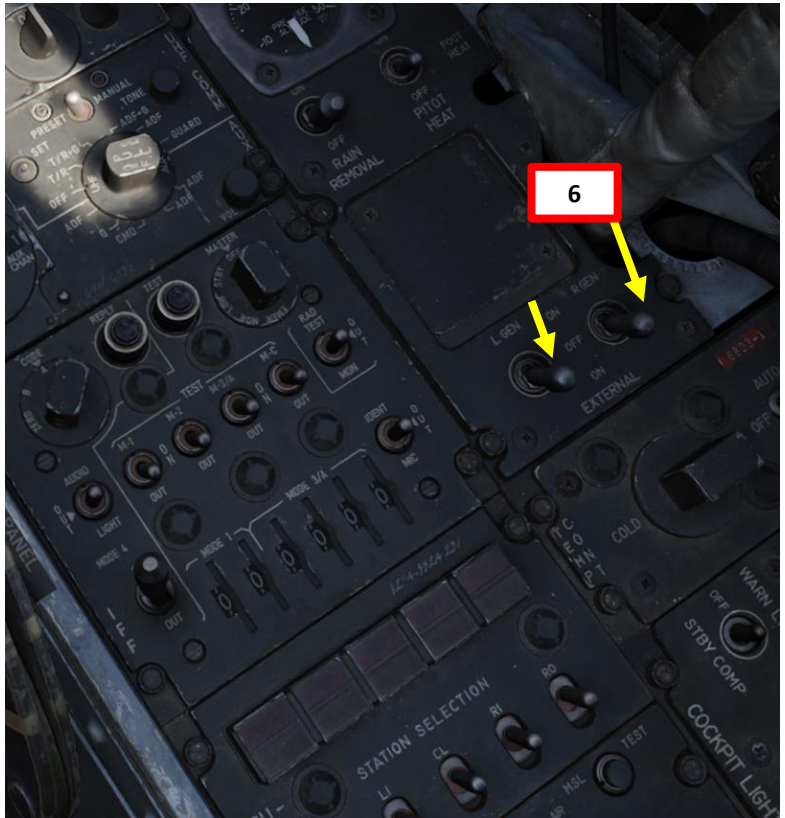
5. *[P]* Request ground crew to connect the aircraft with the A/M32-60B External Ground Power Cart (also known as “Dash Sixty”, or “Huffer”).
   a) Open JESTER AI wheel by short-pressing “A”.
   b) Click on CREW CHIEF (HAND SIGNALS)
   c) Click on EXTERNAL POWER, then CONNECT
   d) Close JESTER AI wheel by long-pressing “A”.

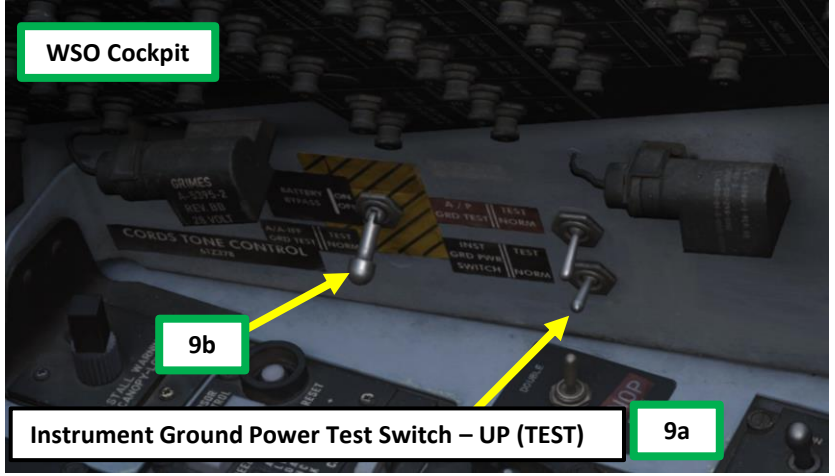


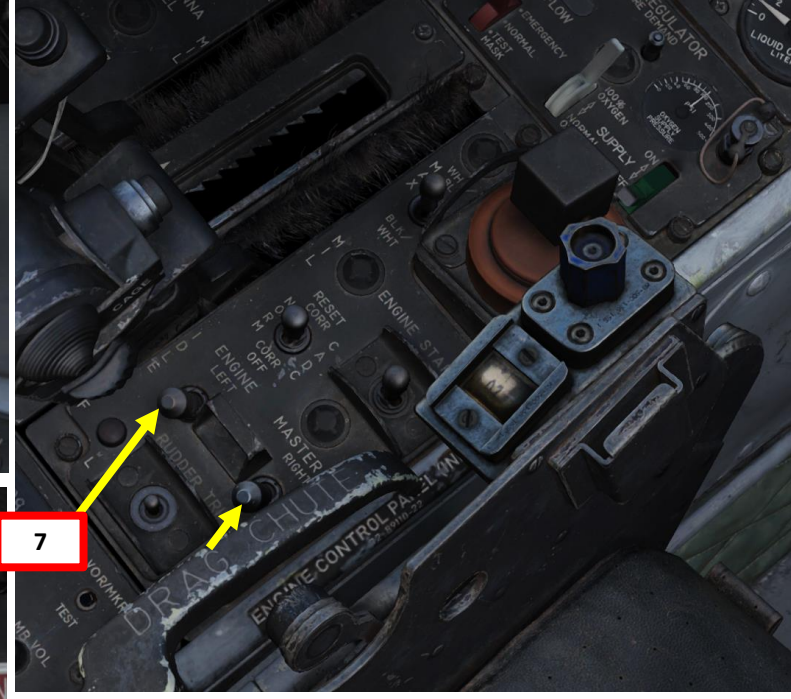


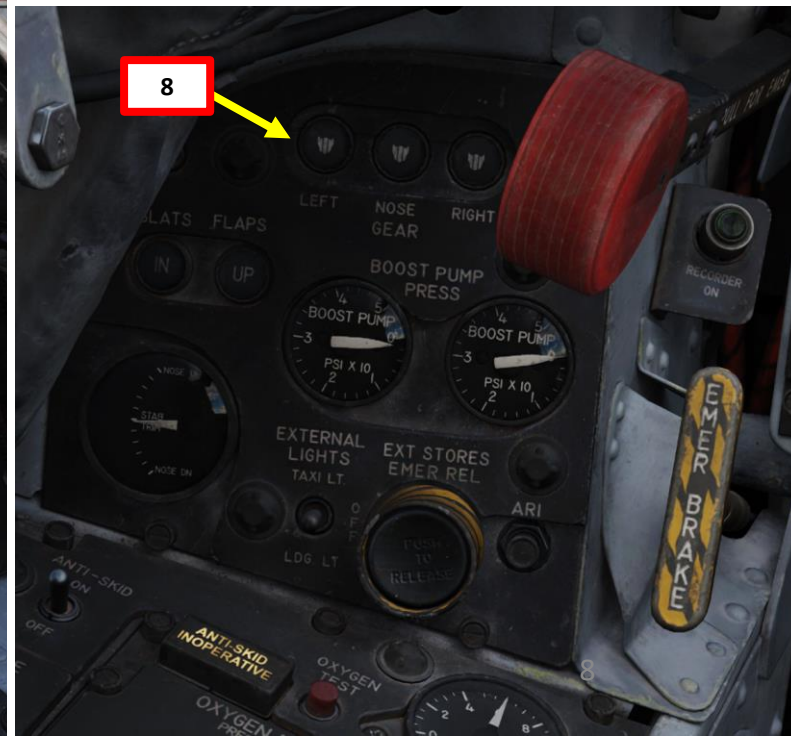
A – BEFORE START-UP

6. *[P]* Once ground power is connected, set Left & Right Generator Switches – EXTERNAL ON (AFT).
7. *[P]* Check Left & Right Engine Master Switches – OFF (AFT)
8. **[P]* Check TR (Transformer Rectifier) Units.
    - Both TR units operate correctly if the Landing Gear Indicators are energized and indicate GEAR DOWN.
9. *[WSO]* Once ground power is connected, the WSO (Weapon Systems Officer) can proceed with his own start-up procedure (INS pre-heat).
    a) Set Instrument Ground Power Test Switch – TEST (UP). This will power up the rear cockpit even if engines are not running.
    b) Check Battery Bypass Switch is set to OFF (DOWN).





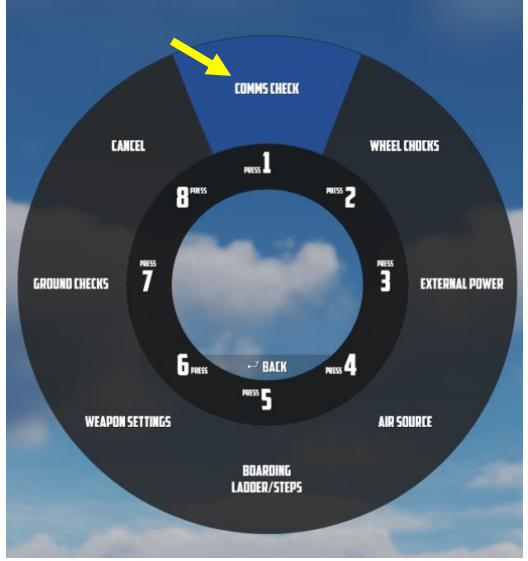


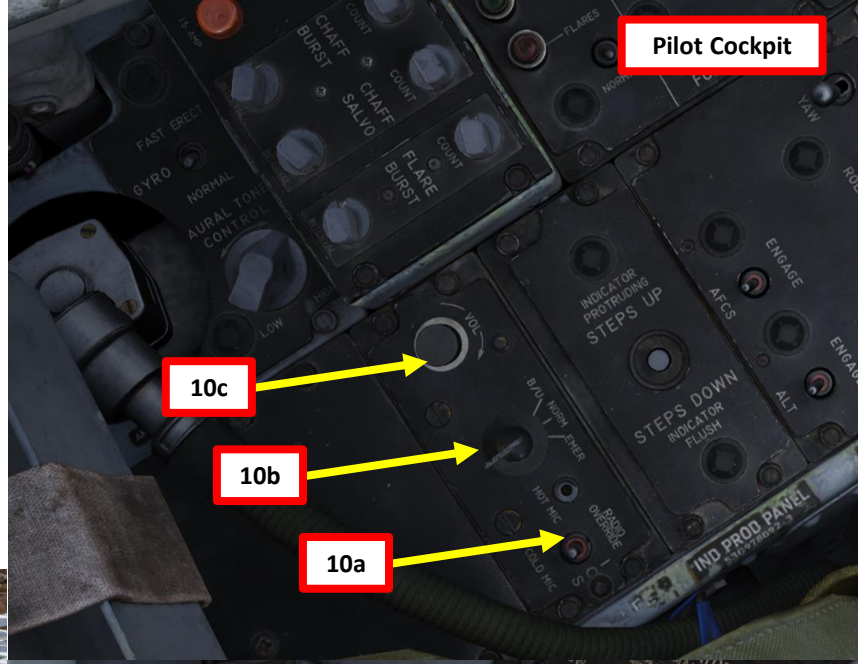


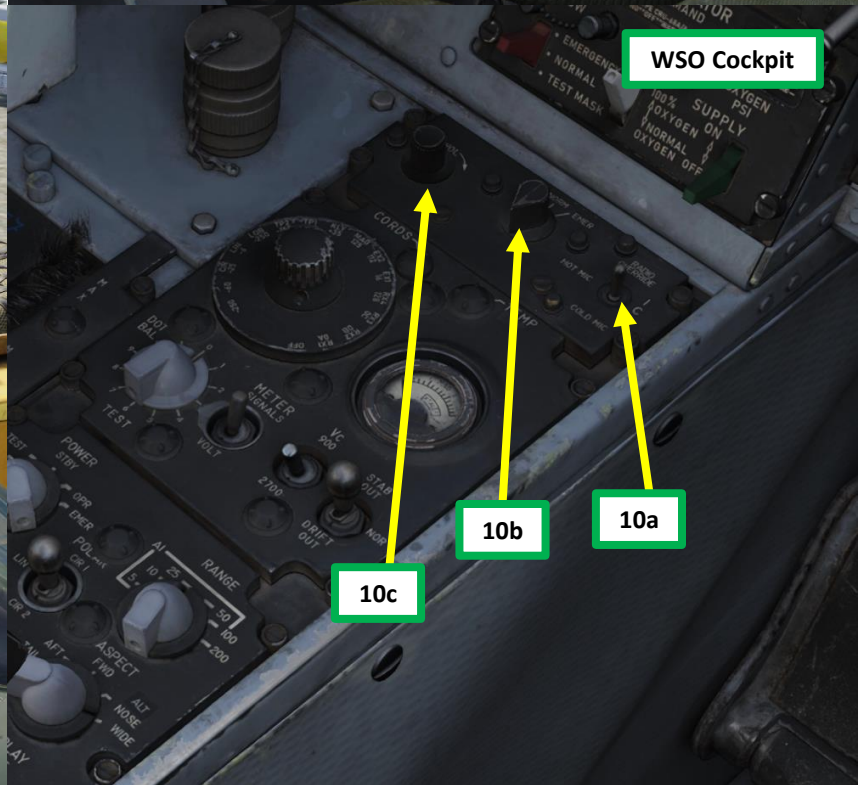
A – BEFORE START-UP

10. *[P+WSO]* Set ICS (Intercom Set). This will allow communication between the pilot, WSO (Weapon Systems Officer) and crew chief with the intercom once aircraft power is provided.
    a) Set ICS Switch – HOT MIC (MIDDLE).
    b) Set Amplifier Selector – NORM
    c) Set Intercom Volume – As desired.

- Note: from the JESTER AI "CREW CHIEF" menu, you can do a "Comms Check" to verify radios are working correctly.

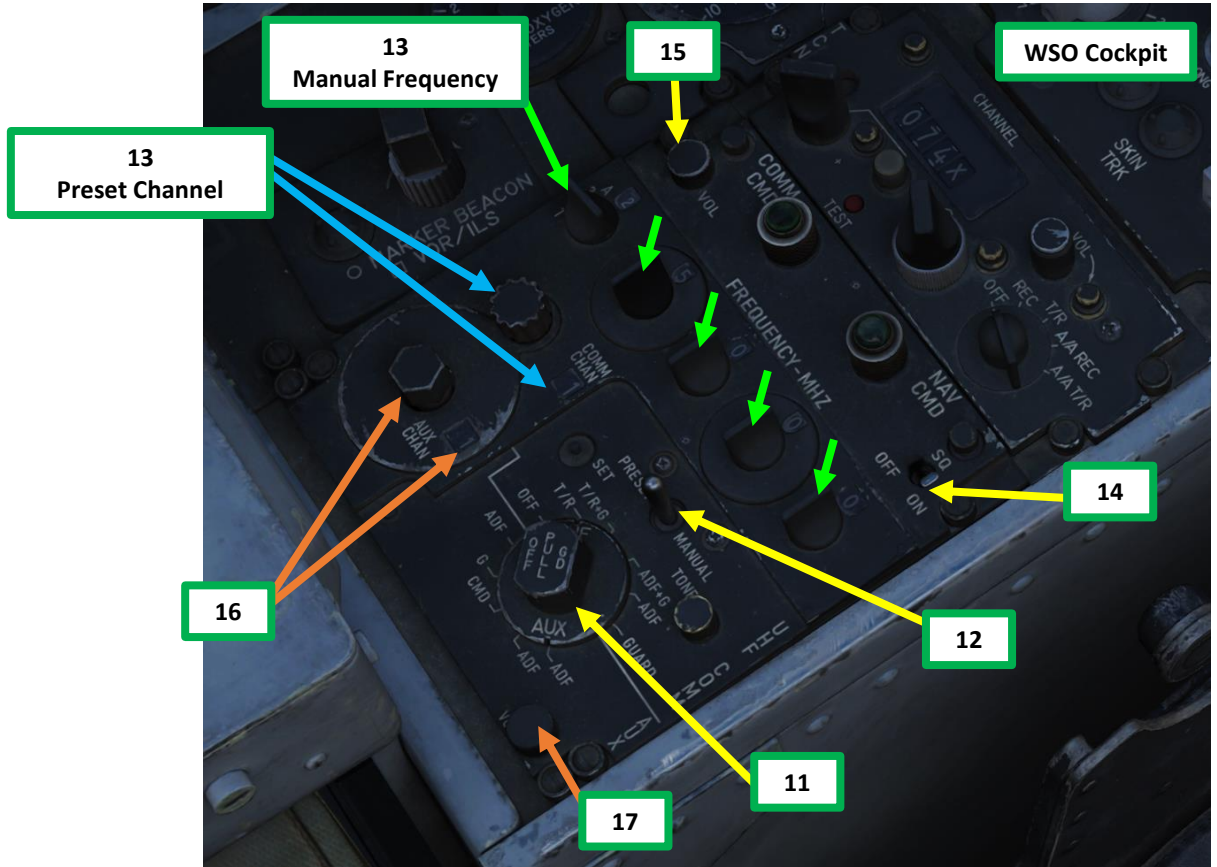


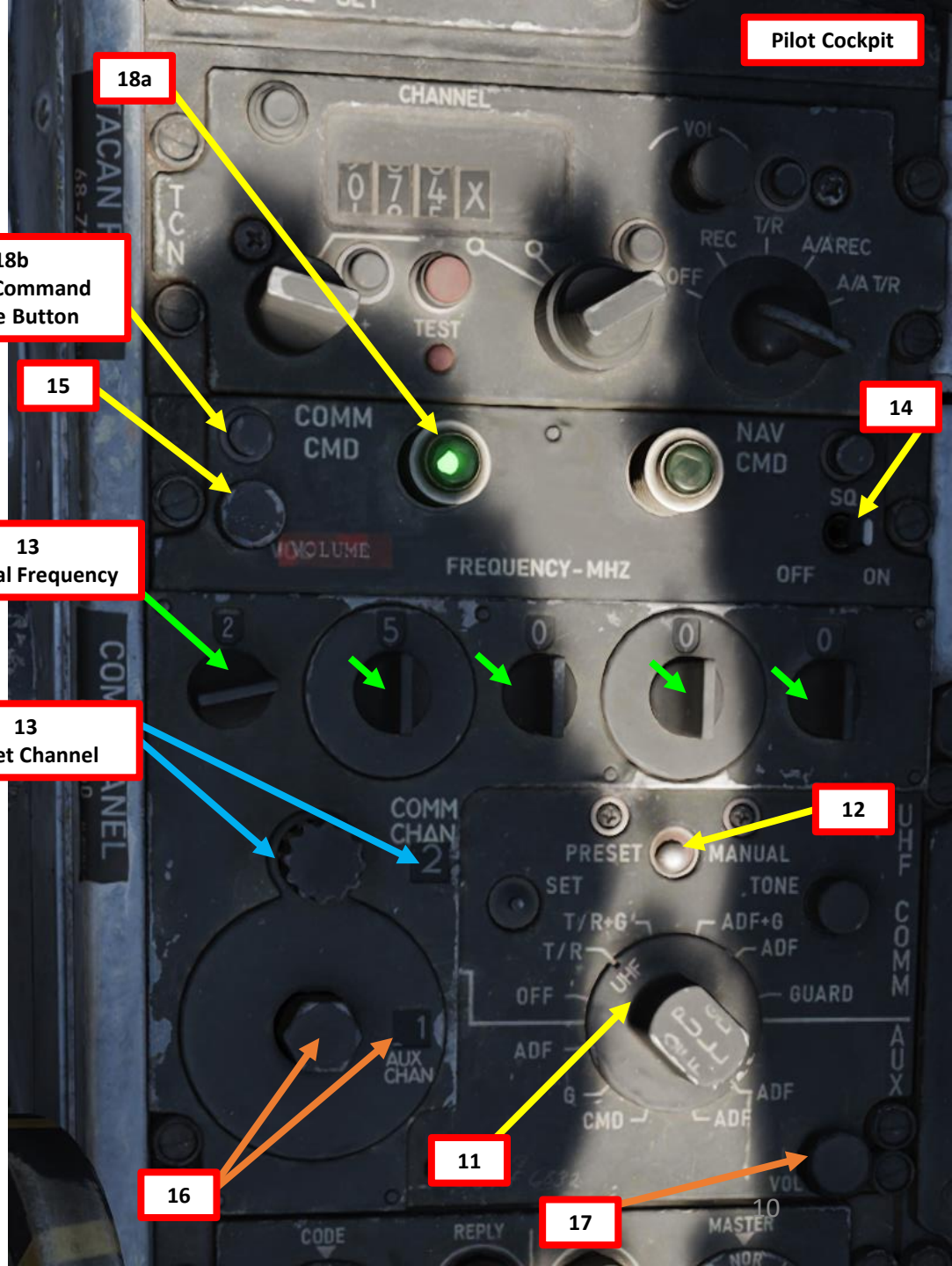




A – BEFORE START-UP

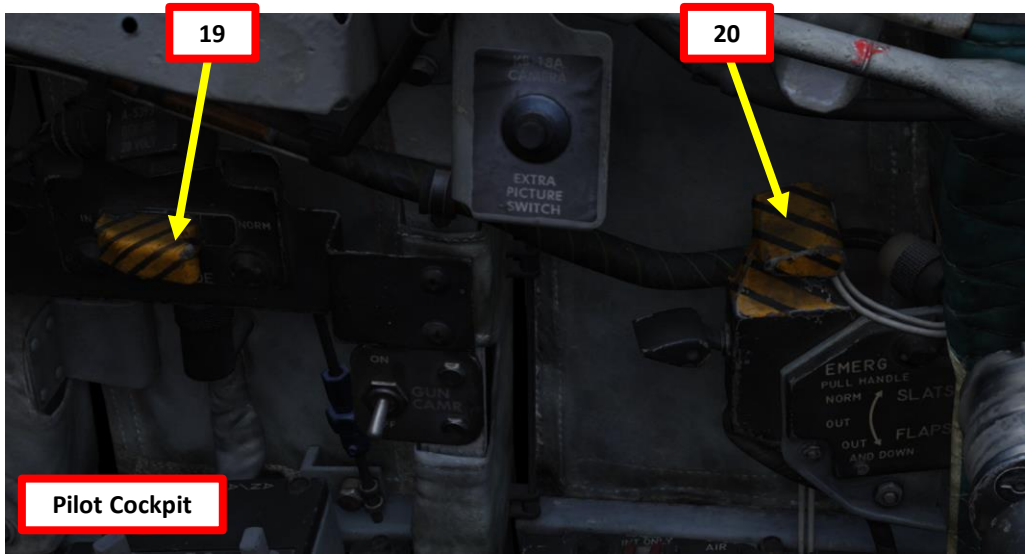
11. *[P+WSO]* Set UHF Radio Mode Selector – T/R (Transmit/Receive) or T/R+G.
12. *[P+WSO]* Set UHF Radio Frequency Mode Selector – As desired (Preset or Manual).
13. *[P+WSO]* Set UHF Radio Frequency – As required.
    - Use Frequency Tuning knobs for Manual Frequencies
    - Use COMM CHAN selector for Preset Channels
14. *[P+WSO]* Set Radio Squelch Switch – ON (OUTBOARD).
15. *[P+WSO]* Set UHF Radio Volume – As desired.
16. *[P+WSO]* Set AUX Radio Channel – As required.
17. *[P+WSO]* Set AUX Radio Volume – As desired.
18. *[P]* Check COMM CMD light is illuminated. If not, press the Radio Command Toggle Button.

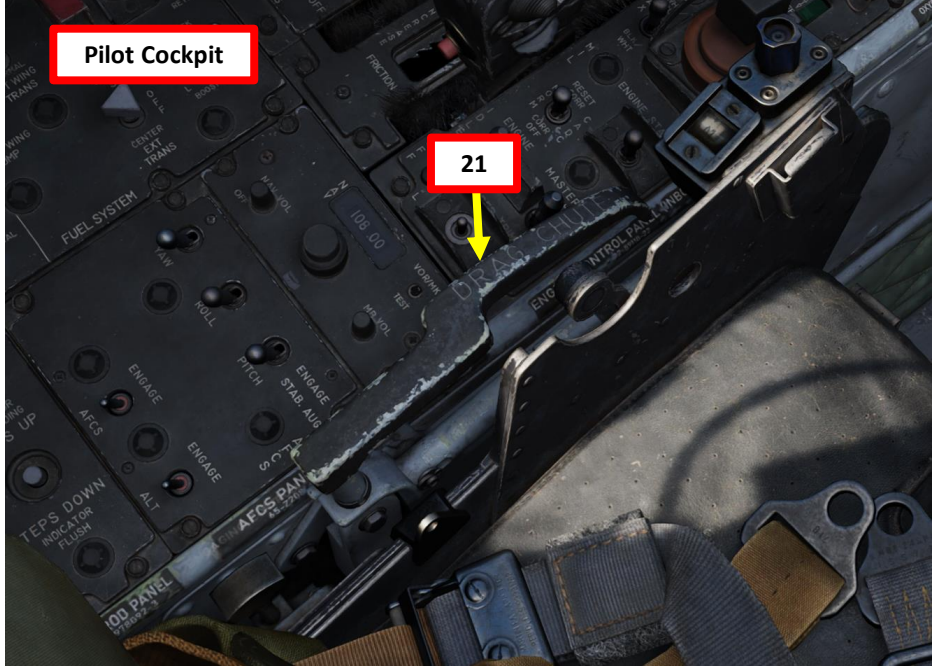


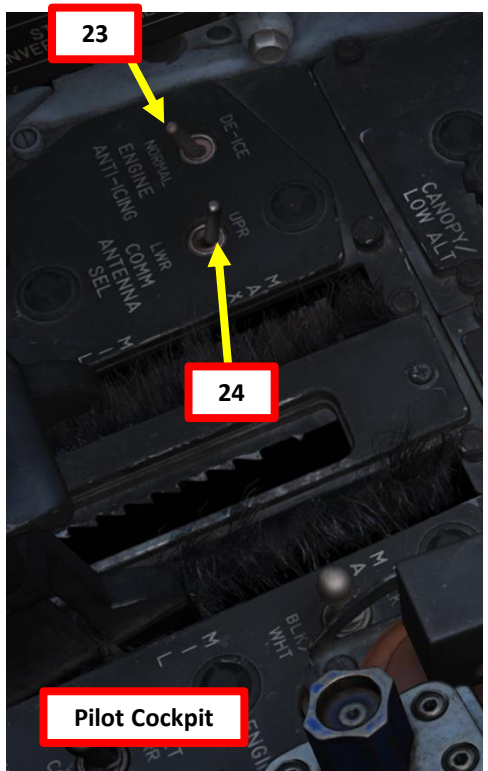


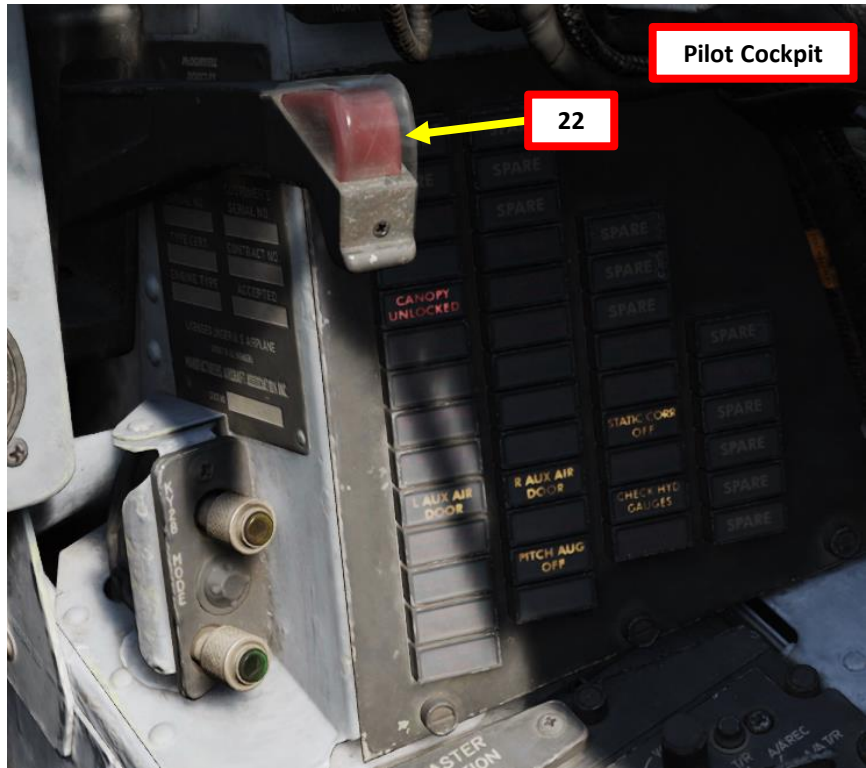
A – BEFORE START-UP

19. *[P]* Set Slats Override Switch – NORMAL & Guarded (FWD)
20. *[P+WSO]* Check Emergency Slats/Flaps Handle – FWD (as shown)
21. *[P]* Check Drag Chute Control Handle – DOWN & SECURE
22. *[P]* Check Arresting Hook Control Handle – RETRACTED (UP)
23. *[P]* Set Engine Anti-Icing (De-Ice) Switch – NORMAL (AFT)
24. *[P]* Set Communication Antenna Select Switch – UPR.
    - Note: Anti-Skid and nosewheel steering may malfunction while transmitting on the lower antenna due to electromagnetic interference.



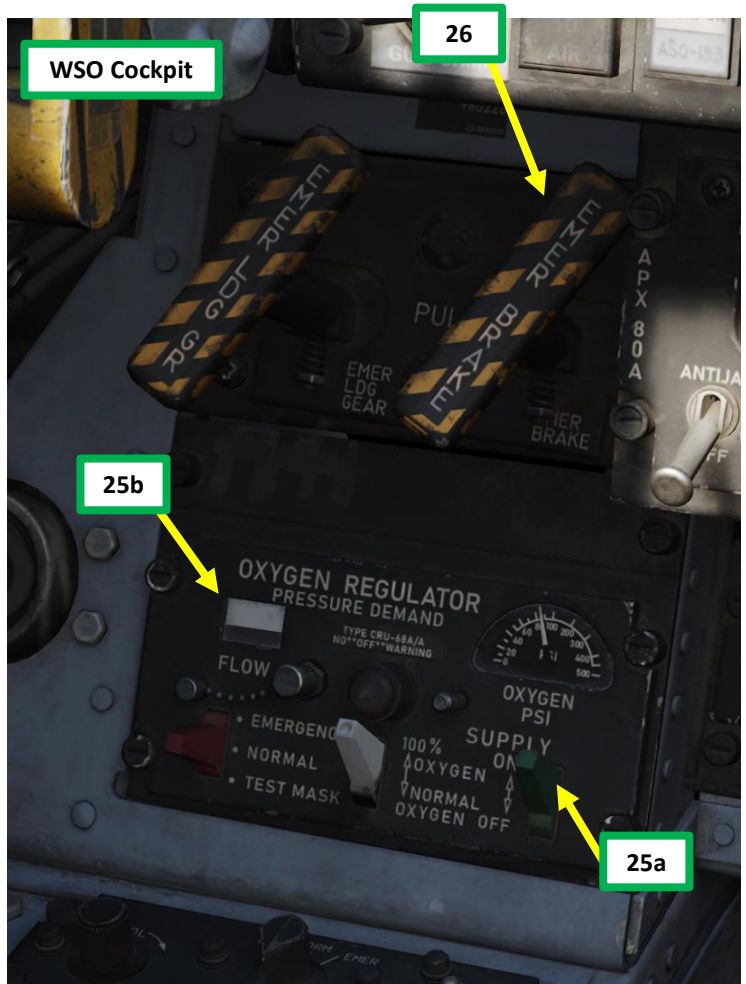


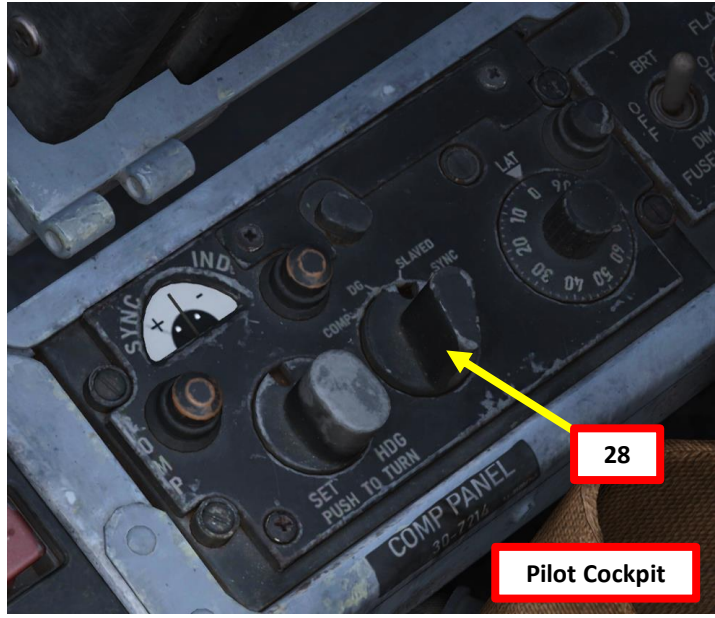


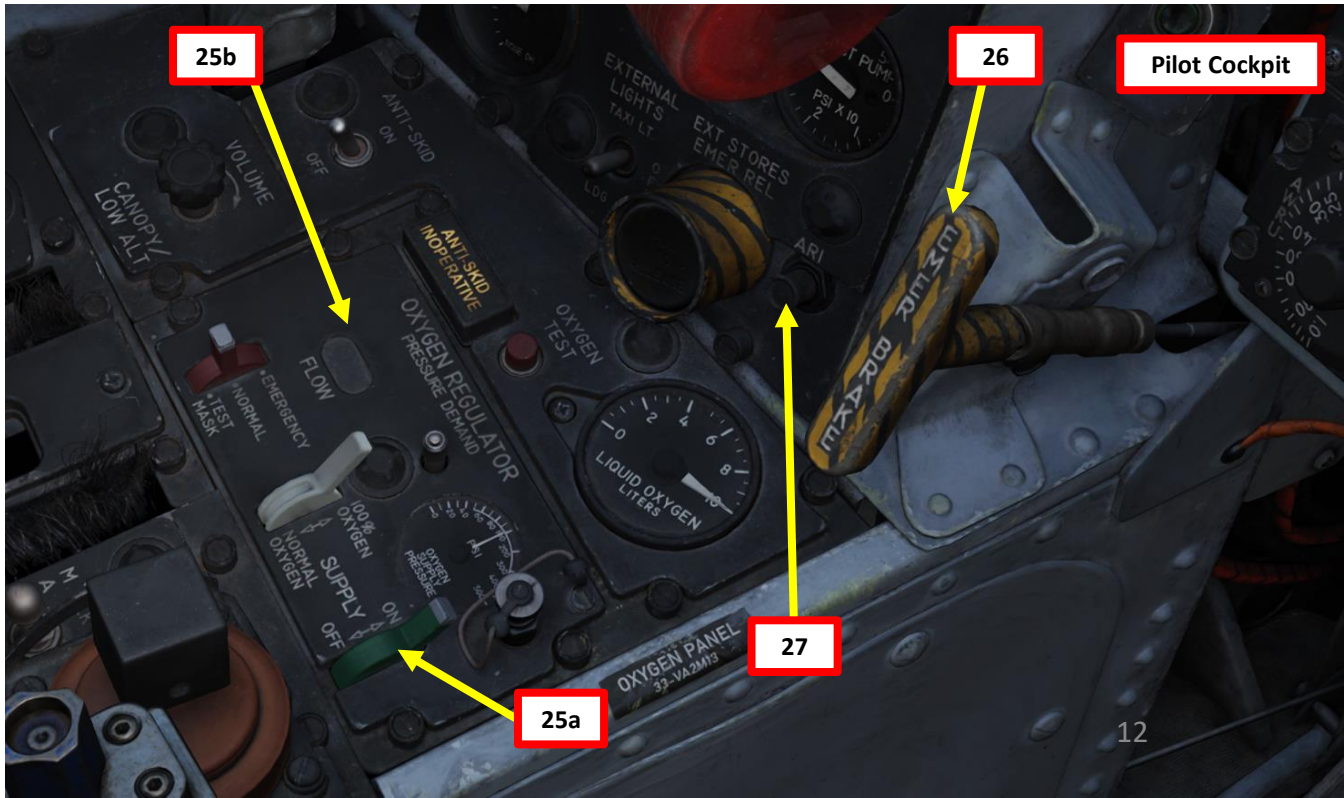


A – BEFORE START-UP

25. *[P+WSO]* Set Oxygen Supply Switch – ON (FWD). Confirm Oxygen Flow Blinker is operating.
26. *[P+WSO]* Check Emergency Brake Control Handle – IN & SECURE.
27. *[P]* Check ARI (Aileron-Rudder Interconnect) Circuit Breaker – IN.
28. *[P]* Set Compass Mode Selector – Slaved.





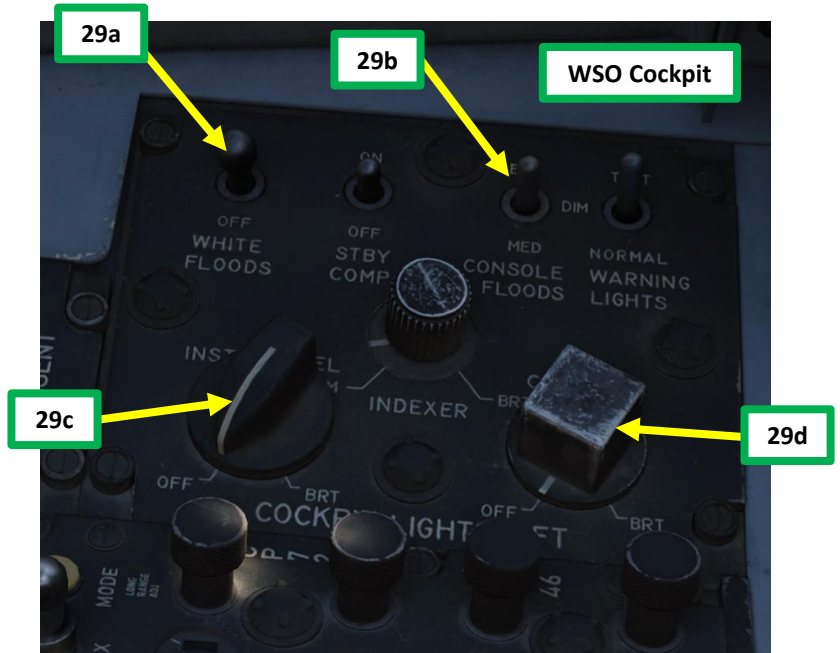


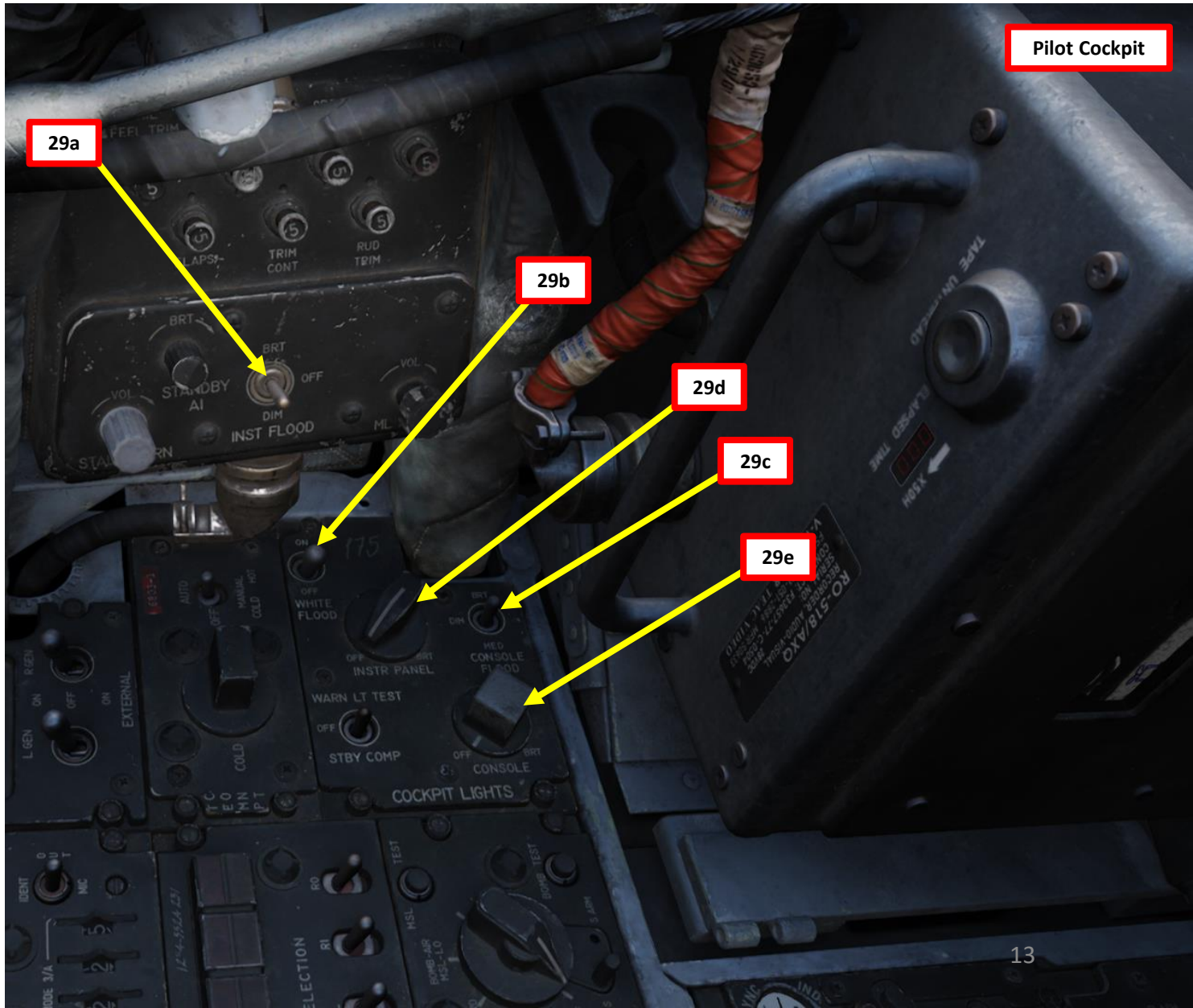
A – BEFORE START-UP

29. [P+WSO] Set Interior Lights – As required.

- Pilot:
  a) Instrument Panel Red Flood Light Switch
     - BRT (UP) / OFF (MIDDLE) / DIM (DOWN)
  b) Instrument Panel White Flood Light Switch
     - BRT (OUTBOARD) / OFF (INBOARD)
  c) Console Red Flood Light Switch
     - BRT (OUTBOARD) / OFF (MIDDLE) / DIM (INBOARD)
  d) Instrument Panel Light Brightness Control
  e) Console Light Brightness Control

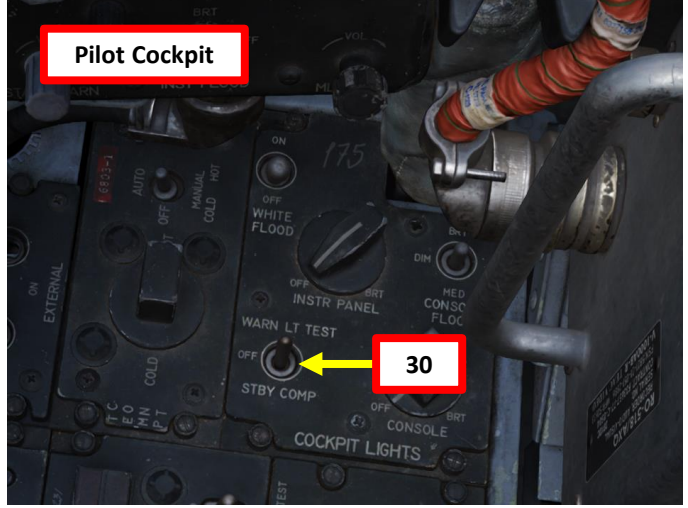
- WSO:
  a) Instrument Panel White Flood Light Switch
     - BRT (OUTBOARD) / OFF (INBOARD)
  b) Console Red Flood Light Switch
     - BRT (OUTBOARD) / OFF (MIDDLE) / DIM (INBOARD)
  c) Instrument Panel Light Brightness Control
  d) Console Light Brightness Control

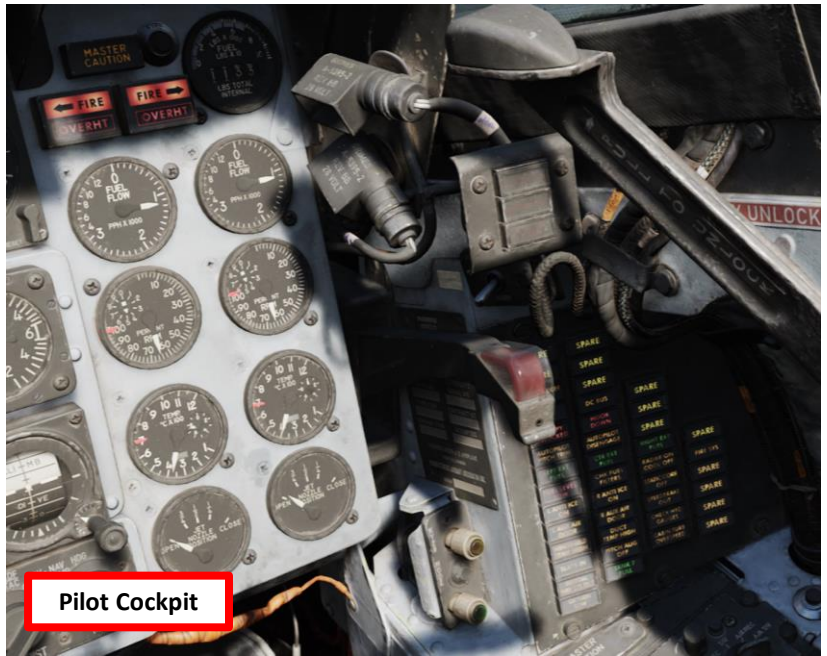




A – BEFORE START-UP

30. *[P+WSO]* Set Warning Light Test / Standby Compass Light Switch – TEST (OUBOARD) momentarily and check annunciator lights illuminate correctly. Then, release the Set Warning Light Test / Standby Compass Light Switch back to the OFF (MIDDLE) position.





A – BEFORE START-UP

31. [P] Set Exterior Lights – As required.

a) Formation Lights Mode Switch
   - ON (UP) / OFF (MIDDLE) / MOMENTARY (DOWN)

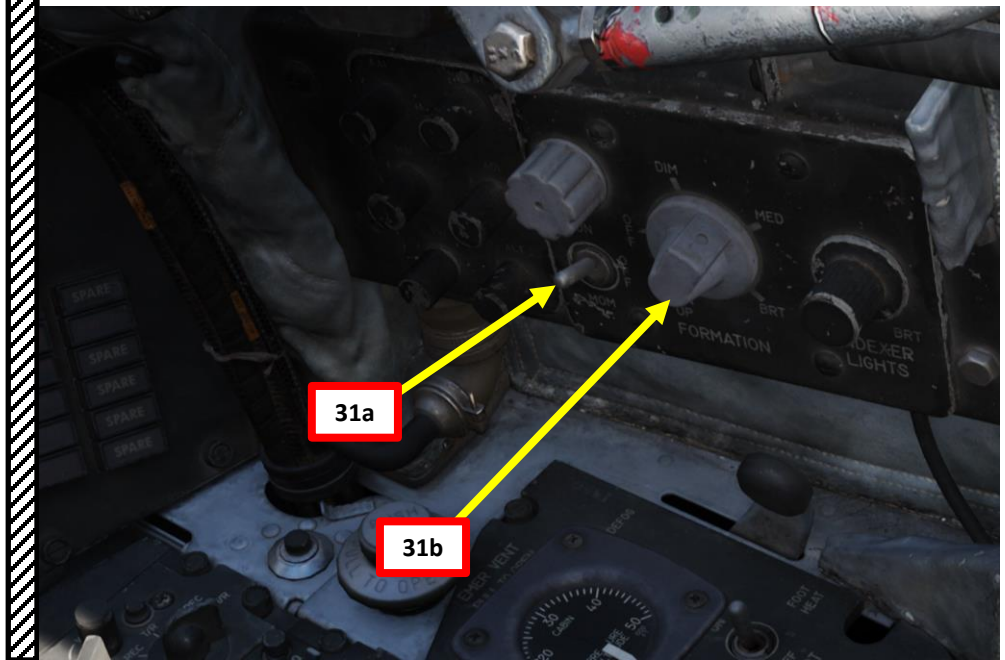
b) Formation Lights Brightness Knob – As required.

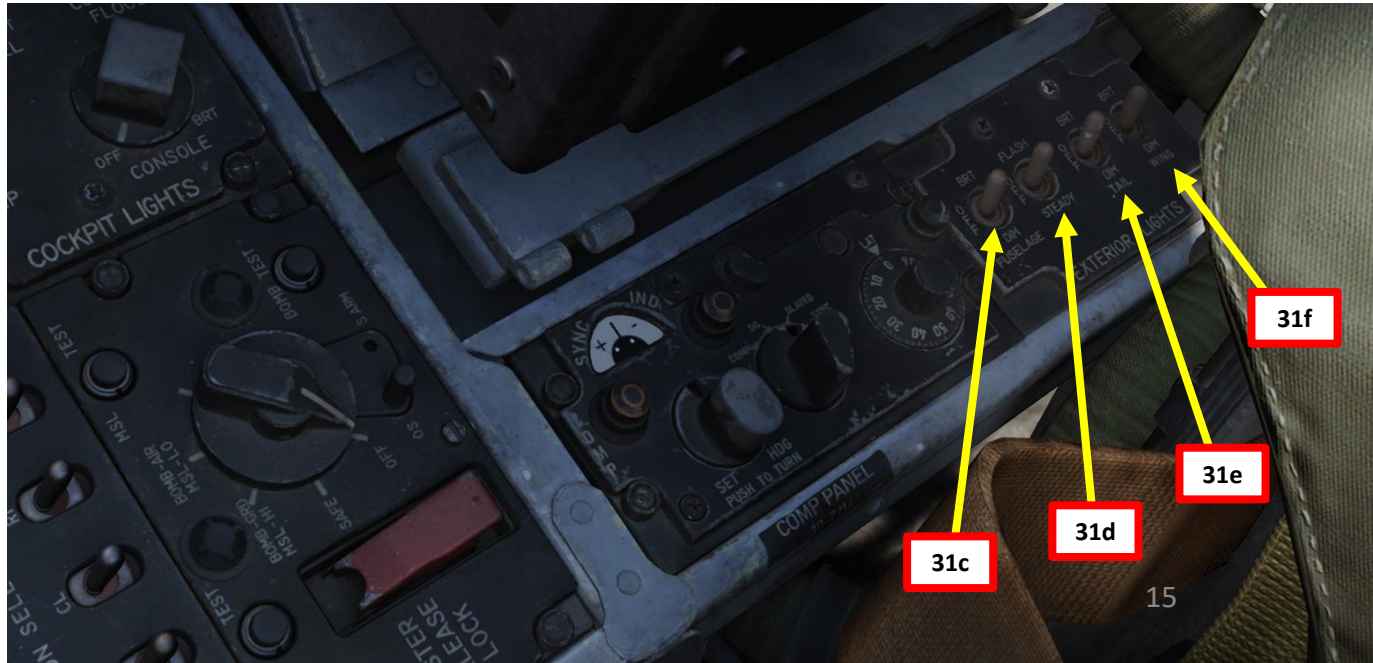
c) Fuselage & Anti-Collision Brightness Switch
   - BRT (OUTBOARD) / OFF (MIDDLE) / DIM (INBOARD)

d) Flasher Mode Switch
   - FLASH (OUTBOARD) / OFF (MIDDLE) / STEADY (INBOARD)
   - Only applicable for Tail, Anti-Collision & Fuselage lights

e) Tail Position Light Switch
   - BRT (OUTBOARD) / OFF (MIDDLE) / DIM (INBOARD)

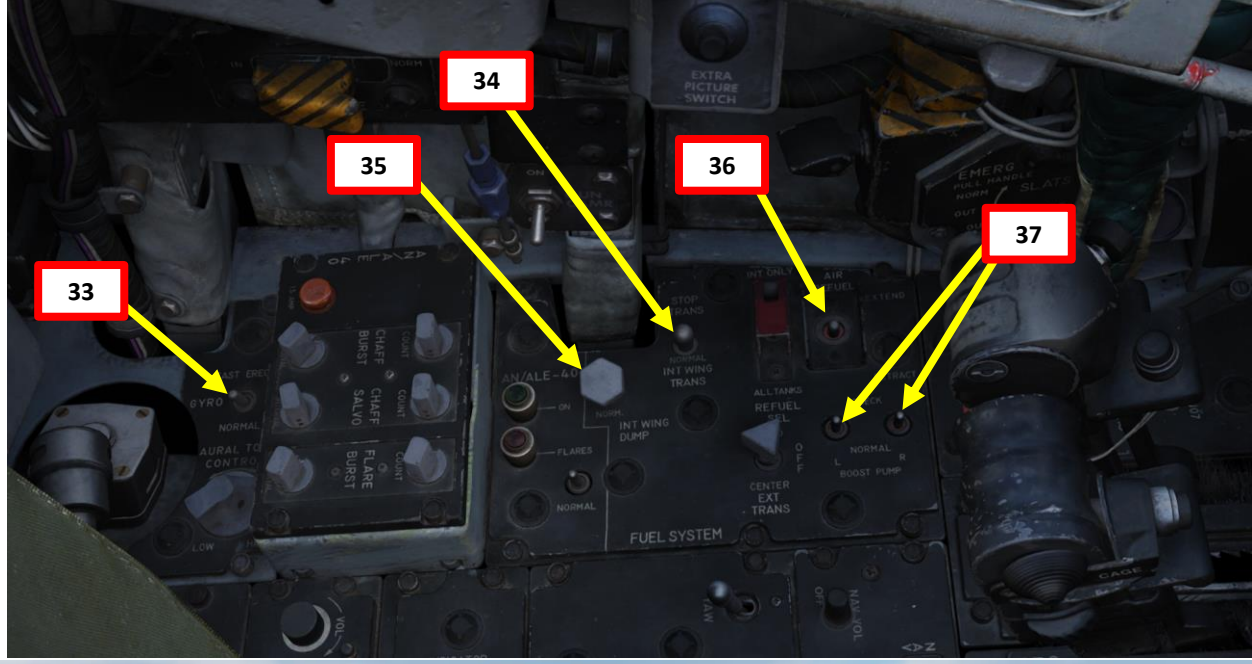
f) Wing Position & Join-Up Light Switch
   - BRT (OUTBOARD) / OFF (MIDDLE) / DIM (INBOARD)

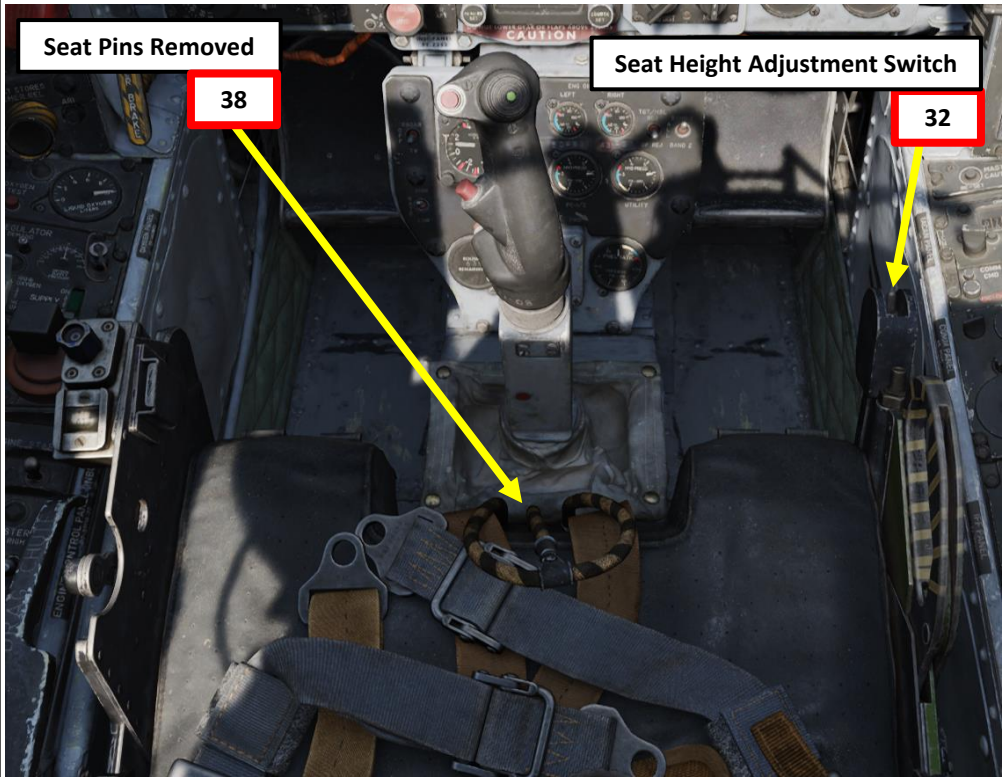


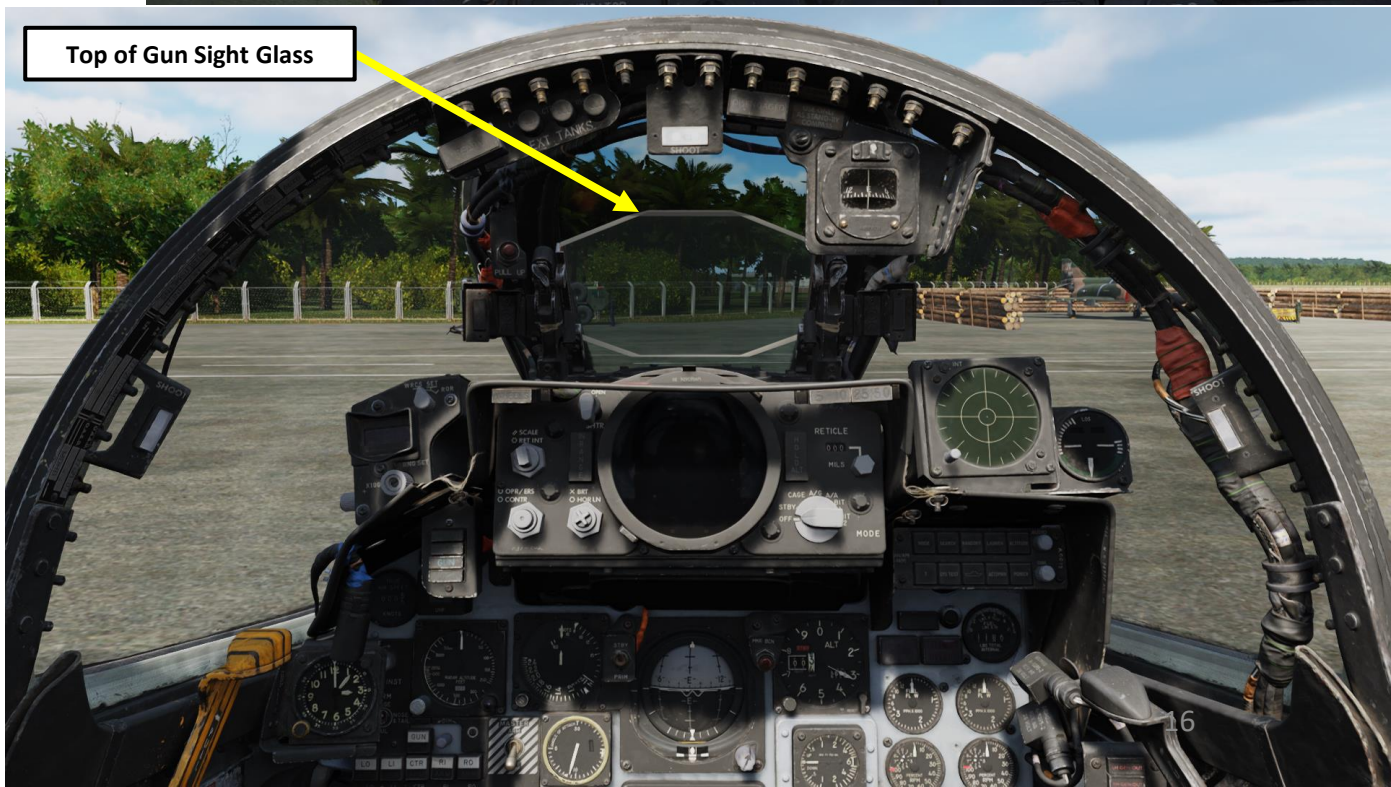


A – BEFORE START-UP

32. *[P+WSO]* Adjust Seat Height – As required.
    - For the pilot, your eyes should be lined up with the top of the gun sight glass.
33. *[P]* Set Gyro Switch – NORMAL (INBOARD).
34. *[P]* Check Internal Wing Transfer Switch – NORMAL (INBOARD position).
35. *[P]* Check Internal Wing Dump Switch – NORMAL (INBOARD position)
36. *[P]* Check Air Refuel Switch – RETRACT (INBOARD position).
37. *[P]* Check Left & Fuel Boost Pumps are in the NORMAL (INBOARD) position.
38. *[P]* Check Seat Pins – REMOVED & STOWED.
39. *[P+WSO]* Check fore and aft areas are cleared.



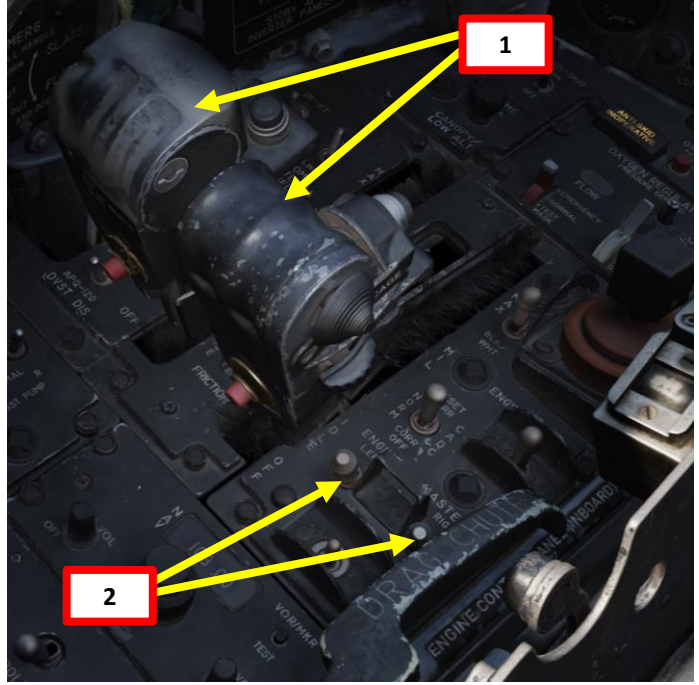


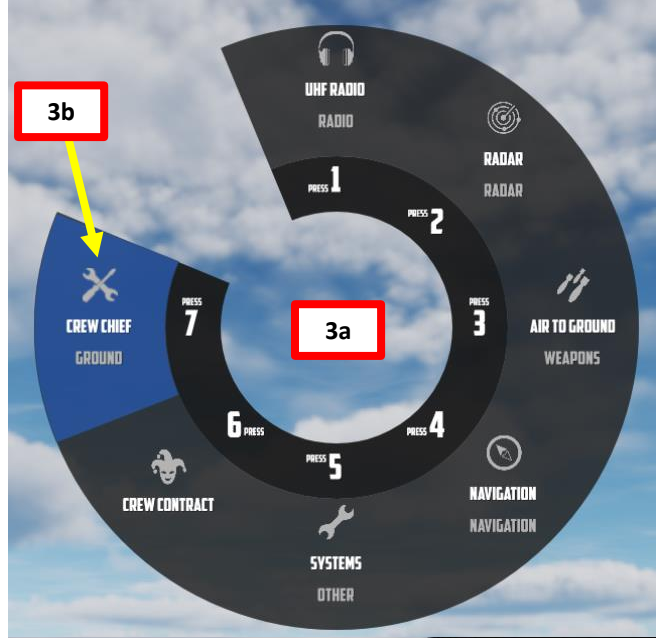


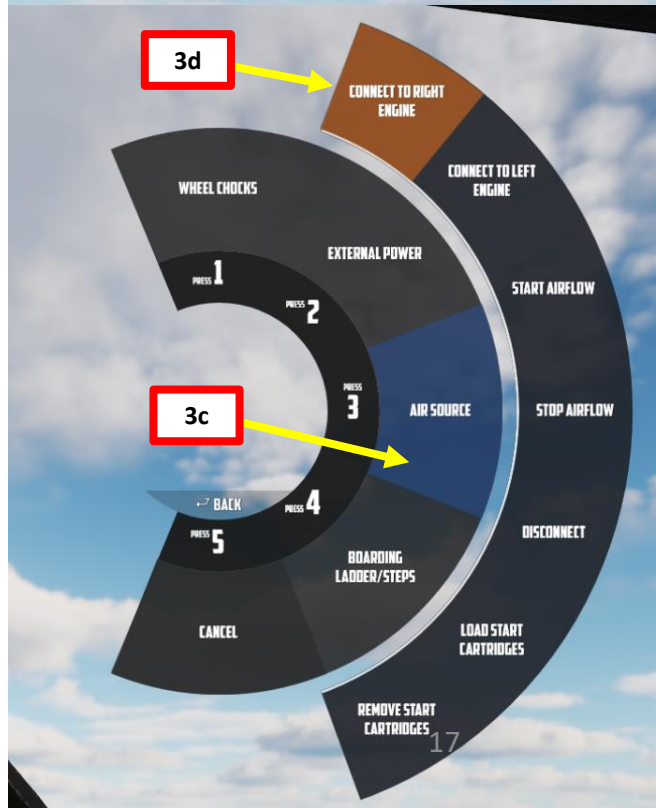
B – ENGINE START

***Note**: The F-4 does not have a battery switch nor an APU (Auxiliary Power Unit) – its electrical systems run strictly on either engine generator power or an external power source. General Electric J79-GE-17A/F engines have pneumatic starters and require an external air pressure source, which can be provided by contacting the Ground Crew.*

1. *[P+WSO]* Verify throttles are set to OFF detent. Attempting to start the engines with throttles out of the OFF detent will result in fuel puddling and the possibility of a hot start (or even… engine fire!).
    - Left Throttle OFF/IDLE Toggle: "RALT+END" binding.
    - Right Throttle OFF/IDLE Toggle : "RCTRL+END" binding.
2. *[P]* Verify Left & Right Engine Master Switches are set to OFF (AFT)
3. *[P]* Call ground crew to connect compressed air supply unit to the right engine:
    a) Open JESTER AI wheel by short-pressing "A".
    b) Click on CREW CHIEF
    c) Click on AIR SOURCE, then CONNECT TO RIGHT ENGINE
    d) Close JESTER AI wheel by long-pressing "A".
    e) Once connected, the ground crew will call out "Connected to the Right".

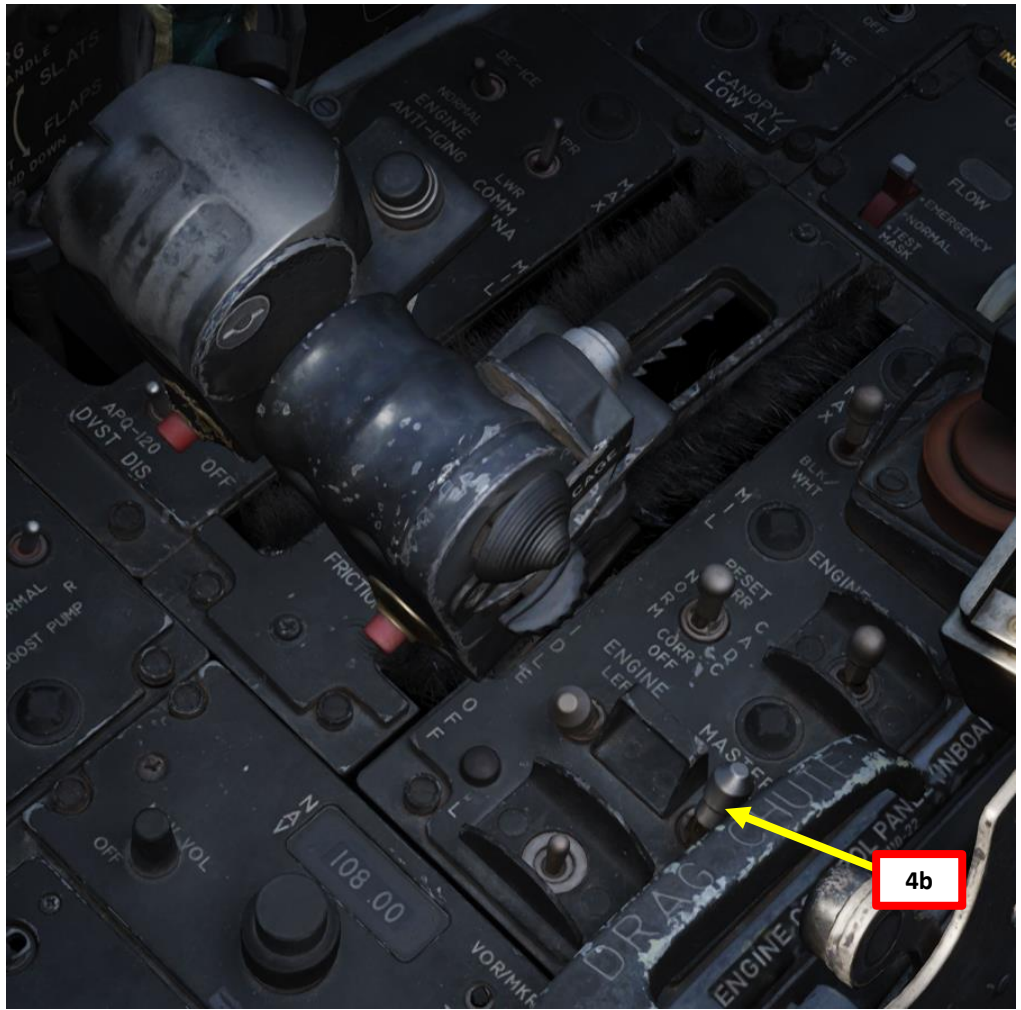


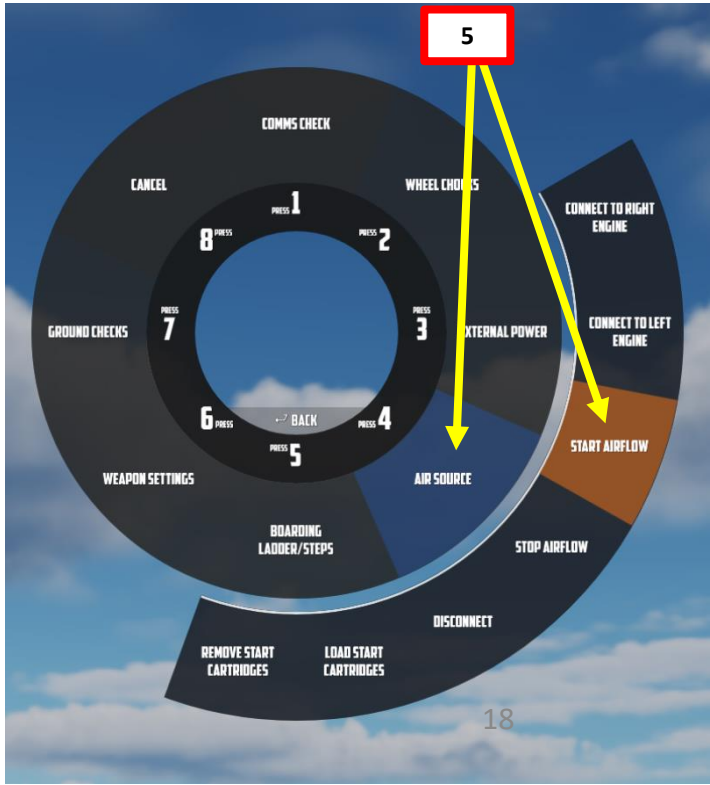




B – ENGINE START

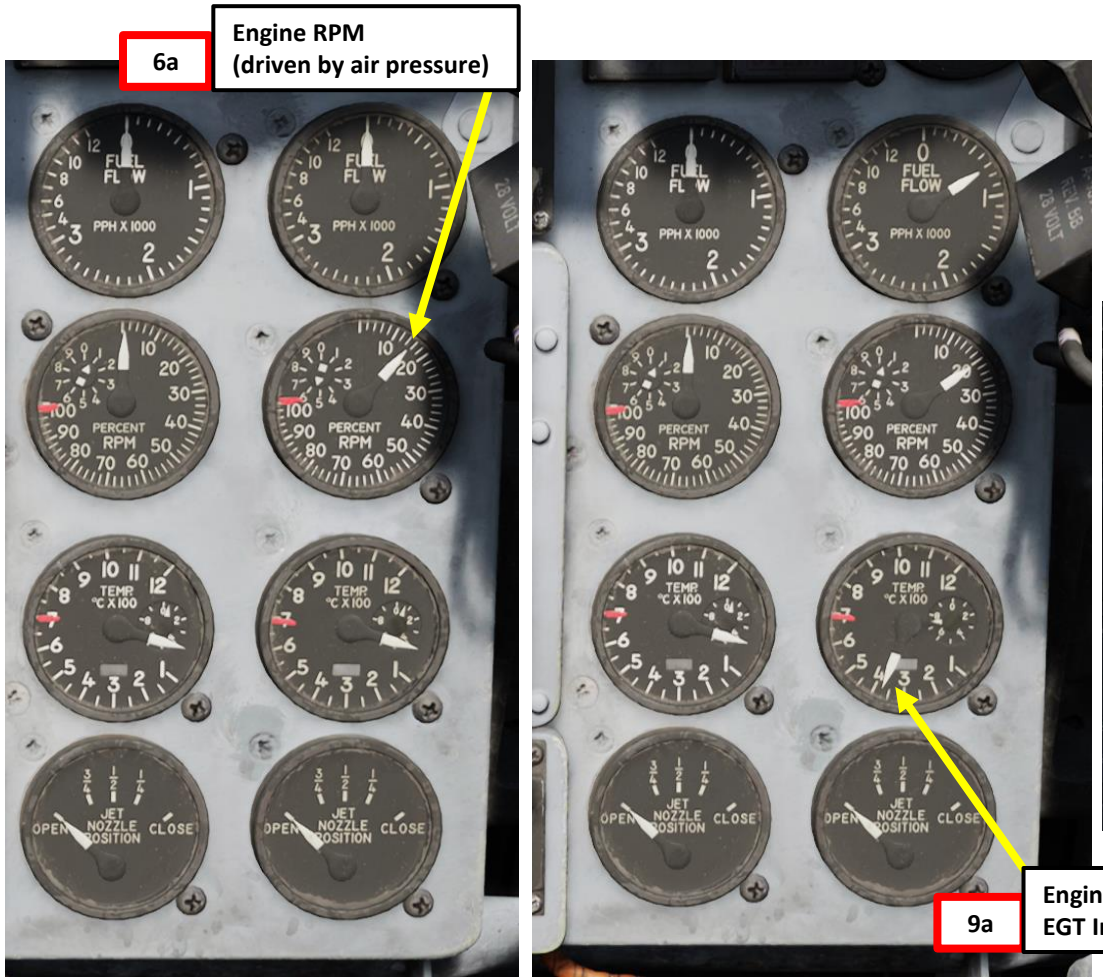
4. *[P]* Check right engine RPM is at 0 %, then set Right Engine Master Switch – ON (FWD).
5. *[P]* Request the crew chief to apply air supply pressure to drive the right engine starter (motoring).
    - From JESTER AI wheel AIR SOURCE sub-menu, click START AIRFLOW.

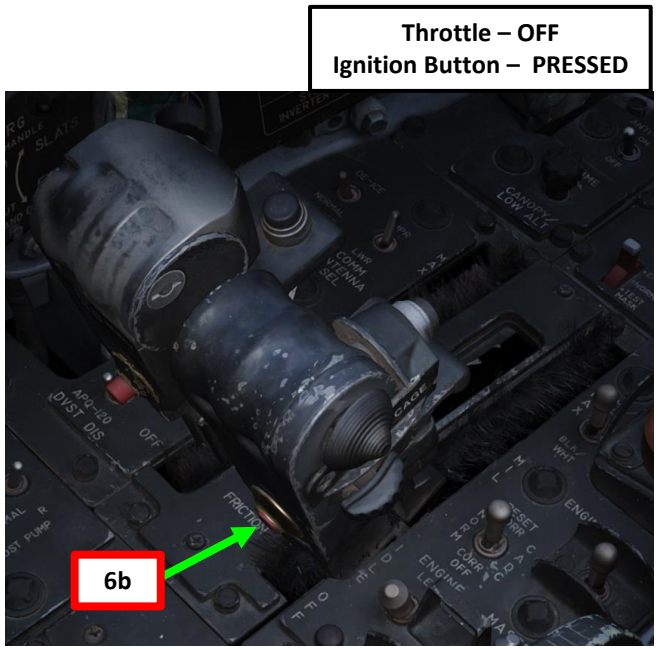


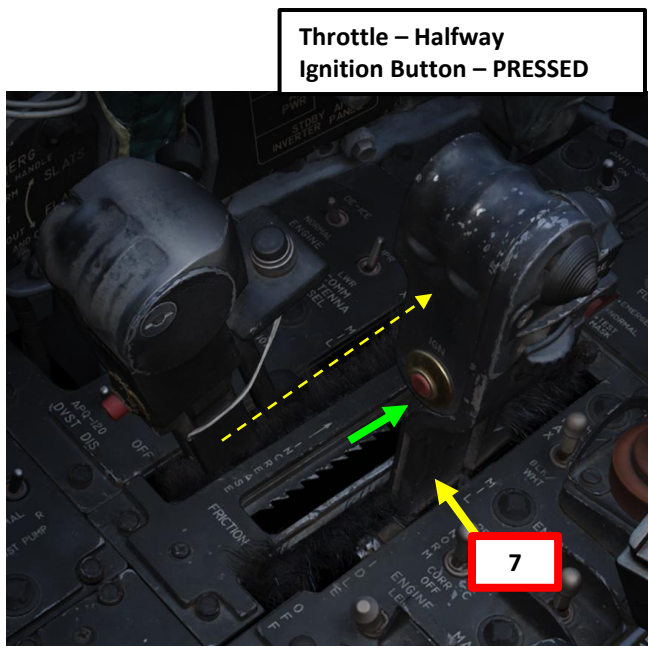


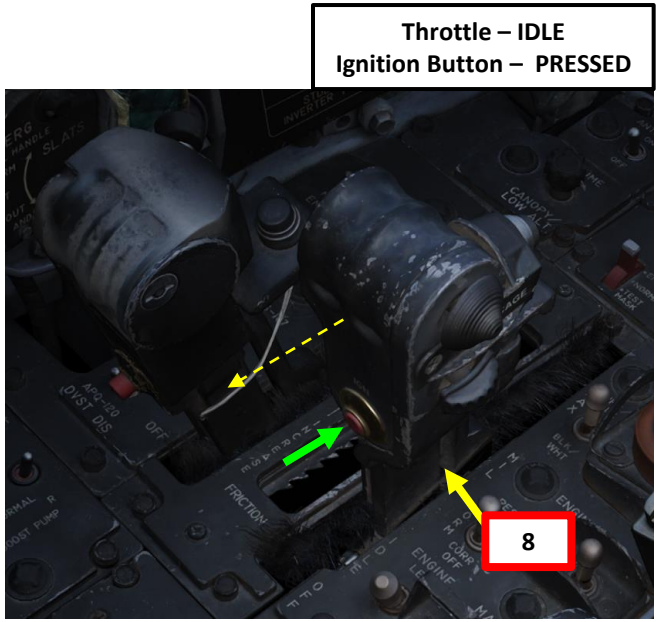
B – ENGINE START

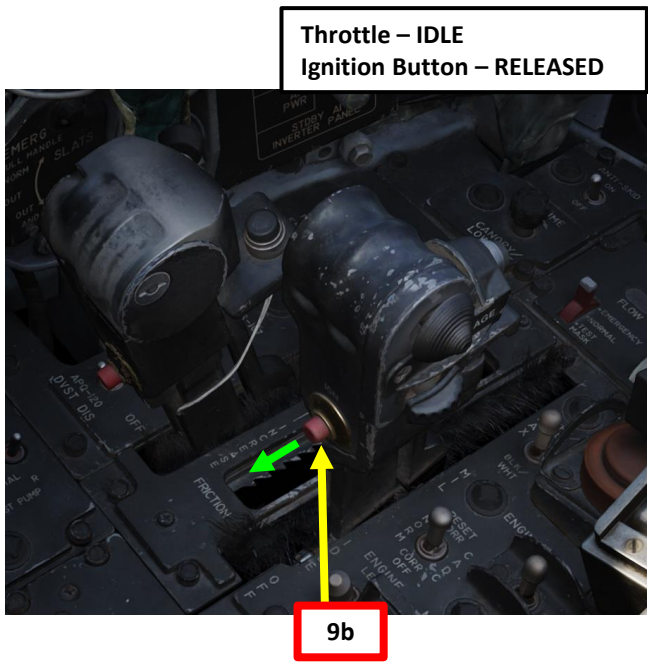
6. *[P]* Right engine RPM will gradually increase, its starter being driven by the airflow supply. When Engine RPM reaches 10 %, press and hold the Right Ignition Button. I recommend clicking and holding the button.
    - Right Throttle Ignition Button: "RCTRL+HOME" binding.
7. *[P]* Move Right Throttle out of the OFF detent halfway forward. Keep Right Ignition Button PRESSED.
    - Right Throttle OFF/IDLE Toggle : "RCTRL+END" binding.
8. *[P]* Move Right Throttle back to IDLE detent. Keep Right Ignition Button PRESSED.
9. *[P]* Confirm right engine lightoff occurs by checking for EGT (Exhaust Gas Temperature) increase, then release Right Ignition Button.





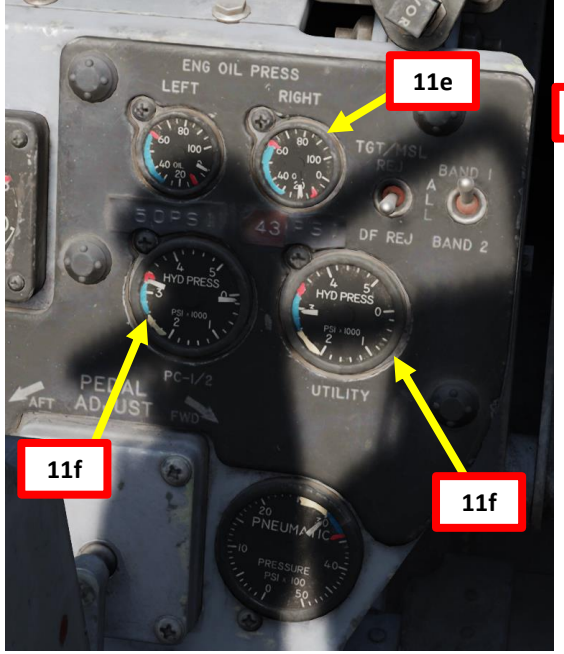


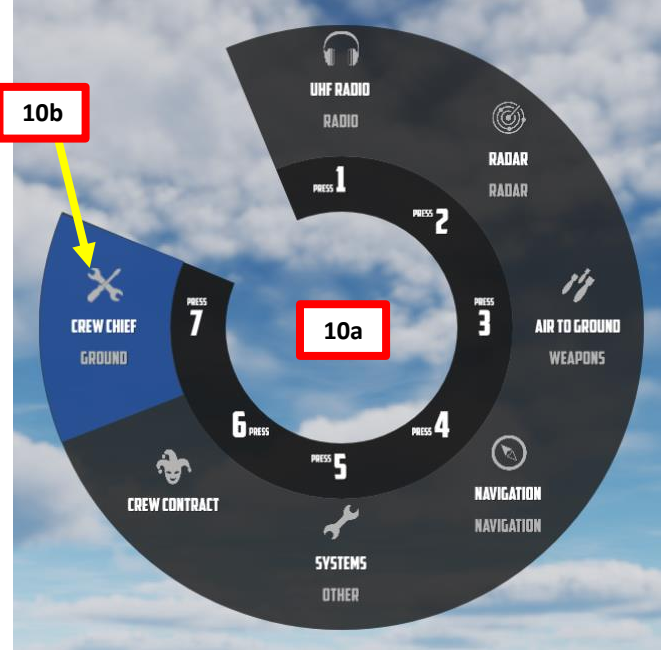


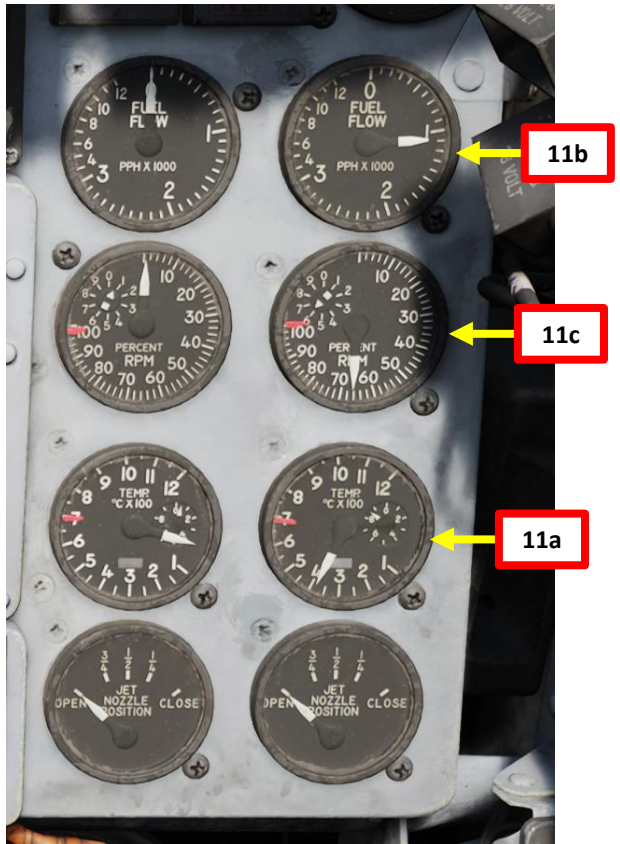


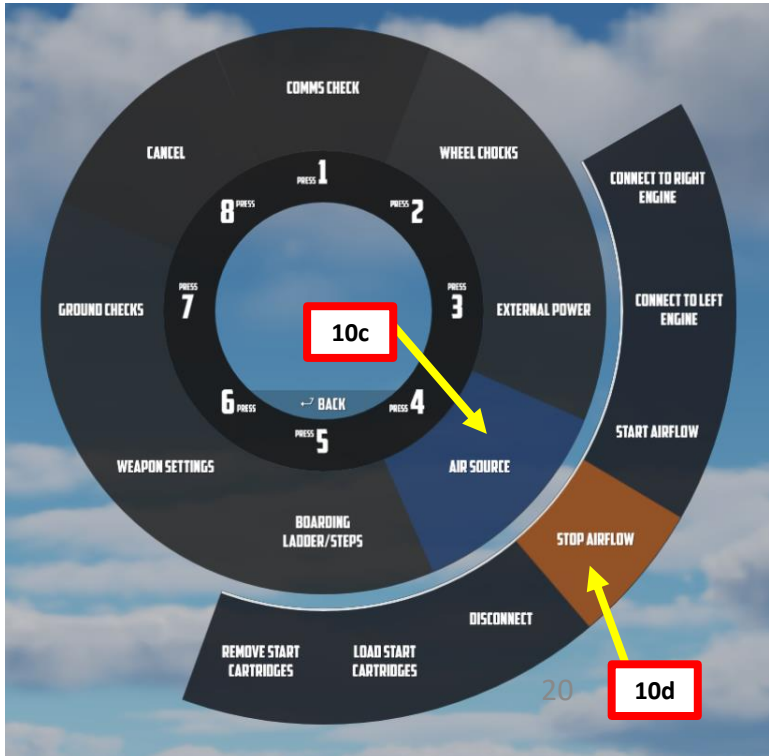
B – ENGINE START

10. *[P]* At 45% Engine RPM, external air flow is no longer needed. Request the crew chief to stop airflow.
    a) Open JESTER AI wheel by short-pressing “A”.
    b) Click on CREW CHIEF
    c) Click on AIR SOURCE, then STOP AIRFLOW
    d) Close JESTER AI wheel by long-pressing “A”.
11. *[P]* Wait for engine parameters to stabilize, then check parameters are within nominal ranges.
    a) Exhaust Gas Temperature: 220 to 420 deg C
    b) Fuel Flow Indicator: 800 to 1400 lbs/hour (pph)
    c) Idle RPM: 65 %
    d) Fuel Boost Pump Pressure: 30 (+/- 5) psi
    e) Engine Oil Pressure: 12 to 50 psi
    f) Hydraulic Pressure – Within Limits
        - PC-2 Hydraulic Pressure: 3000 (+/- 250) psi
        - Utility Hydraulic Pressure: 2755 (+/- 255) psi









B – ENGINE START

12. *[P]* Set Right Generator Switch – ON (FWD)
13. *[P]* Confirm that RH GEN OUT light extinguishes once right engine generator power comes online.

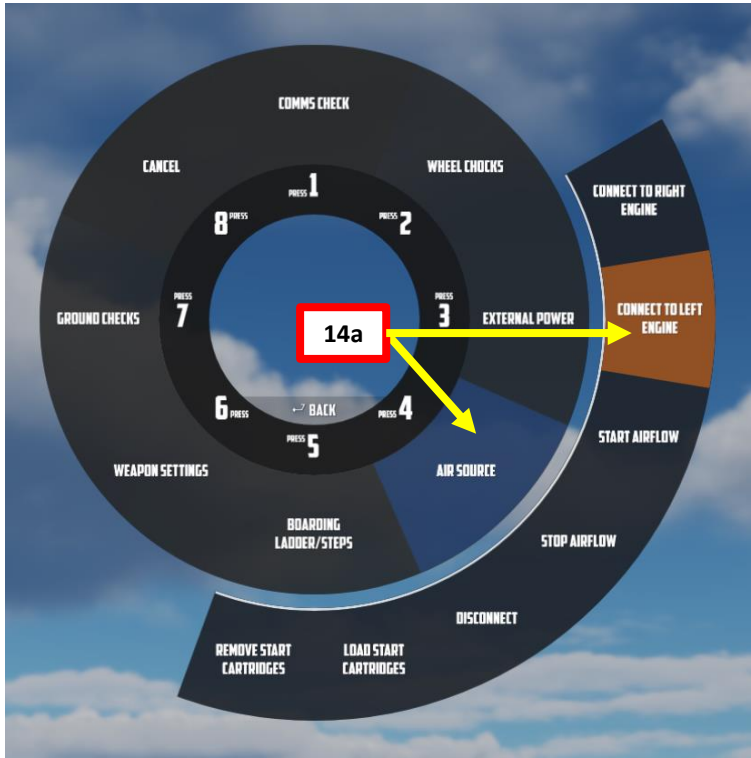
Note for the WSO: *To avoid electrical power interruption which could result in an INS NO-GO indication, ensure Inertial Navigation System is not in the ALIGN mode when generator switches are placed to ON. If a power interruption does occur, switch the INS power control knob to OFF. When power is restored, go from OFF to ALIGN pausing momentarily at STBY.*

B – ENGINE START

14. [P] Call ground crew to connect compressed air supply unit to the left engine:

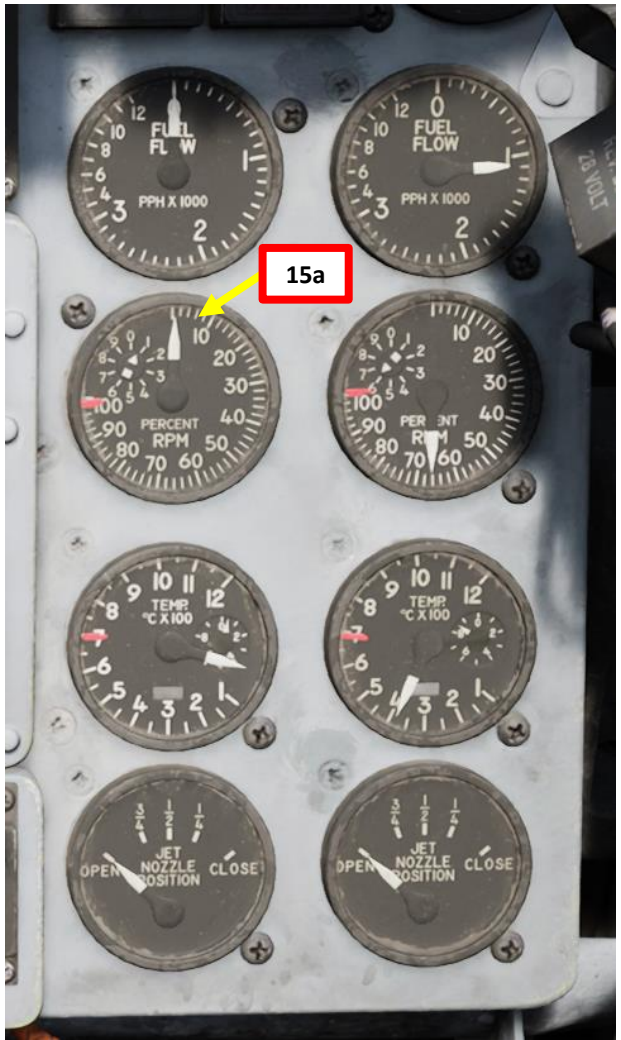
a) From JESTER AI wheel AIR SOURCE sub-menu, click CONNECT TO LEFT ENGINE

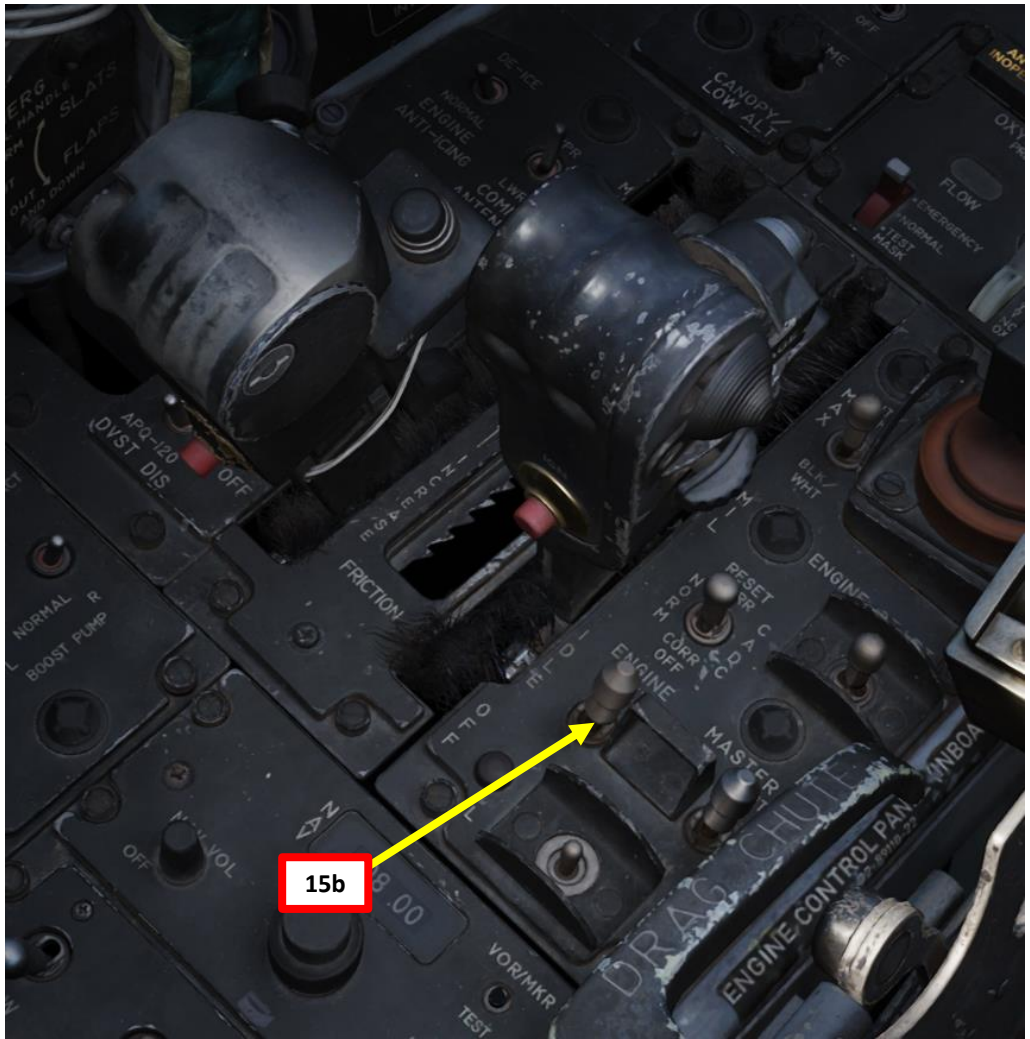
b) Once connected, the ground crew will call out “Connected to the Left”.

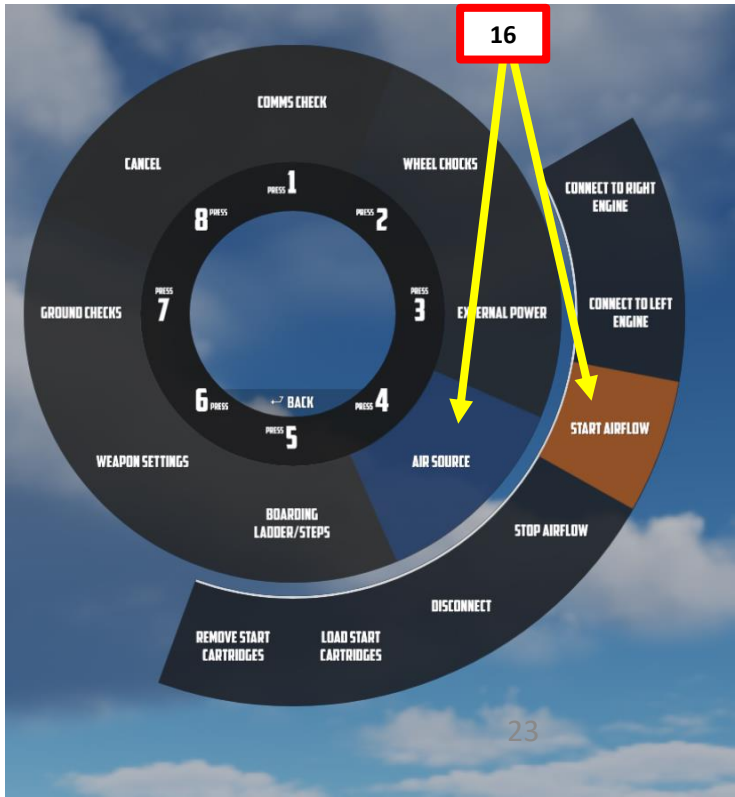


B – ENGINE START

15. *[P]* Check left engine RPM is at 0 %, then set Left Engine Master Switch – ON (FWD).
16. *[P]* Request the crew chief to apply air supply pressure to drive the left engine starter (motoring).
    - From JESTER AI wheel AIR SOURCE sub-menu, click START AIRFLOW.

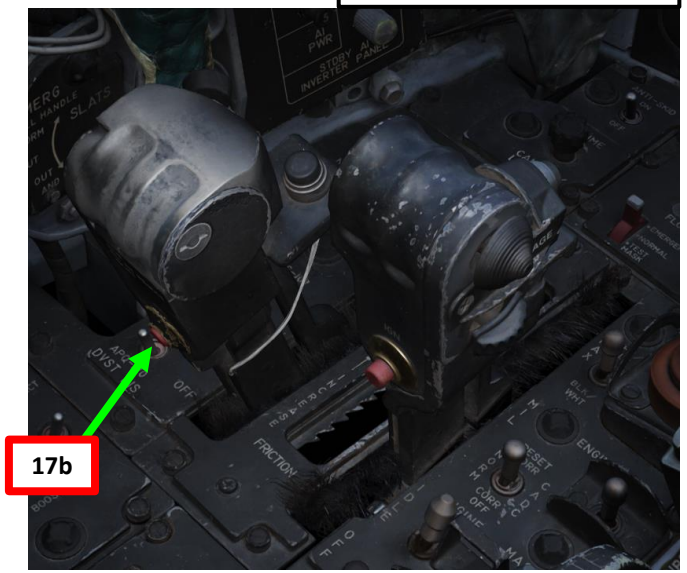


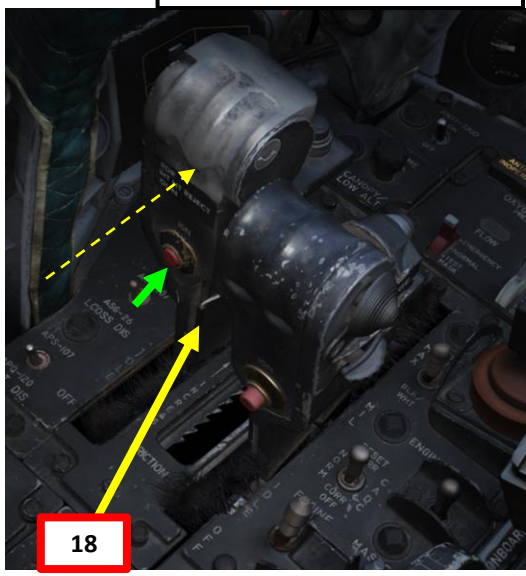


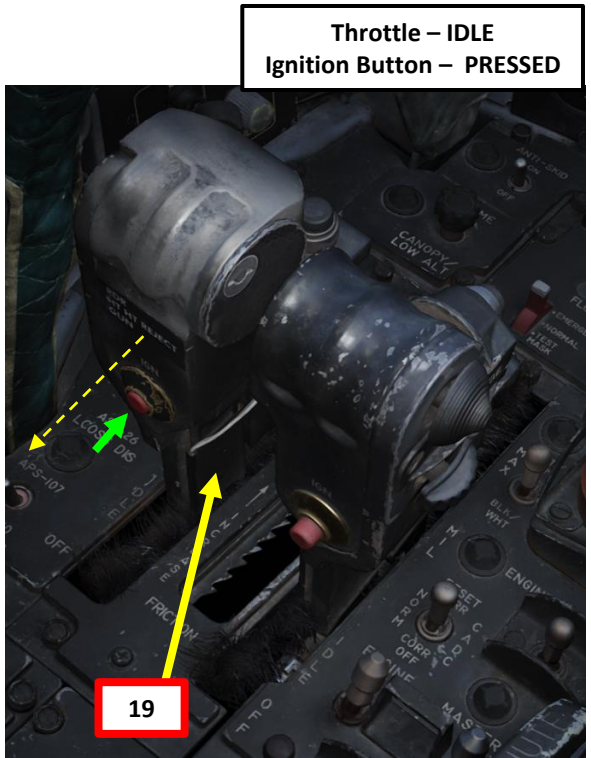


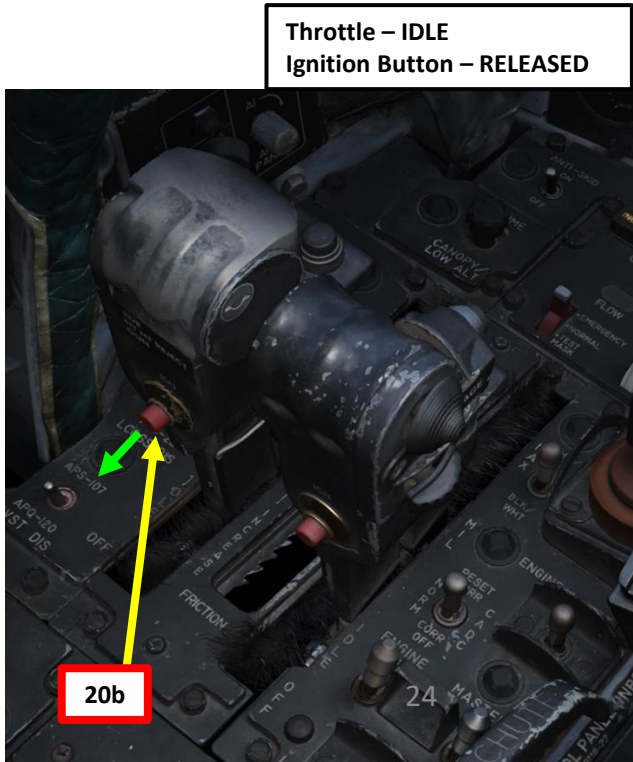
B – ENGINE START

17. *[P]* Left engine RPM will gradually increase, its starter being driven by the airflow supply. When Engine RPM reaches 10 %, press and hold the Left Ignition Button. I recommend clicking and holding the button.
    - Left Throttle Ignition Button: “RALT+HOME” binding.
18. *[P]* Move Left Throttle out of the OFF detent halfway forward. Keep Left Ignition Button PRESSED.
    - Left Throttle OFF/IDLE Toggle: “RALT+END” binding.
19. *[P]* Move Left Throttle back to IDLE detent. Keep Left Ignition Button PRESSED.
20. *[P]* Confirm left engine lightoff occurs by checking for EGT (Exhaust Gas Temperature) increase, then release Left Ignition Button.



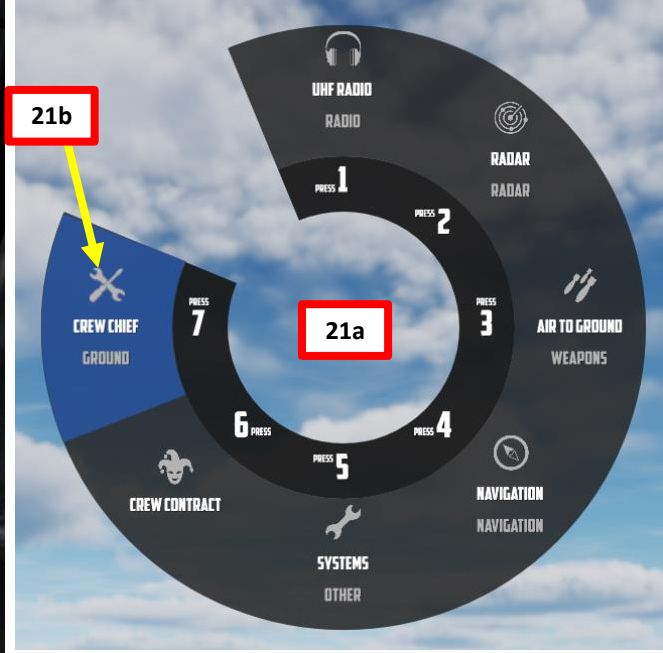


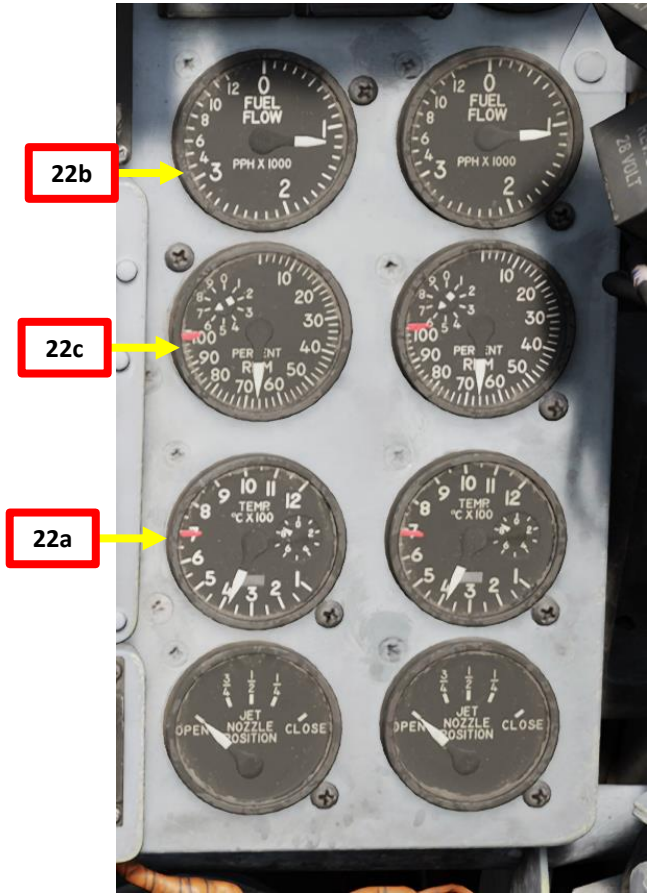


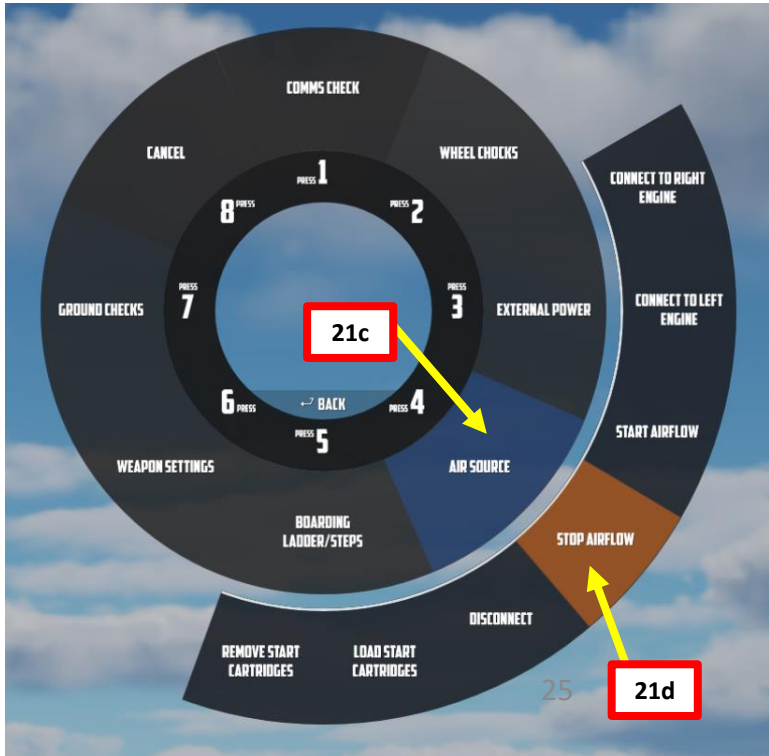


B – ENGINE START

21. *[P]* At 45% Engine RPM, external air flow is no longer needed. Request the crew chief to stop airflow.
    a) Open JESTER AI wheel by short-pressing “A”.
    b) Click on CREW CHIEF
    c) Click on AIR SOURCE, then STOP AIRFLOW
    d) Close JESTER AI wheel by long-pressing “A”.
22. *[P]* Wait for engine parameters to stabilize, then check parameters are within nominal ranges.
    a) Exhaust Gas Temperature: 220 to 420 deg C
    b) Fuel Flow Indicator: 800 to 1400 lbs/hour (pph)
    c) Idle RPM: 65 %
    d) Fuel Boost Pump Pressure: 30 (+/- 5) psi
    e) Engine Oil Pressure: 12 to 50 psi



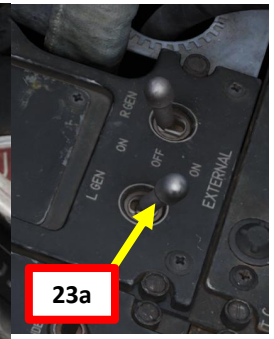


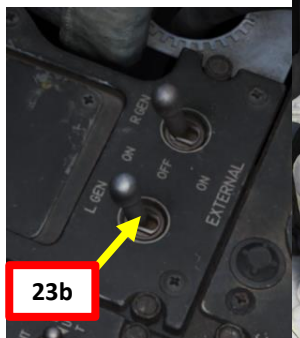


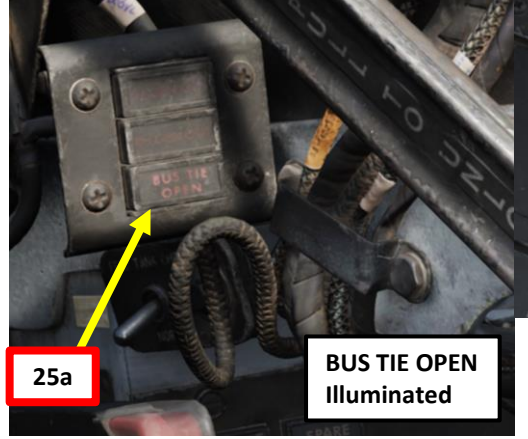
B – ENGINE START

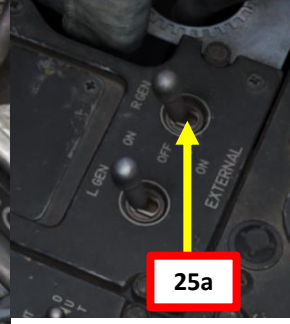
23. *[P]* Set Left Generator Switch – ON (FWD)
24. *[P]* Confirm that LH GEN OUT light extinguishes once left engine generator power comes online.
25. *[P]* Set Right Generator Switch to OFF (MIDDLE) position, then back to ON. Once generator has been cycled ON and OFF, check that BUS TIE OPEN LIGHT is extinguished.

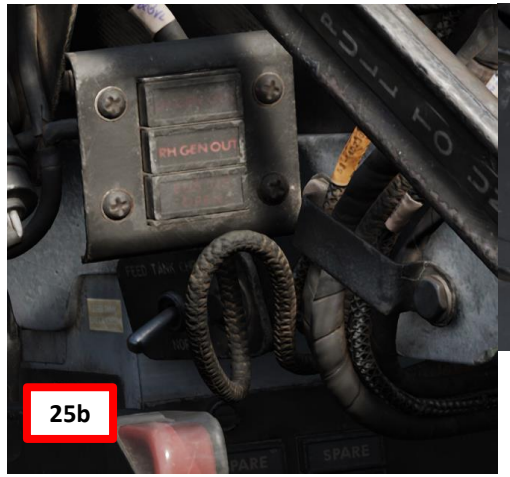
Note for the WSO: *To avoid electrical power interruption which could result in an INS NO-GO indication, ensure Inertial Navigation System is not in the ALIGN mode when generator switches are placed to ON. If a power interruption does occur, switch the INS power control knob to OFF. When power is restored, go from OFF to ALIGN pausing momentarily at STBY.*

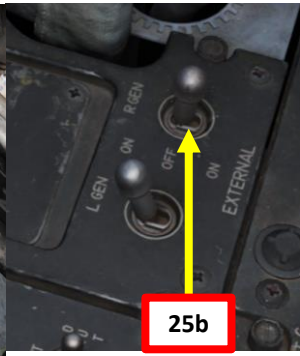


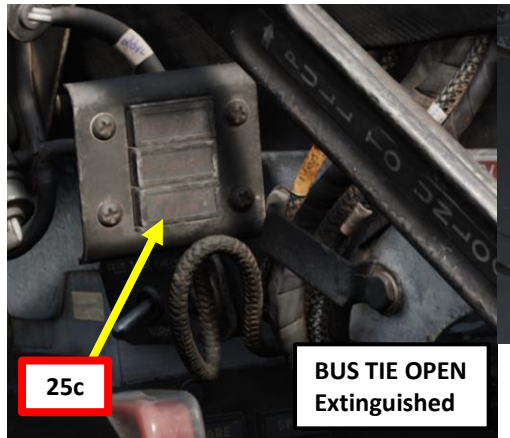


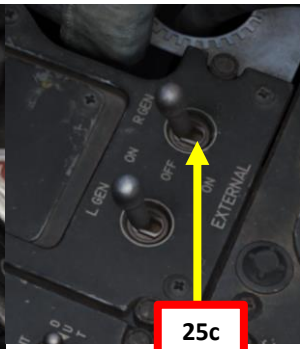






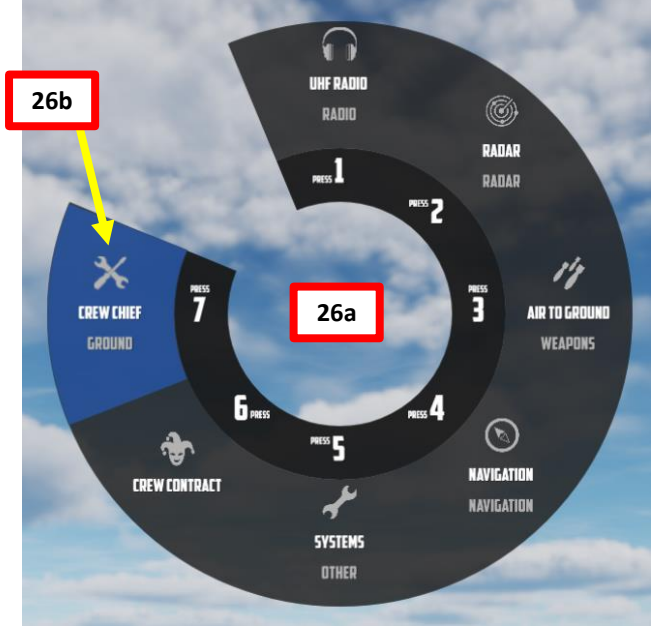


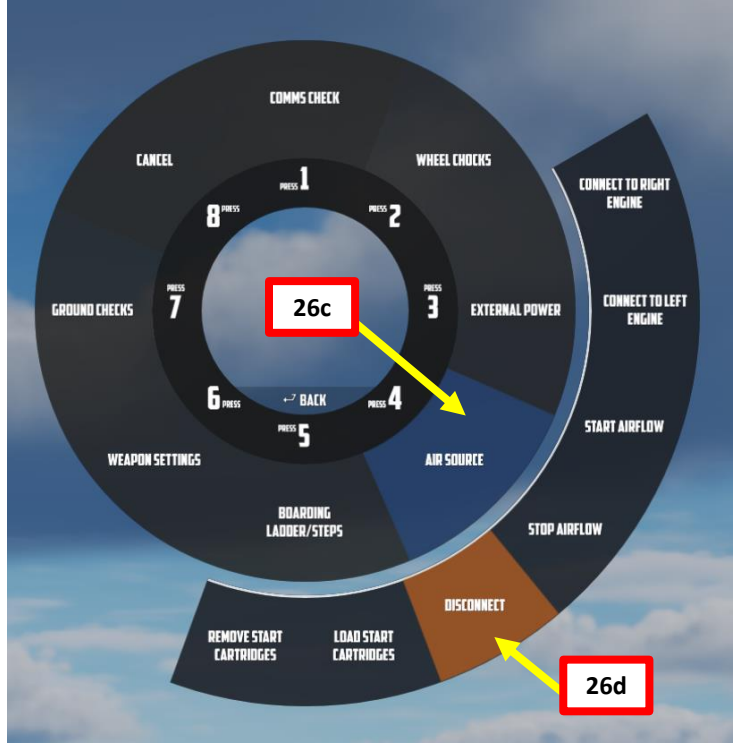


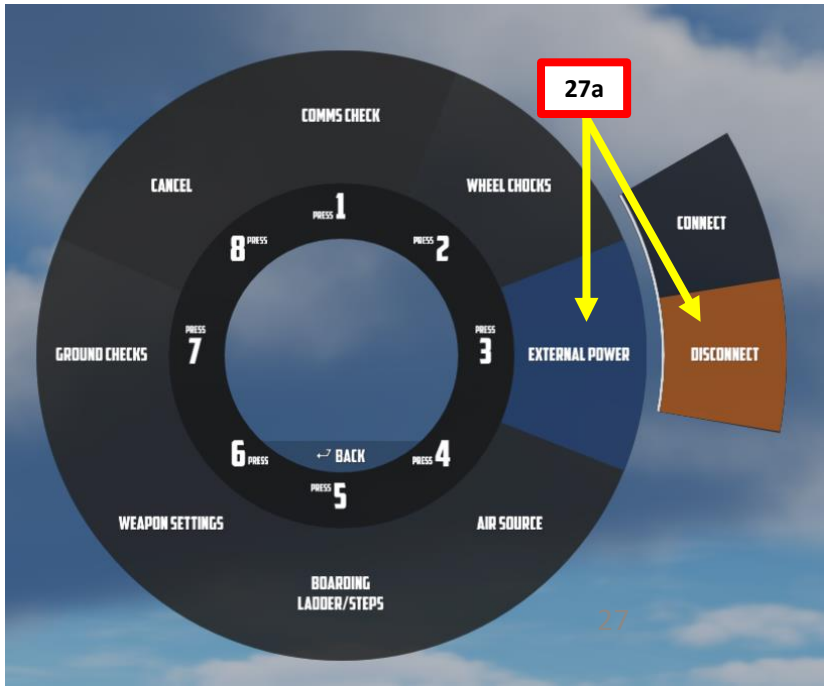


B – ENGINE START

26. *[P]* Call ground crew to disconnect compressed air supply unit:
    a) Open JESTER AI wheel by short-pressing “A”.
    b) Click on CREW CHIEF
    c) Click on AIR SOURCE, then DISCONNECT
    d) Once disconnected, the ground crew will call out “Disconnected”.
27. *[P]* Request ground crew to disconnect the aircraft with the External Ground Power Cart.
    a) Click on EXTERNAL POWER, then DISCONNECT
    b) Close JESTER AI wheel by long-pressing “A”.







C – INS (INERTIAL NAVIGATION SYSTEM) ALIGNMENT

Basics & Alignment Types

The LN-12D Navigational Computer and the AN/ASN-63 INS (Inertial Navigation System) require position alignment. There are three primary methods to perform this alignment on the ground:

Option A – Full Gyrocompass Alignment:

- This process takes approximately between **8 minutes to 12 minutes**, but alignment time varies based on temperature and BATH alignment accuracy. The initial **aircraft position** (Latitude/Longitude) and **magnetic variation** (MAGVAR) are both required for this alignment, which can be obtained from the kneeboard TURNPOINTS page.
- This alignment offers a relative CEP (Circular Error Probability) of **3 nm per hour** (think of this is the INS drift/position error accumulating over time).

Option B – Fast BATH (Best Available True Heading) Alignment:

- This process takes approximately **2 minutes 15 seconds**. This method minimizes alignment time but can potentially be inaccurate if the available true heading does not match the actual aircraft heading (which is why Stored Heading can be set via the Mission Editor to prevent this issue).
- Once in BATH, the INS is accurate to a CEP (Circular Error Probability) of roughly **5.5 nm per hour**, although higher inaccuracies can be seen.

Option C – Stored Heading (HDG MEM) Alignment:

- This process takes approximately **2 minutes 15 seconds**. This method minimizes alignment time while providing a reasonably accurate position.
- Once in HDG MEM, the INS offers a relative CEP (Circular Error Probability) at the optimal end of BATH (**5.5 nm per hour**), or even Gyrocompass Alignment (**3 nm per hour**) if the previous alignment occurred within the last 2 hours.
- This option is only available if a previously stored alignment has been done and the aircraft has remained stationary. Stored Heading is enabled via the Mission Editor in the Aircraft Additional Properties tab. “INS REFERENCE ALIGNMENT STORED” option checkbox needs to be ticked.

AN/ASN-63 INS Control Panel

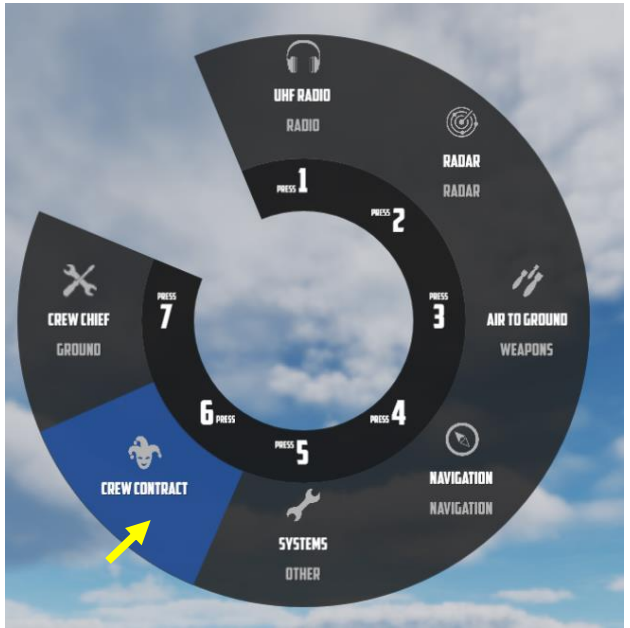
AN/ASN-46A Navigation Computer Control Panel

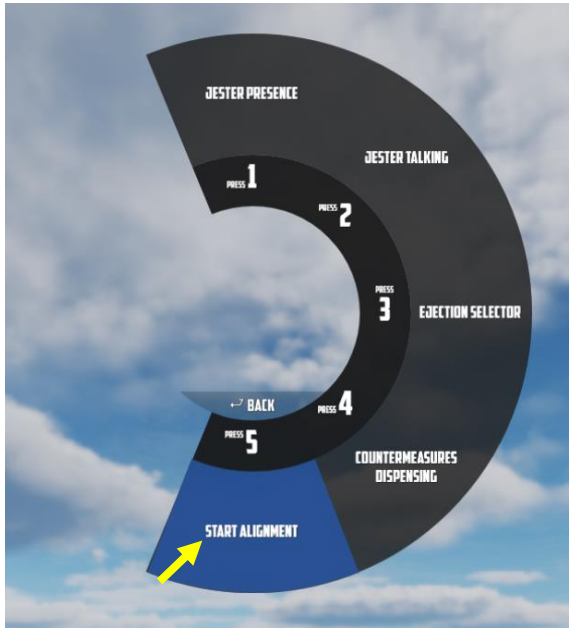
C – INS (INERTIAL NAVIGATION SYSTEM) ALIGNMENT (PILOT)

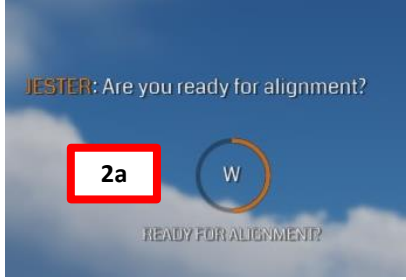
Alignment with JESTER AI

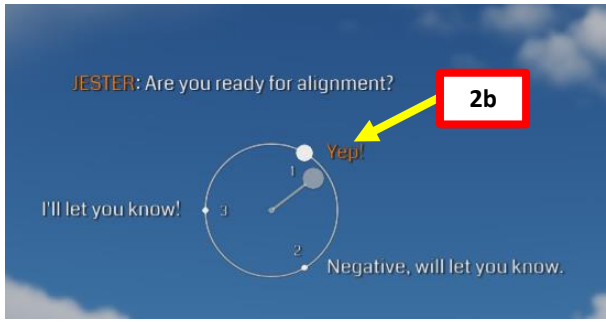
1. *[WSO]* Now that the engines are started and aircraft is running on generator power, the WSO (Weapon Systems Officer) can proceed with setting up the rear cockpit (including navigation, radar and targeting pod systems). In this case, JESTER AI will set up the following systems for us:
   - INS (Inertial Navigation System) alignment
   - AN/APQ-120 Fire Control Radar Setup **(see section E)**
   - DSCG (Digital Scan Converter Group) setup, which displays radar, weapon and targeting pod video footage **(see section E)**
   - WRCS (Weapon Release Computer Set) setup **(see section E)**
   - AN/AVQ-23 Pave Spike Targeting Pod setup if equipped **(see section E)**
2. *[WSO]* When JESTER asks: "Are you ready for alignment?" Press "W" to select dialog option, then click on "Yep".
3. *[WSO]* When JESTER asks: "What alignment do you want?" Press "W" to select dialog option, then click on desired INS alignment mode. We will use BATH alignment for this tutorial for an expedited start-up.
   - **Full Alignment**: Takes between 8 to 12 minutes. Most precise but longest form of alignment.
   - **BATH (Best Available True Heading) Alignment**: Takes 2 minutes 15 seconds. Offers quick alignment with reasonable precision if Stored Heading is not available.
   - **HDG Memory Alignment**: Takes 2 minutes 15 seconds. Offers better precision vs alignment time than BATH. Only available if Stored Heading option is enabled via Mission Editor.
4. *[WSO]* JESTER will also automatically enter Waypoint and Target Point coordinates of your flight plan. A player-controlled WSO will have to enter all this data manually. Once INS alignment is complete, JESTER will call out that "Alignment is done, ready to taxi".

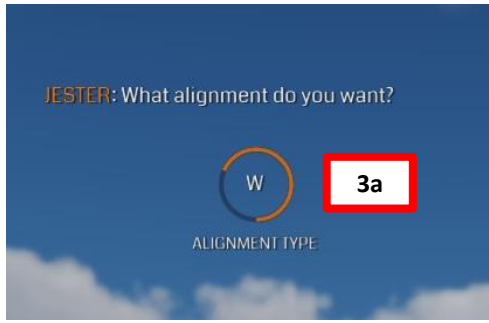
- Note: If you miss the dialog option, open JESTER AI wheel by short-pressing "A", click on CREW CONTRACT, then START ALIGNMENT. JESTER will then ask you what alignment type you want (step 3).







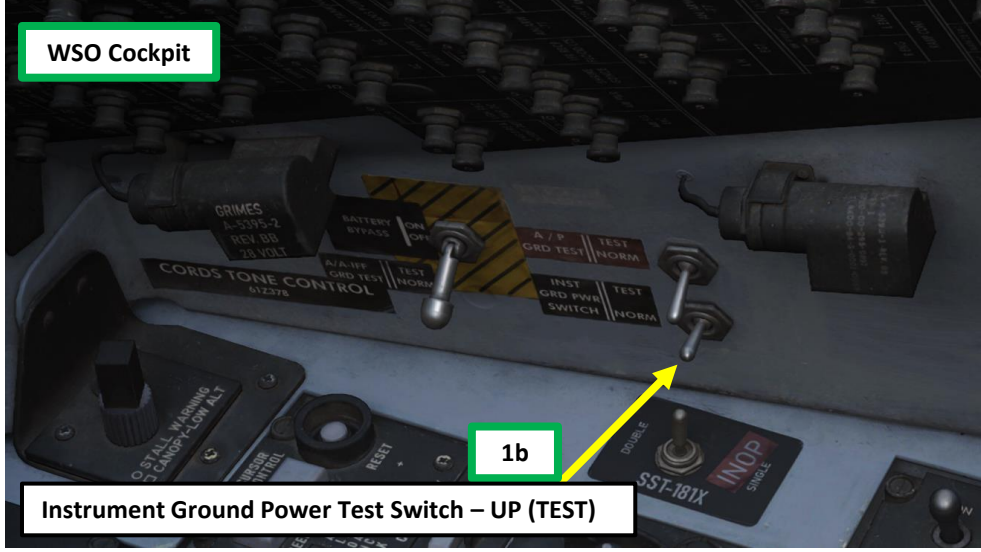


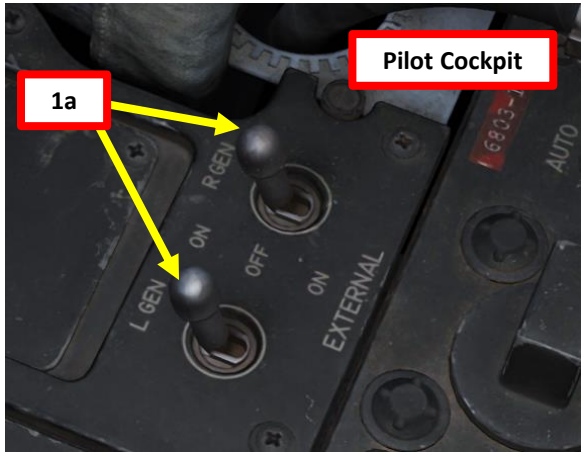


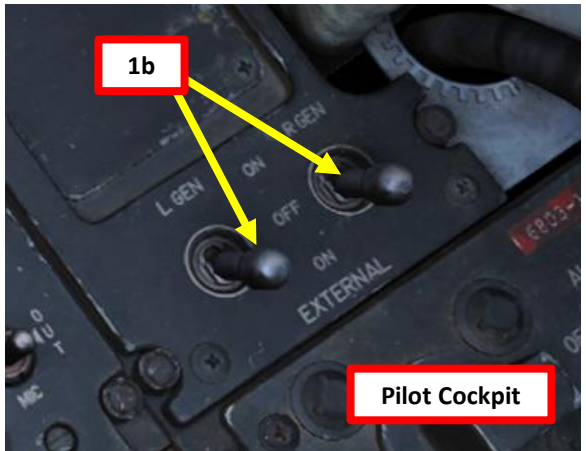
C – INS (INERTIAL NAVIGATION SYSTEM) ALIGNMENT (WSO)

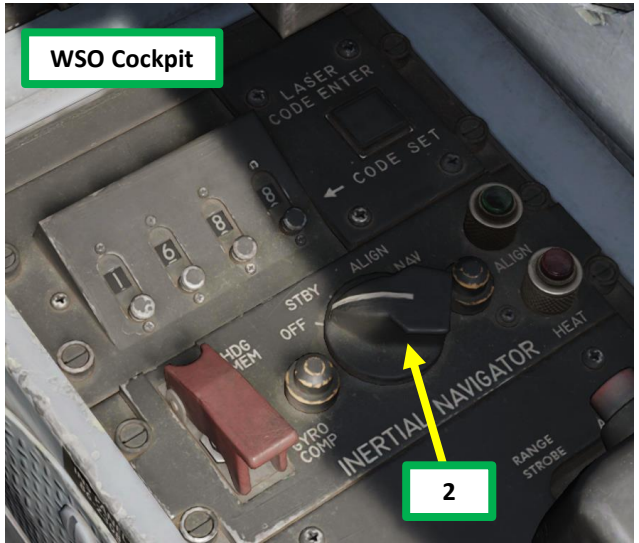
Before Starting INS Alignment: Power Considerations

1. *[WSO]* **Very Important**: Before starting INS alignment, check with the pilot the power state of the aircraft.
   a) If aircraft **engines are running** and **generator** switches are set to **ON** (FWD), set Instrument Ground Power Test Switch – NORM (DOWN).
   b) If aircraft is powered by **external ground power** and **generator** switches are set to **EXTERNAL ON** (AFT), set Instrument Ground Power Test Switch – TEST (UP). This will power up the rear cockpit even if engines are not running.
   - Note: To avoid an "INS NO-GO" indication, check that the INS Power Knob is not in the ALIGN position if power interruptions occur (as an example, transitioning from ground power to engine generator power).
2. *[WSO]* Check INS Power Selector – OFF
3. *[WSO]* Check Navigation Computer Mode Selector – OFF





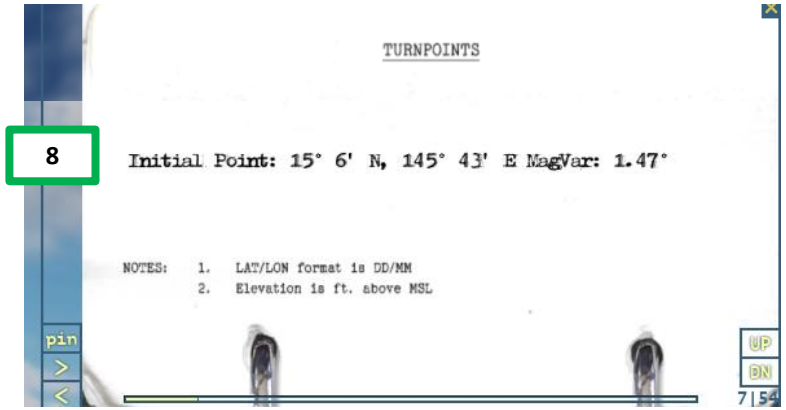


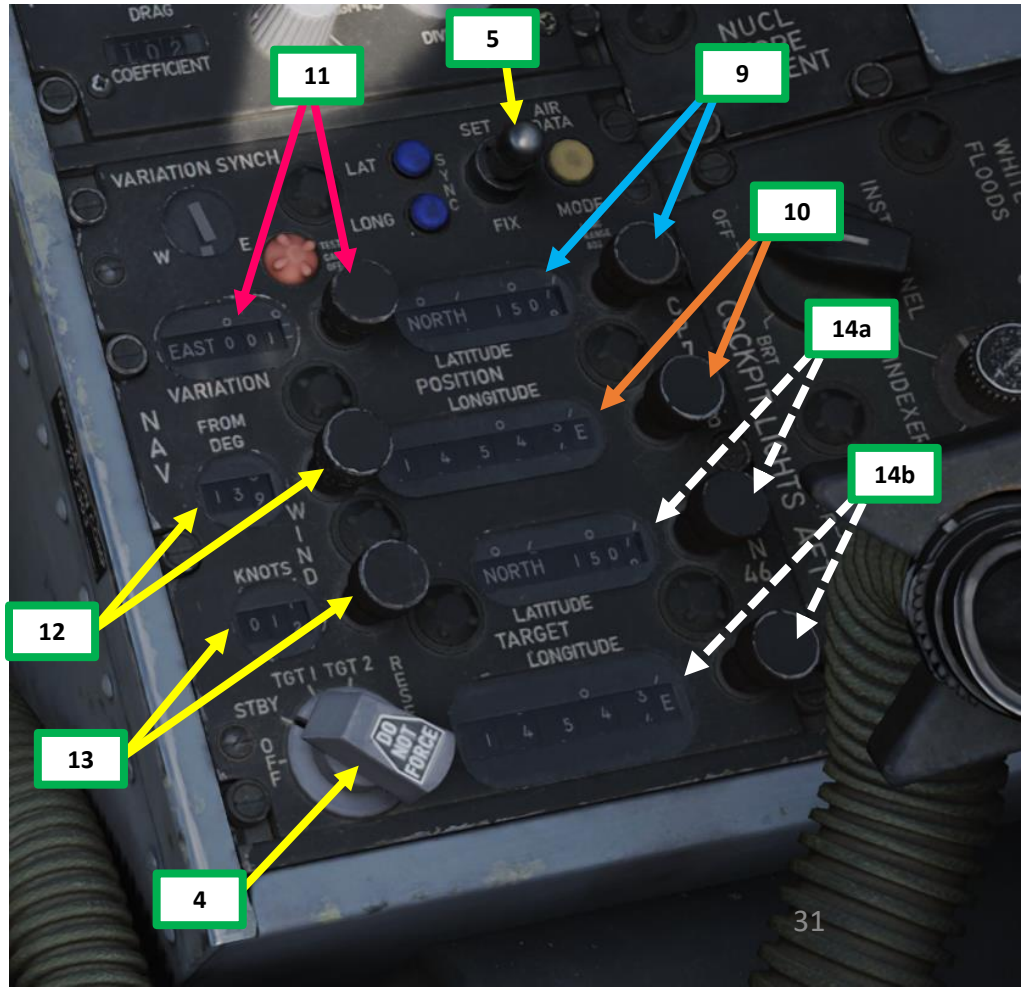


C – INS (INERTIAL NAVIGATION SYSTEM) ALIGNMENT (WSO)

Option A: Full Gyrocompass Alignment

4. *[WSO]* Set Navigation Computer Mode Selector – STBY (Standby)
5. *[WSO]* Set Position Update Switch – NORMAL (Middle position)
6. *[WSO]* Open up your kneeboard using "RSHIFT+K".
7. *[WSO]* Cycle through pages using the "[" and "]" (kneeboard previous/next page bindings) until reaching Initial Point section.
8. *[WSO]* Initial Point Data:
   - LATITUDE : **15 deg 06 minutes North**
   - LONGITUDE: **145 deg 43 minutes East**
   - MAGVAR (Magnetic Variation): **1.47 deg**
9. *[WSO]* Press and hold **LATITUDE** position knob IN (left click and hold), then rotate (scroll mousewheel) to set Latitude to **15 deg 06 minutes North**. Release knob (OUT) when correct value is set.
10. *[WSO]* Press and hold **LONGITUDE** position knob IN (left click and hold), then rotate (scroll mousewheel) to set Longitude to **145 deg 43 minutes East**. Release knob (OUT) when correct value is set.
11. *[WSO]* Press and hold **VARIATION** knob IN (left click and hold), then rotate (scroll mousewheel) to set MAGVAR to **1.47 deg**. Release knob (OUT) when correct value is set.
12. **[WSO]* If wind direction is available from mission briefing: press and hold **WIND FROM** knob IN (left click and hold), then rotate (scroll mousewheel) to set the direction the wind is coming from (as an example, 139 is for a wind coming from the South East). Release knob (OUT) when correct value is set. *This step will be omitted for simplicity since the INS does not require this value for alignment.*
13. **[WSO]* If wind speed is available from mission briefing: press and hold **WIND KNOTS** knob IN (left click and hold), then rotate (scroll mousewheel) to set the wind speed (as an example, 12 knots). Release knob (OUT) when correct value is set. *This step will be omitted for simplicity since the INS does not require this value for alignment.*
14. **[WSO]* Set Target 2 (TGT 2) Latitude & Longitude. *This step will be omitted for simplicity*.

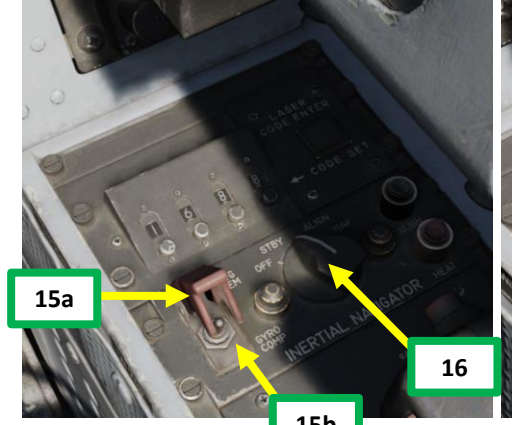


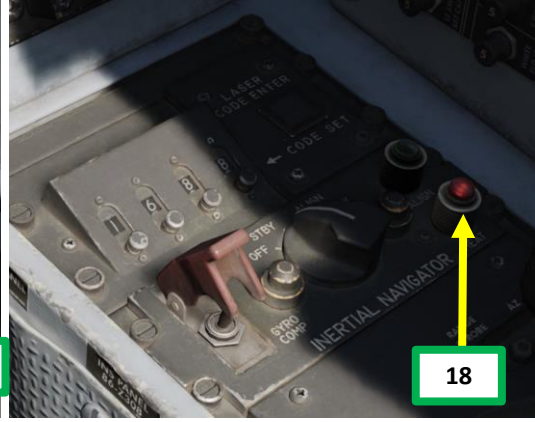


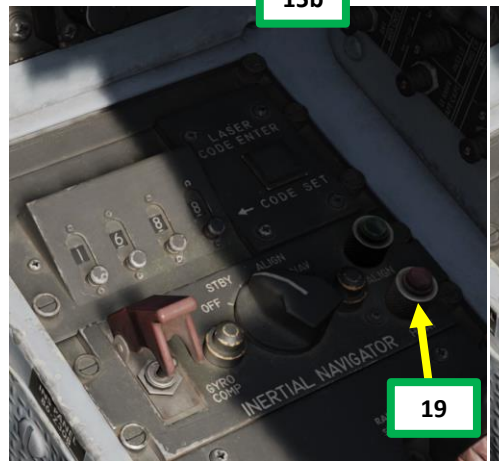
C – INS (INERTIAL NAVIGATION SYSTEM) ALIGNMENT (WSO)

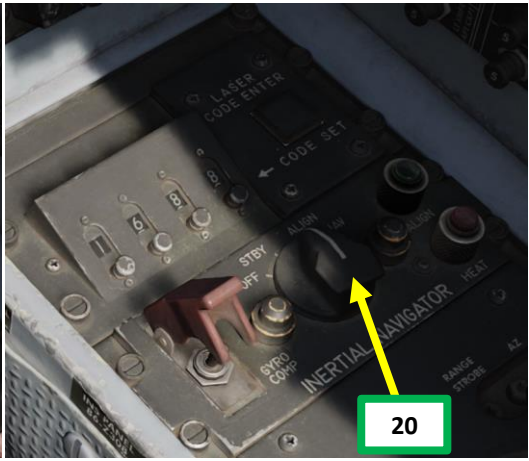
Option A: Full Gyrocompass Alignment

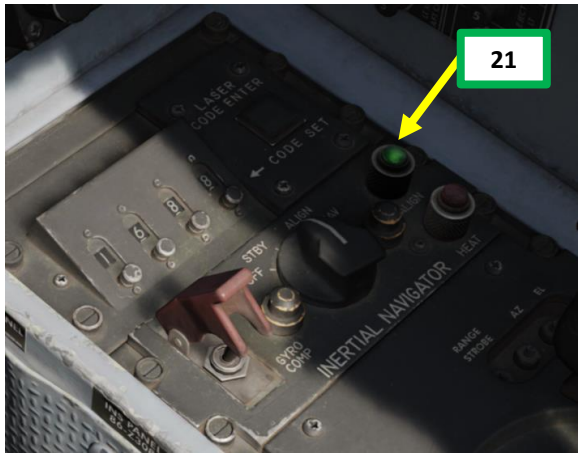
15. *[WSO]* Flip INS Alignment Mode Switch guard UP, then check INS Alignment Mode Switch is set to AFT to GYRO COMP (Gyrocompass). Take note that GYRO COMP is the default (guard down) position.
16. *[WSO]* Set INS Power Selector – STBY (Standby).
17. *[WSO]* Power is applied to the INS heaters and temperature control system and initiates Coarse alignment.
18. *[WSO]* Confirm HEAT lamp illuminates. This means the INS pre-heat sequence is ongoing and operational temperature has not been reached yet.
19. *[WSO]* Wait until HEAT lamp extinguishes (approximately **6 minutes**).
    - When the system heats up to an operational temperature of 160 deg F (which takes about 5 minutes), the HEAT lamp will take another 50 seconds to extinguish, indicating that the INS is ready for alignment.
20. *[WSO]* Set INS Power Selector – ALIGN.
21. *[WSO]* Wait until ALIGN lamp illuminates steadily (approximately **75 seconds**). This indicates the completion of the initial BATH (Best Available True Heading) or "Fine" alignment, initiating the gyro-compassing process.
    - When ALIGN lamp is illuminated, you can set INS Power Selector to NAV mode at any time, but optimal accuracy is not attained until ALIGN lamp is flashing.
22. *[WSO]* Wait until ALIGN lamp flashes (approximately **5 minutes**), indicating the gyro-compassing process is complete and optimal accuracy is attained.
23. *[WSO]* Set INS Power Selector – NAV.
24. *[WSO]* Confirm ALIGN light extinguishes.
25. *[WSO]* Flip INS Alignment Mode guard DOWN. This will ensure INS Alignment Mode stays to GYRO COMP.

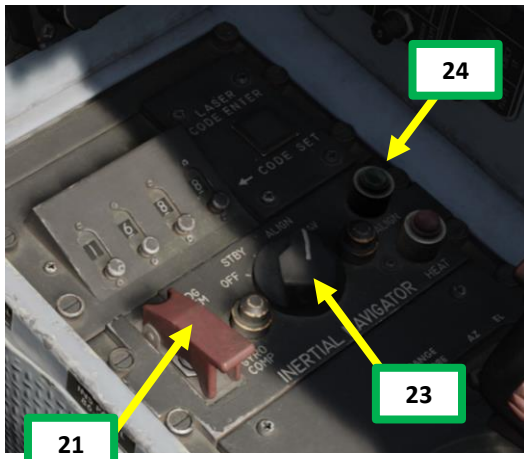








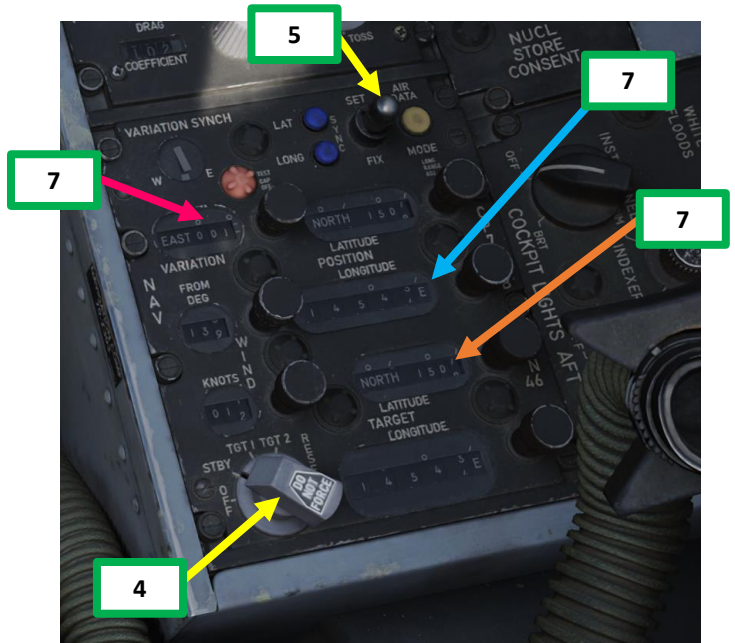


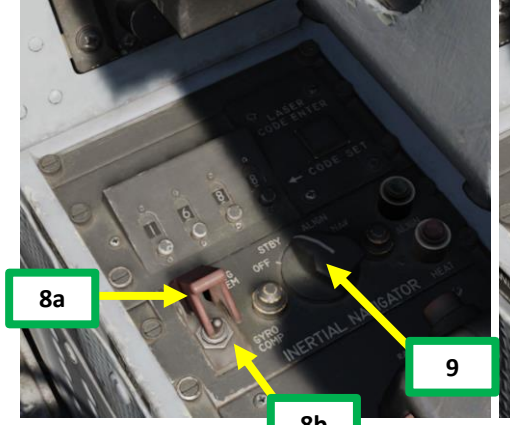


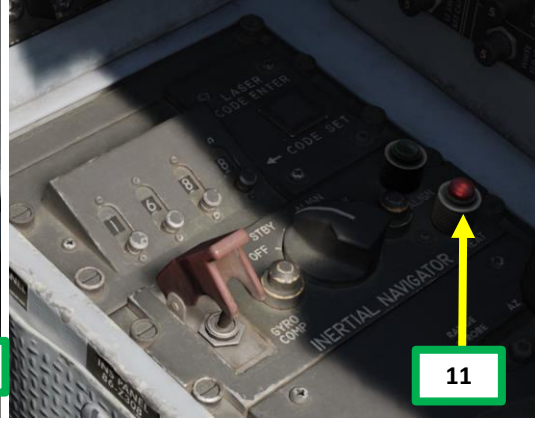
C – INS (INERTIAL NAVIGATION SYSTEM) ALIGNMENT (WSO)

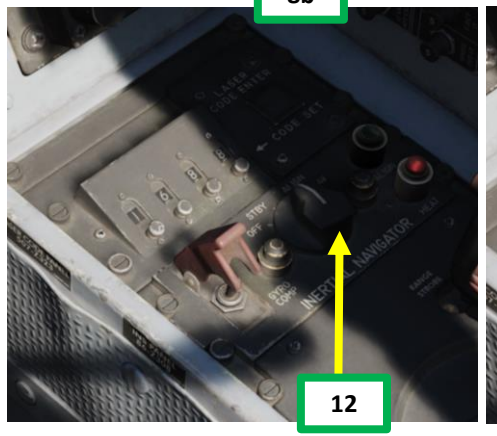
Option B: Fast BATH (Best Available True Heading) Alignment

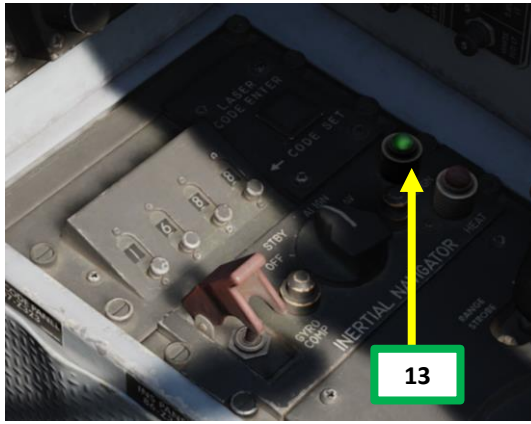
4. *[WSO]* Set Navigation Computer Mode Selector – STBY (Standby)
5. *[WSO]* Set Position Update Switch – NORMAL (Middle position)
6. *[WSO]* Initial Point Data:
   - LATITUDE : **15 deg 06 minutes North**
   - LONGITUDE: **145 deg 43 minutes East**
   - MAGVAR (Magnetic Variation): **1.47 deg**
7. *[WSO]* We will assume latitude, longitude and MAGVAR values have all been entered correctly in the Navigation Computer already.
8. *[WSO]* Flip INS Alignment Mode Switch guard UP, then check INS Alignment Mode Switch is set to AFT to GYRO COMP (Gyrocompass). Take note that GYRO COMP is the default (guard down) position.
9. *[WSO]* Set INS Power Selector – STBY (Standby).
10. *[WSO]* Power is applied to the INS heaters and temperature control system and initiates Coarse alignment.
11. *[WSO]* For BATH alignment, we will disregard the status of the HEAT lamp.
12. *[WSO]* Set INS Power Selector – ALIGN.
13. *[WSO]* Wait until ALIGN lamp illuminates steadily (approximately **2 minutes 15 seconds**). This indicates the completion of the initial BATH (Best Available True Heading) or "Fine" alignment.
14. *[WSO]* Set INS Power Selector – NAV.
15. *[WSO]* Confirm ALIGN light extinguishes.
16. *[WSO]* Flip INS Alignment Mode guard DOWN. This will ensure INS Alignment Mode stays to GYRO COMP.

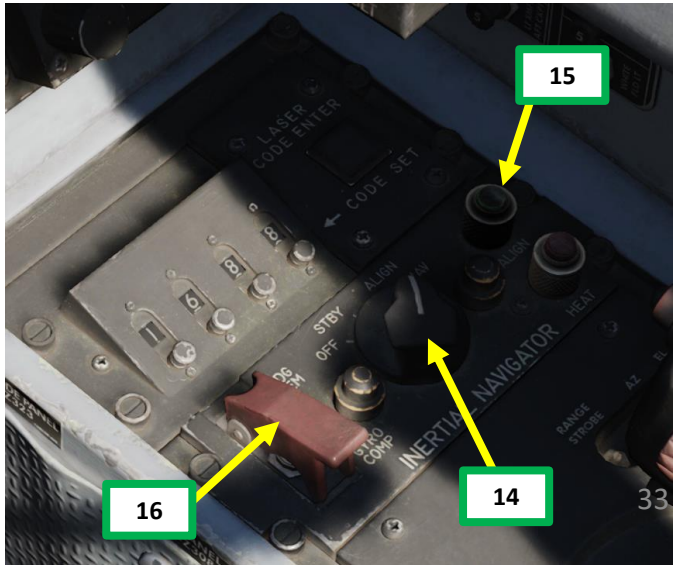








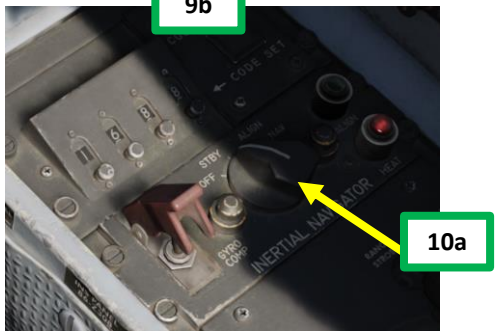


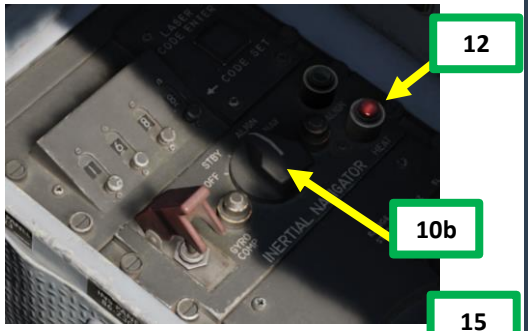


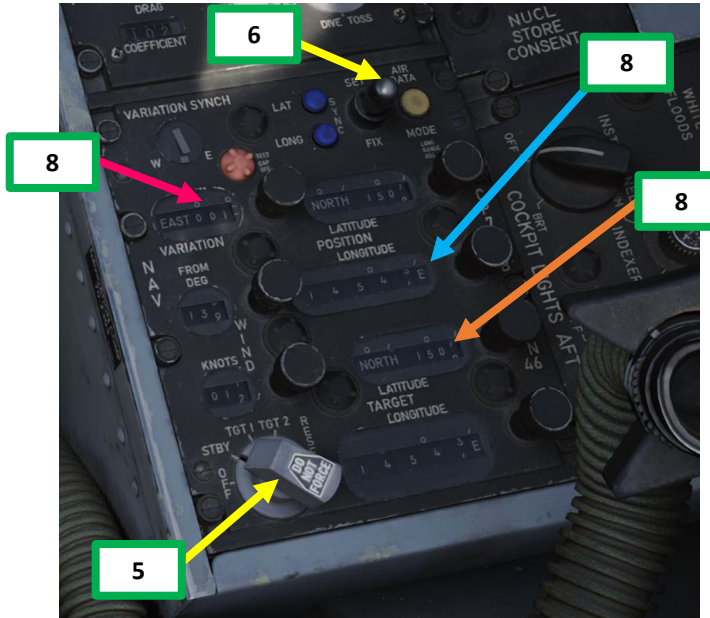
C – INS (INERTIAL NAVIGATION SYSTEM) ALIGNMENT (WSO)

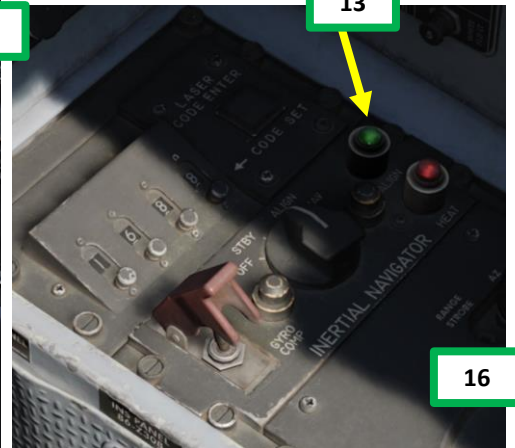
Option C: HDG MEM (Stored Heading) Alignment

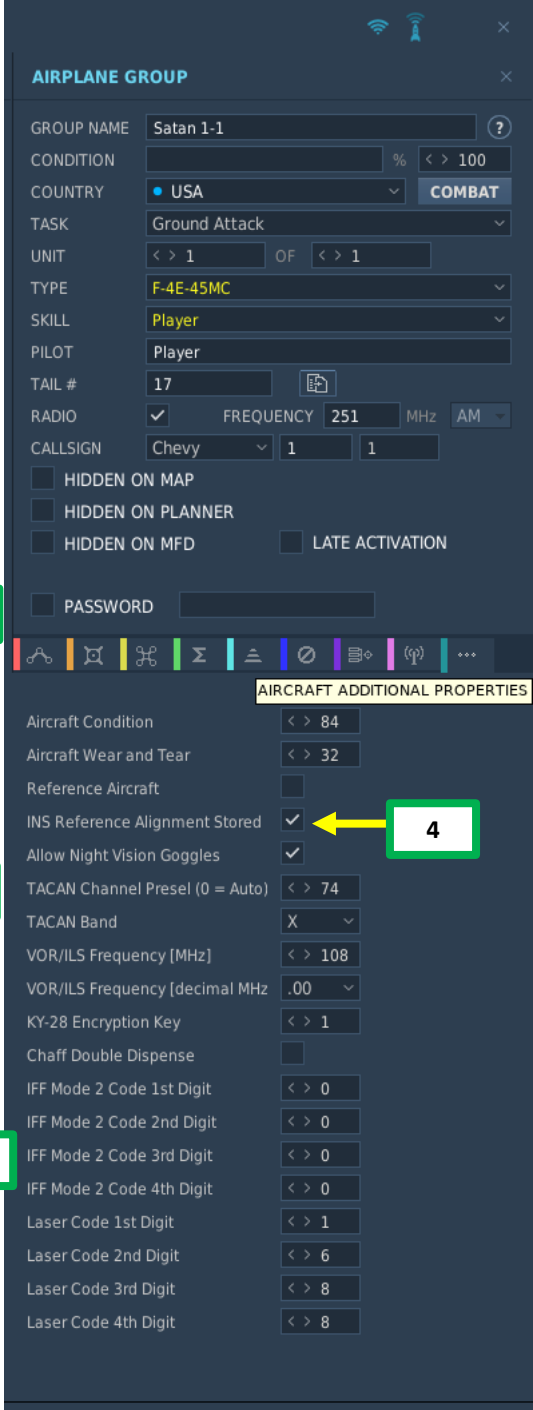
4. HDG MEM (INS Reference Alignment Stored Heading) option must be enabled via the Mission Editor. This should be explained in the Mission Briefing.
5. *[WSO]* Set Navigation Computer Mode Selector – STBY (Standby)
6. *[WSO]* Set Position Update Switch – NORMAL (Middle position)
7. *[WSO]* Initial Point Data:
   - LATITUDE : **15 deg 06 minutes North**
   - LONGITUDE: **145 deg 43 minutes East**
   - MAGVAR (Magnetic Variation): **1.47 deg**
8. *[WSO]* We will assume latitude, longitude and MAGVAR values have all been entered correctly in the Navigation Computer already and is memorized by the navigation computer.
9. *[WSO]* Flip INS Alignment Mode Switch guard UP, then check INS Alignment Mode Switch is set FWD to HDG MEM (Heading Memory or "Stored Heading").
10. *[WSO]* Set INS Power Selector – Momentarily to STBY (Standby), then to ALIGN.
11. *[WSO]* Power is applied to the INS heaters and temperature control system and initiates Coarse alignment.
12. *[WSO]* For HDG MEM alignment, we will disregard the status of the HEAT lamp.
13. *[WSO]* Wait until ALIGN lamp flashes (approximately **2 minutes 15 seconds**). This indicates the completion of gyrocompassing alignment.
14. *[WSO]* Set INS Power Selector – NAV.
15. *[WSO]* Confirm ALIGN light extinguishes.
16. *[WSO]* Flip INS Alignment Mode guard DOWN. This will set the INS Alignment Mode to GYRO COMP.





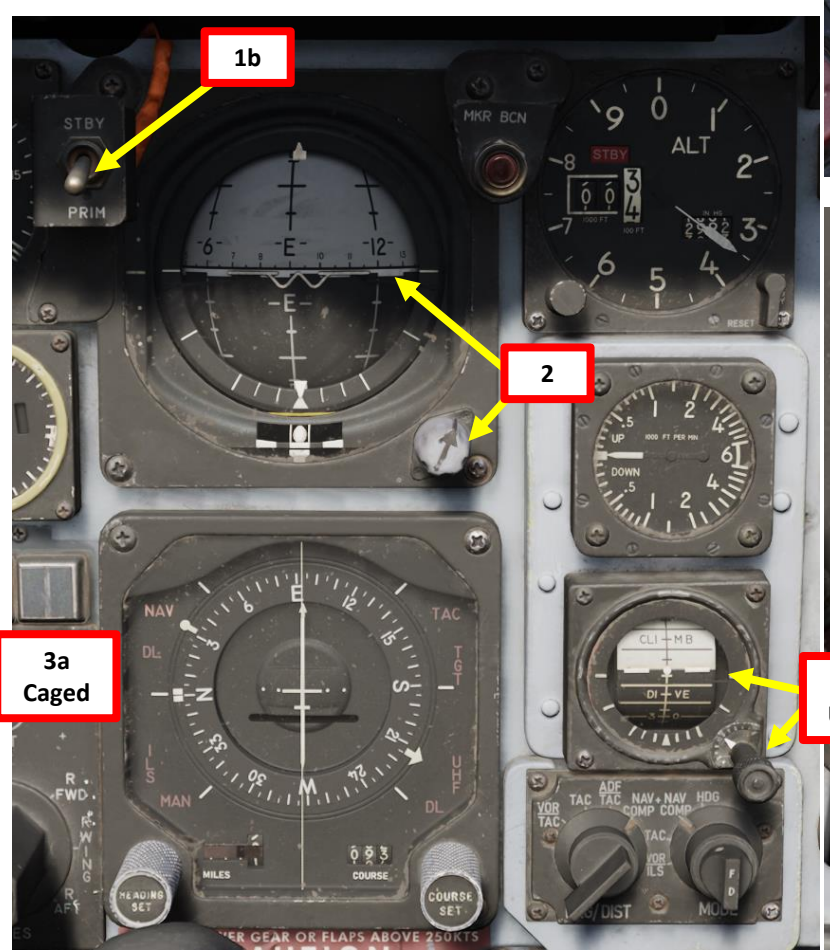


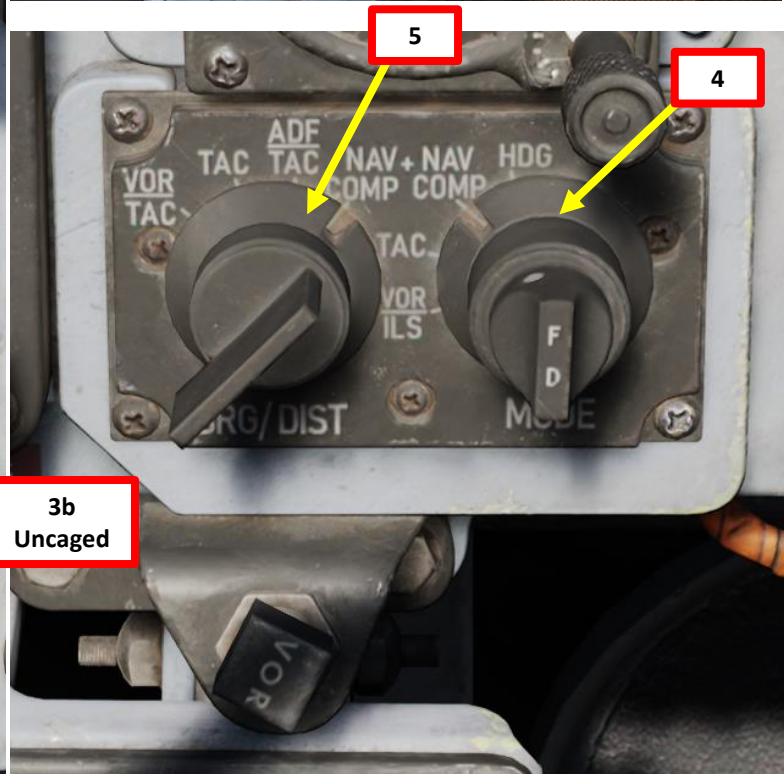




D – BEFORE TAXI (PILOT)

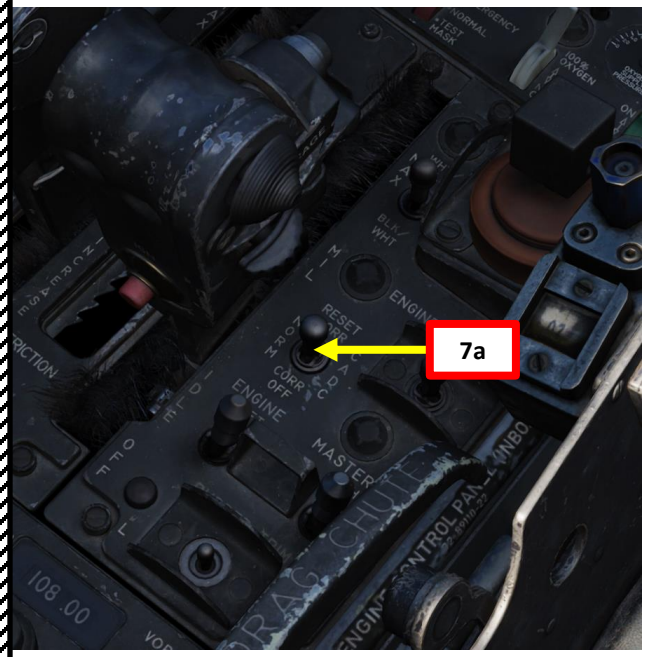
1. *[P]* Once INS alignment is complete, set Reference System Switch – PRIMARY (DOWN).
2. *[P]* Adjust ADI (Attitude Director Indicator) Pitch Trim Line with the Horizon Line position.
3. *[P]* Uncage Standby Attitude Indicator by pushing the Cage/Uncage Knob IN, then adjust the horizon line with the center of the ball. Check that red flag disappears.
4. *[P]* Set Navigation Mode Selector (Outer Knob) – NAV COMP (Navigation Computer)
5. *[P]* Set Navigation Input Selector – NAV COMP (Navigation Computer).
6. *[P]* Set Compass Mode Selector – Set to SYNC (Synchronize), then release. Selector will spring back to SLAVED.

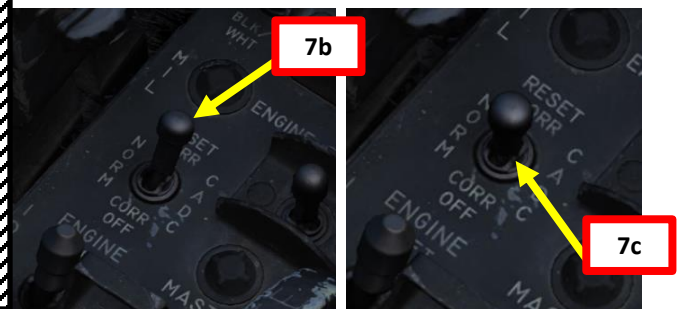


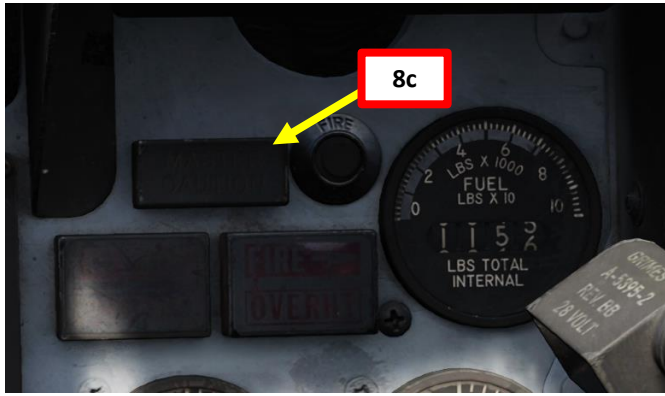


D – BEFORE TAXI (PILOT)

7. *[P]* If the STATIC CORR OFF light is illuminated, the SPC (Static Pressure Compensator), must be reset. Set CADC (Central Air Data Computer) Switch to RESET CORR (FWD), then to NORM (MIDDLE). Confirm the STATIC CORR OFF light extinguishes.
    - The SPC performs correction of altimeter lag caused by rapid altitude change.
8. *[P]* Press the Master Caution Reset Button to clear MASTER CAUTION light.

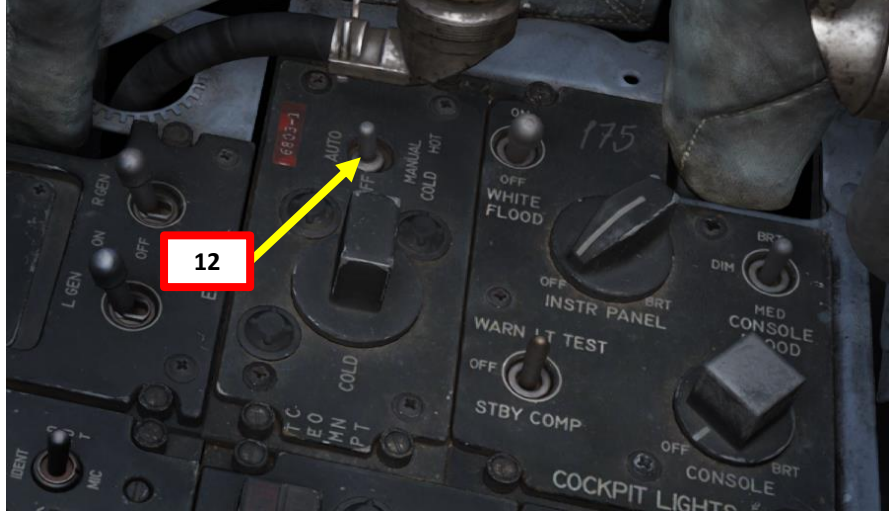


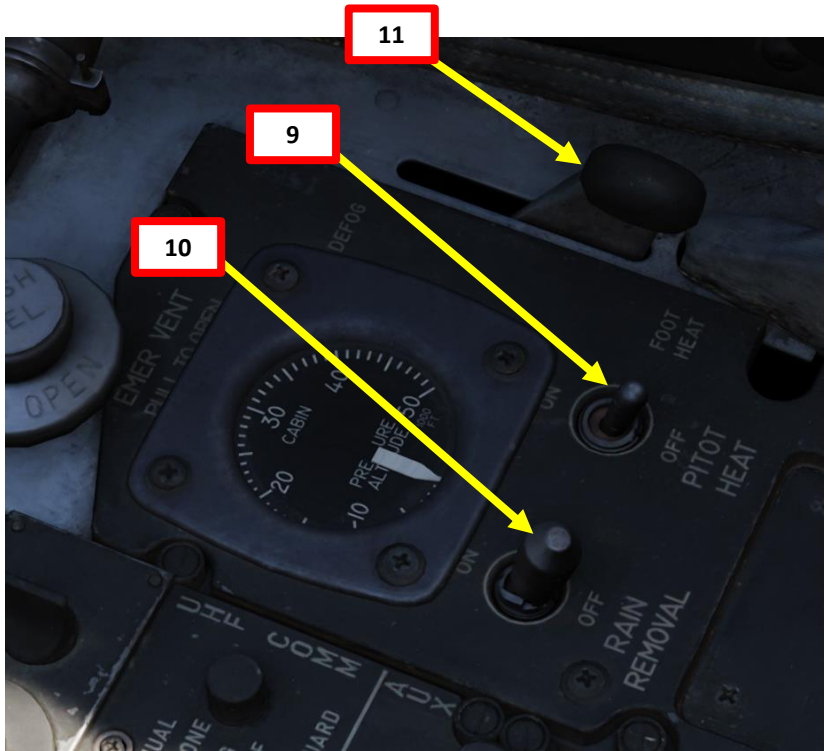


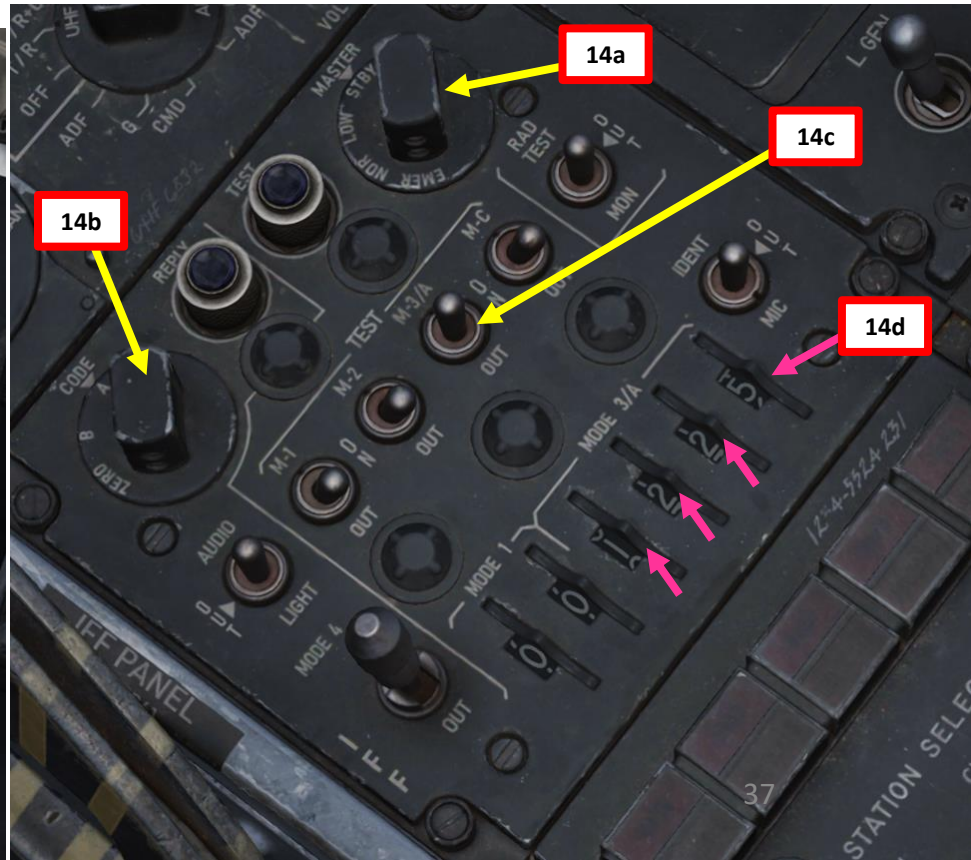


D – BEFORE TAXI (PILOT)

9. *[P]* Set Pitot Heat Switch– OFF (AFT)
    - *Note: The Pitot Heat switch should always be turned on before takeoff but not for longer than one minute as it could damage the instrument.*
10. *[P]* Set Rain Removal Switch – OFF (AFT)
11. *[P]* Set Defog Handle – OFF (AFT)
12. *[P]* Set Cockpit Temperature Control Switch – AUTO (FWD)
13. *[P]* Check Pneumatic Pressure – Within White Range. Sufficient air must be available to cool avionics.
14. *[P]* Set your IFF (Identify-Friend-or-Foe) Transponder Code – As required by mission briefing. As an example, if we need an IFF Transponder set to Mode 3/A Code 1225:
    a) Set IFF Master Selector to STANDBY.
    b) Set IFF Code Selector to A
    c) Set IFF Mode 3/A Switch – ON (MIDDLE)
    d) Set IFF Mode 3/A Channel Wheel Selectors to “1225”.



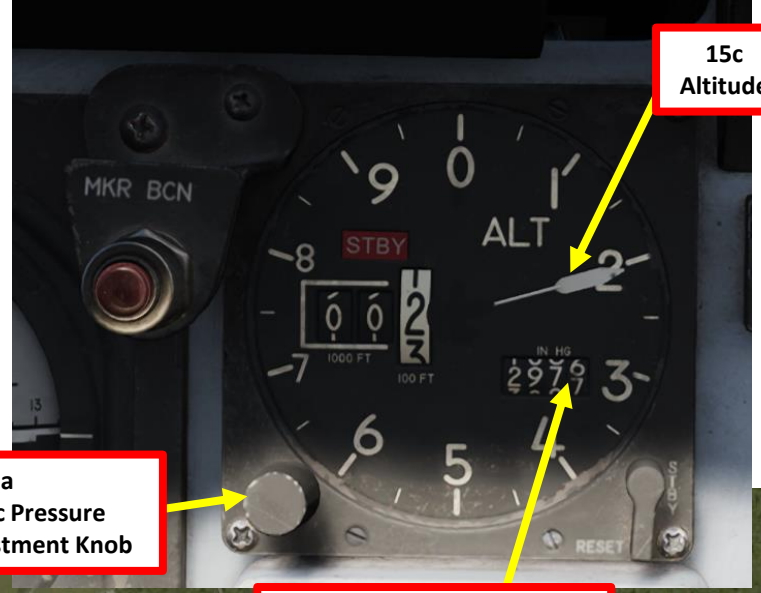




D – BEFORE TAXI (PILOT)

15. [P+WSO] Set altimeter barometric pressure setting.

- If airfield elevation data is available, you can adjust the barometric pressure knob to make the altimeter reading match the airfield elevation (which would be 213 ft in our case since we takeoff from Saipan). However, you will have to keep in mind that your altitude reading will be AMSL (Above Mean Sea Level), not from the ground. This is important to remember when being directed by the ATC (Air Traffic Controller).
- Alternatively, you can set the barometric pressure knob to make the altimeter reading match "0". In that case, the altitude reading will be AGL (Above Ground Level), not from sea level.

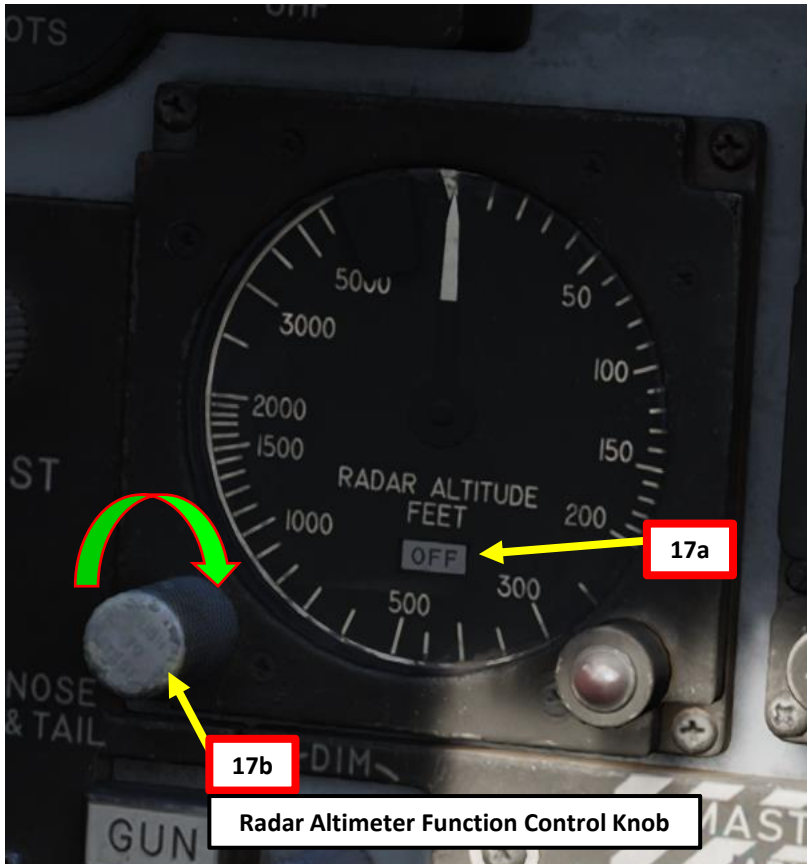


Saipan Elevation (ft)

Saipan Intl		
ICAO	PGSN	
COALITION	BLUE	
ELEVATION	213 ft	
RWY Length	7790 ft	
COORDINATES	15°06'54"N 145°43'07"E	
TACAN	--	
VOR	--	
RSBN	--	
ATC (MHz, AM)	256.900, 125.700, 3.775, 38.450	
RWYs	7	25
ILS	109.90 (IGSN)	--
PRMG	--	--
OUTER NDB	--	--
INNER NDB	--	--
RESOURCES		

D – BEFORE TAXI (PILOT)

16. *[P+WSO]* Hold altimeter mode switch to RESET until STBY red flag disappears, then release switch back to vertical position.
17. *[P]* Power Up Radar Altimeter by turning the Radar Altimeter Function Control Knob clockwise until the OFF flag is removed. Then, turn the knob until safe altitude bug is set. We will set it to 100 ft. As a result, a low altitude warning light illuminates, which is expected.
    - Note: A self-test can be initiated by pressing the Radar Altimeter Function Control Knob IN. The radar altimeter will then show 35 ±15 feet until the knob is released.

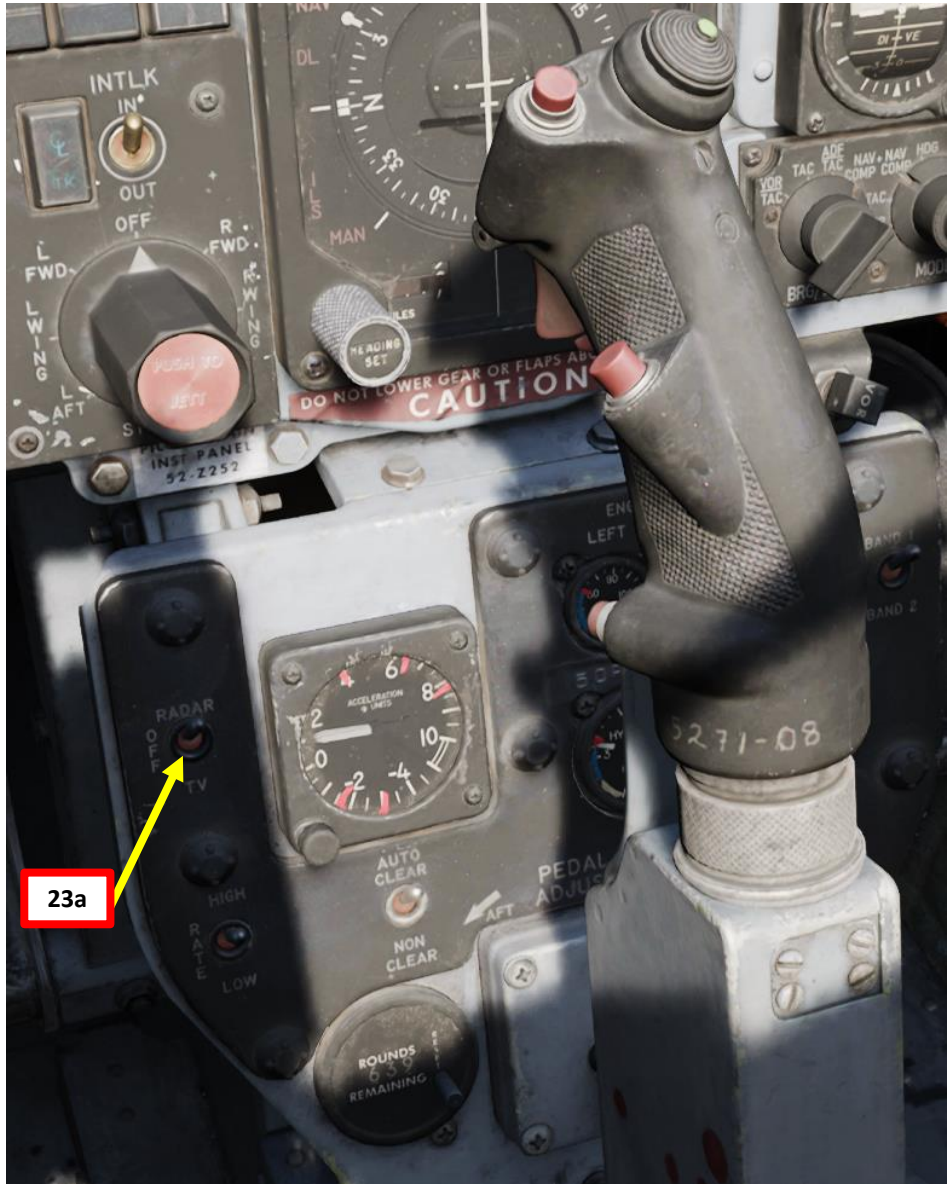


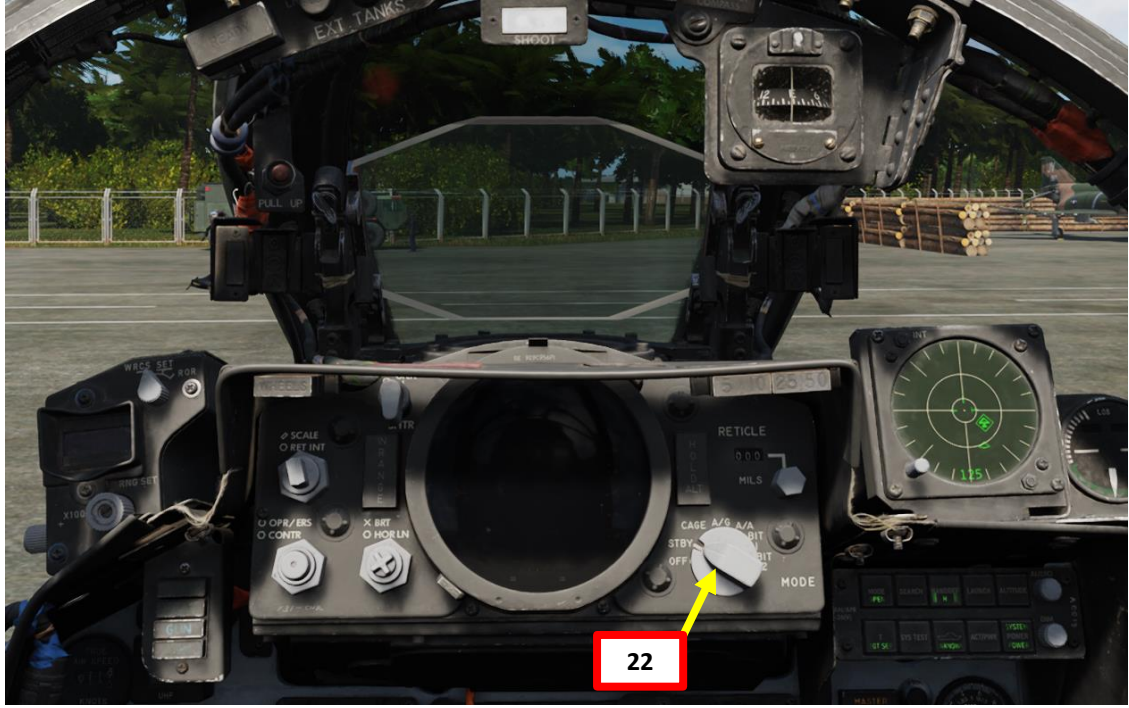
D – BEFORE TAXI (PILOT)

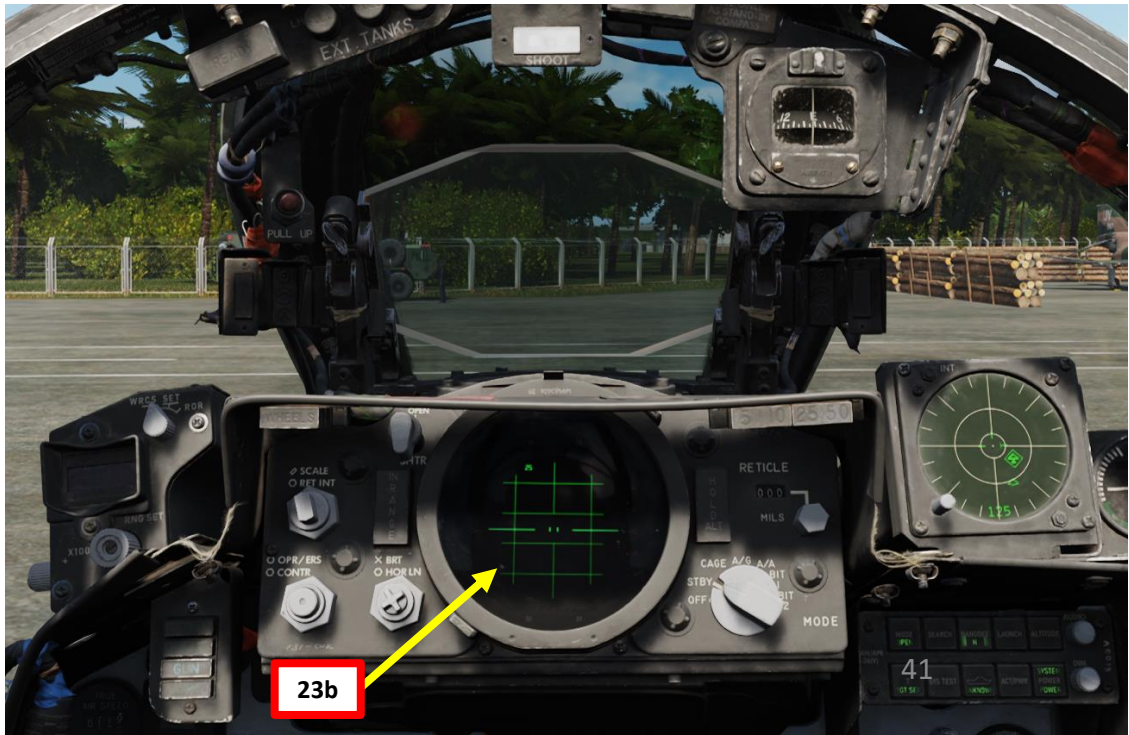
18. *[P]* Set AN/ALE-40 Flare Mode Switch – NORMAL (INBOARD).
19. *[P]* Press on the AN/ALR-46 RWR (Radar Warning Receiver) Power Button.
20. *[P]* A BIT (Built-In Test) will occur; the RWR control panel and display will cycle through their initial 9-second warmup, with the display and illuminated buttons undergoing rapid flashing as the system is prepared for use and proper functioning is confirmed. Search mode is deactivated by default upon startup.
21. *[P]* Select RWR Search Mode.

D – BEFORE TAXI (PILOT)

22. *[P]* Set Optical Sight Mode – STANDBY (or CAGE).
23. *[P]* Set DSCG (Digital Scan Converter Group) Screen Mode Switch – RADAR (UP). This will display the radar display repeater (provided the radar is set up from the WSO seat).

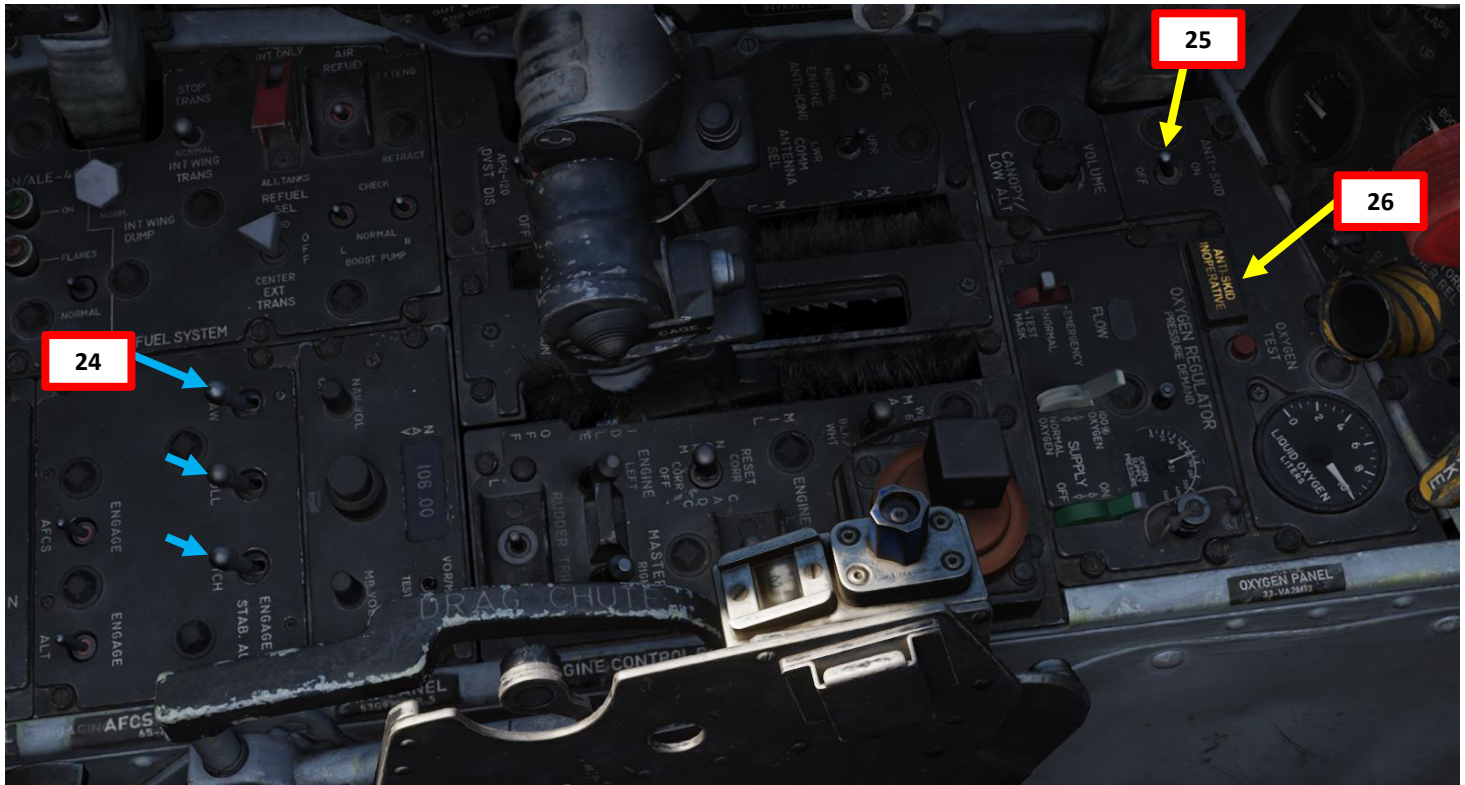






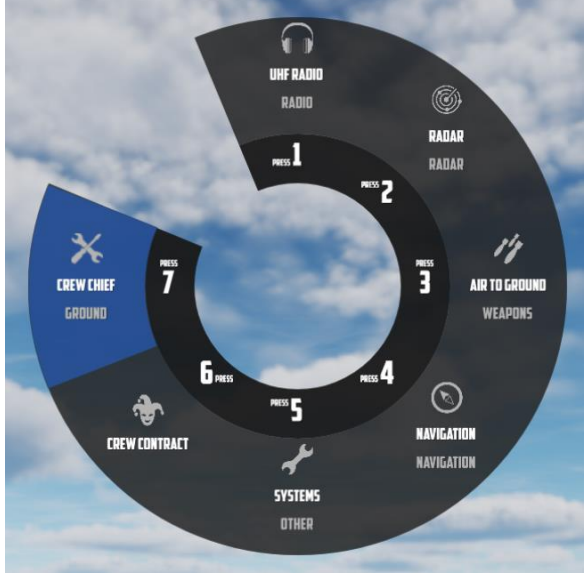
D – BEFORE TAXI (PILOT)

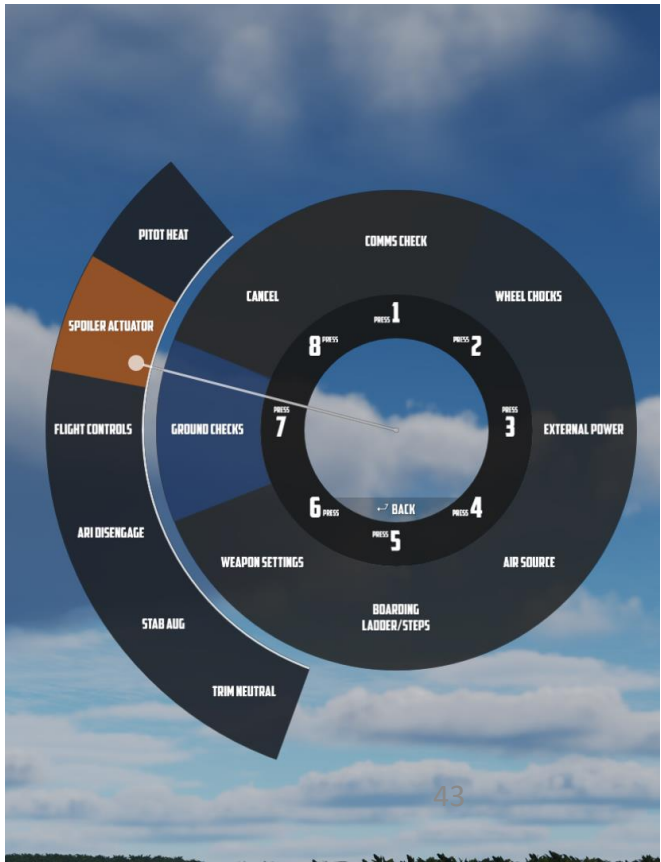
24. *[P]* On AFCS (Automatic Flight Control System) panel, set Yaw, Roll & Pitch Stability Augmentation System Switches – OFF (AFT). Confirm PITCH AUG OFF light is illuminated.
25. *[P]* Set Anti-Skid Switch – OFF (AFT).
26. *[P]* Confirm ANTI-SKID INOPERATIVE light is illuminated.
27. *[P]* Set Pitch Trim – 3 Units Nose Down



D – BEFORE TAXI (PILOT)

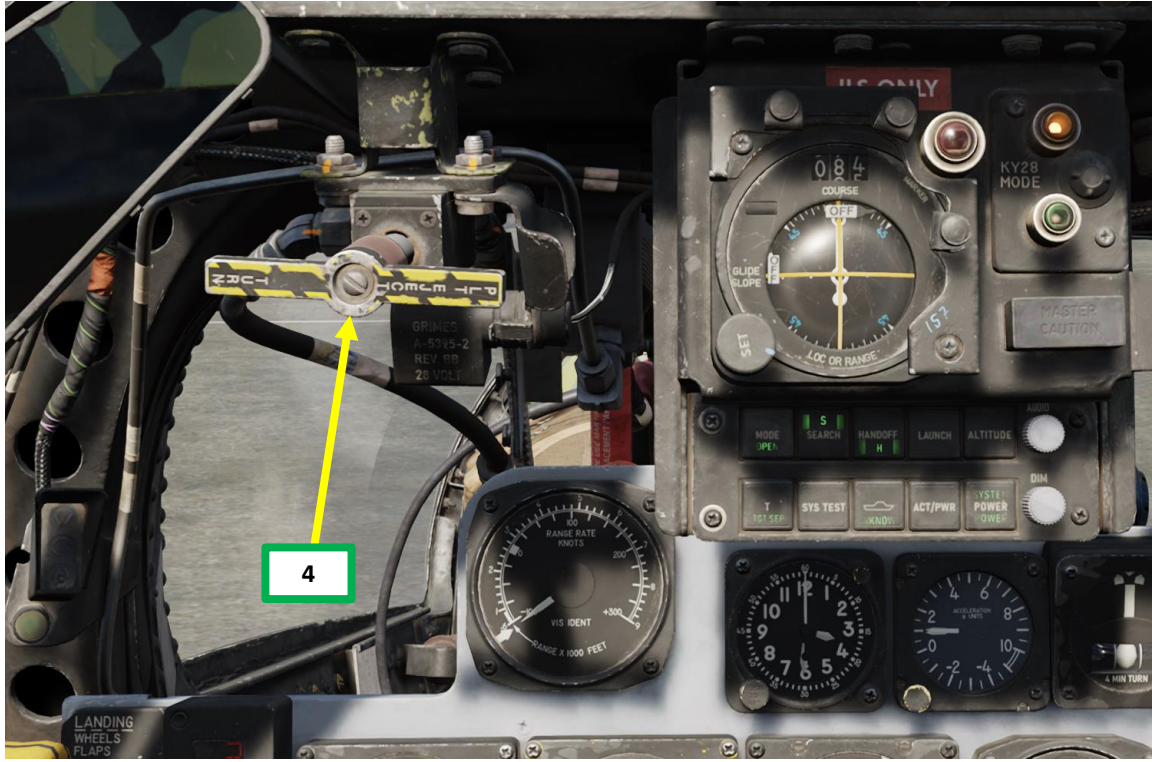
28. *[P]* From the CREW CHIEF menu, it is possible to perform a number of ground checks.
For simplicity, we will skip them and assume the aircraft is fully operational.

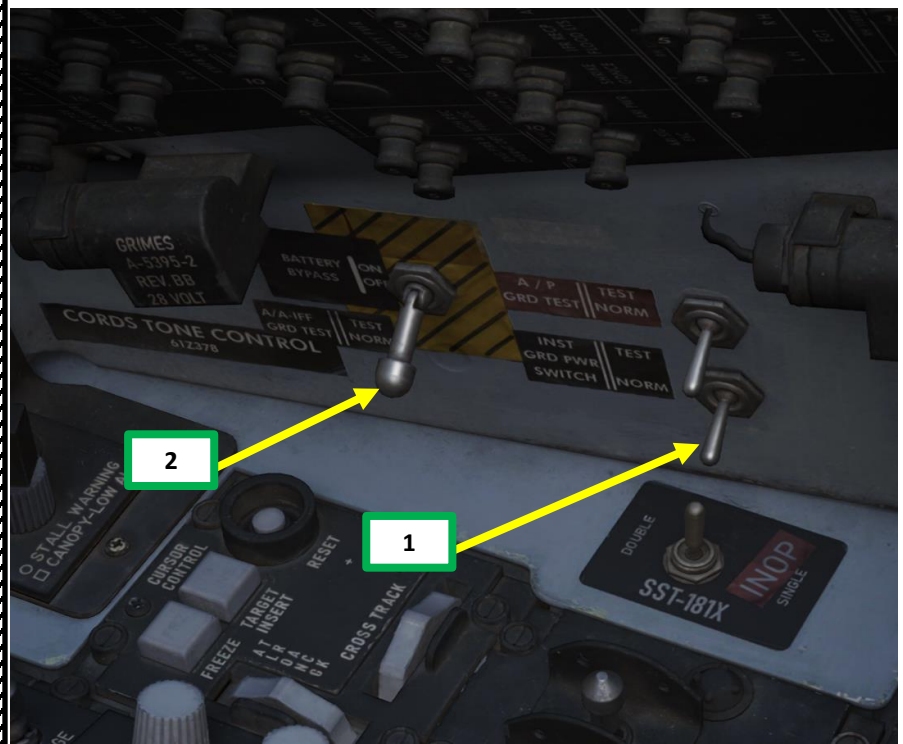


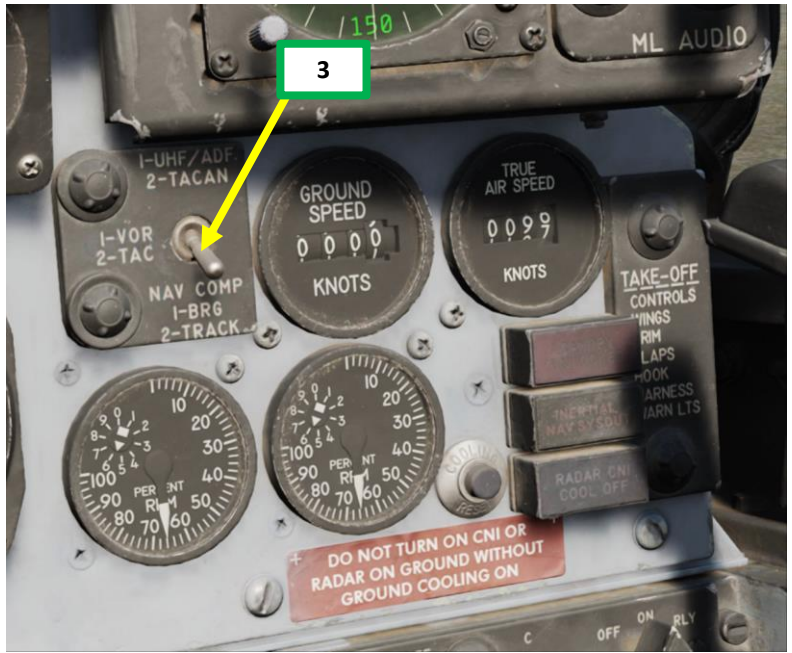


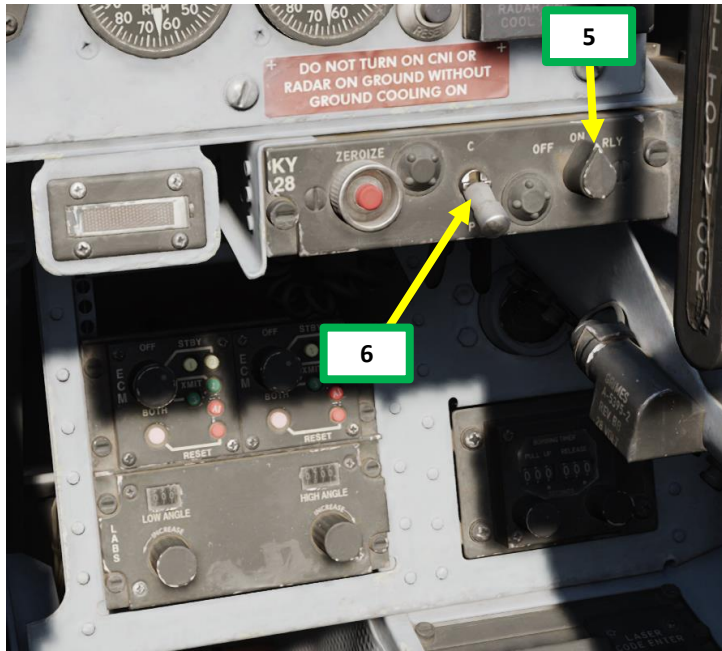
E – BEFORE TAXI (WSO)

1. *[WSO]* Once engines are running, generator switches are set to ON (FWD) and INS alignment is complete, make sure the Instrument Ground Power Test Switch is set to NORM (DOWN).
2. *[WSO]* Check Battery Bypass Switch is set to OFF (DOWN).
3. *[WSO]* Set Navigation Input Selector – NAVIGATION COMPUTER (DOWN)
4. *[WSO]* Set Ejection Command Selector Handle – As required.
    - **Handle Vertical**: WSO setting, initiation of ejection by the WSO ejects only the rear seat.
    - **Handle Horizontal**: BOTH setting, initiation of ejection by the WSO ejects both crew members.
5. *[WSO]* Set KY-28 Encryption Power Selector – ON
6. *[WSO]* Select KY-28 Encryption Mode Selector – As required.
    - C (Cipher) if encrypted communications are required
    - P (Plain) if unencrypted communications are allowed



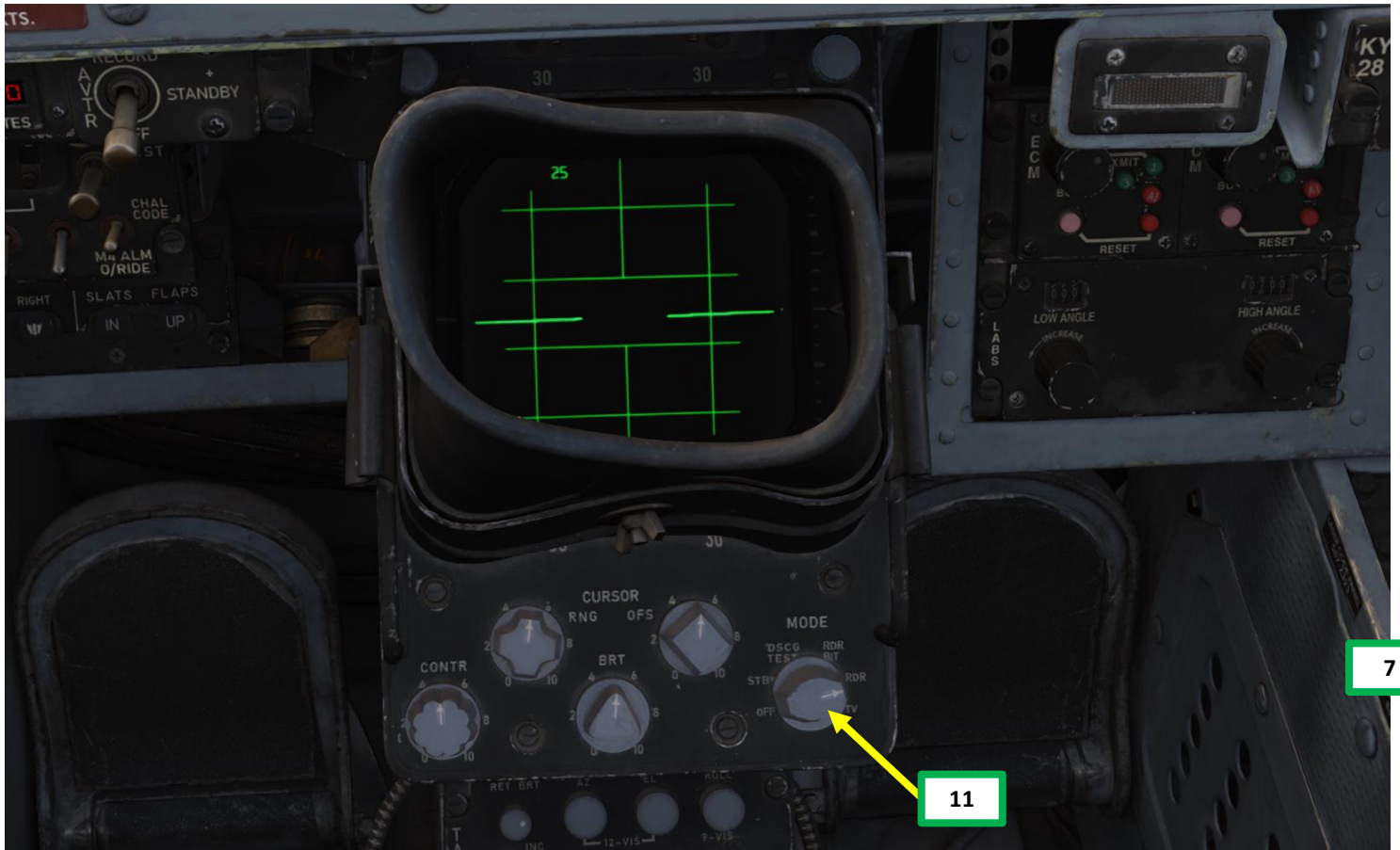


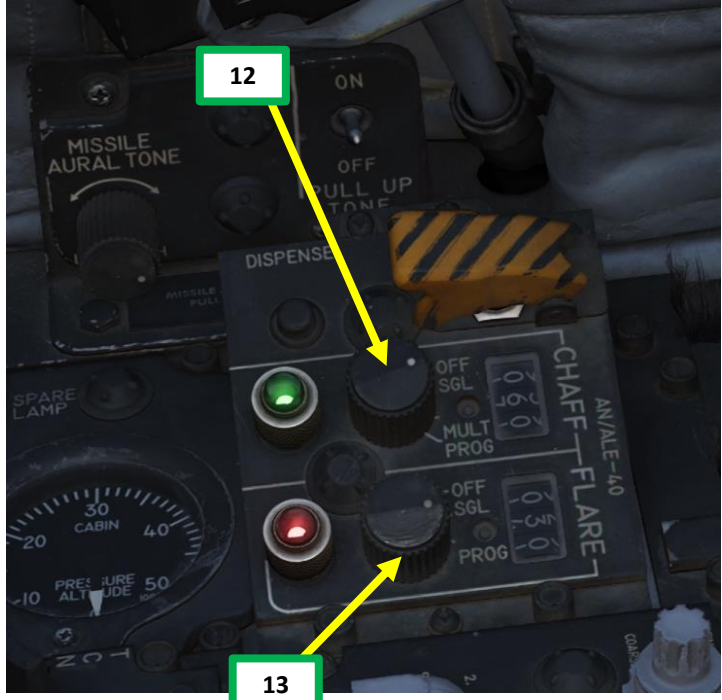


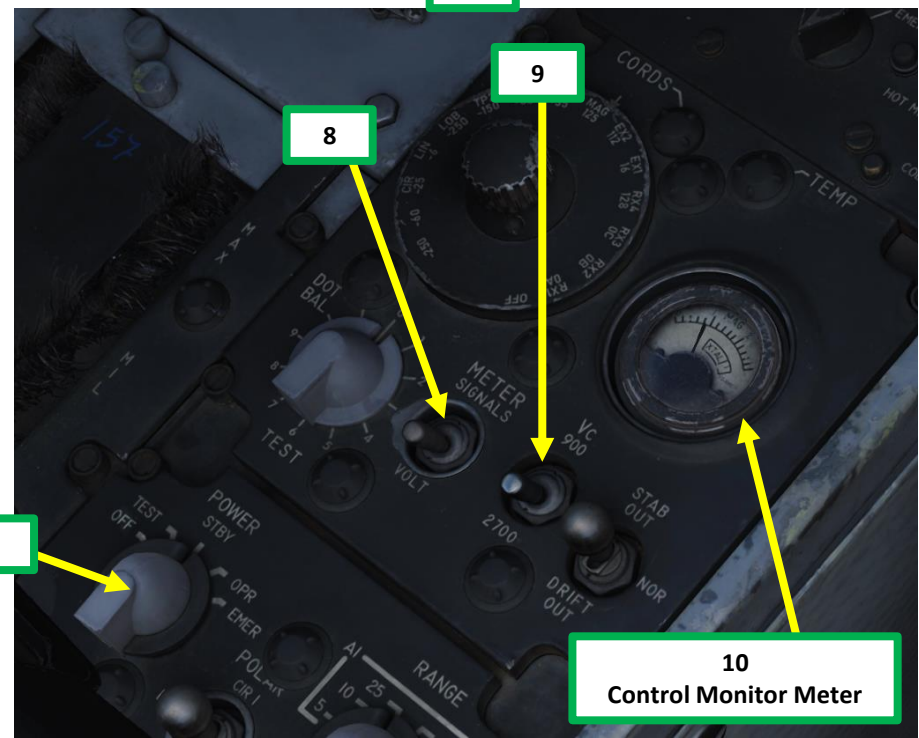


E – BEFORE TAXI (WSO)

7. *[WSO]* Power up AN/APQ-120 Fire Control Radar. Set Radar Power Selector Knob – STBY (Standby).
8. *[WSO]* Set Control Monitor Meter Display Setting Switch – VOLTS (AFT)
9. *[WSO]* Set Vc Display Switch – 2700 (AFT)
10. *[WSO]* **Radar warmup cycle requires 3 minutes**. After 30 seconds, Control Monitor Meter displays roughly 250 Vdc; from the point the needle shows power at this nominal value, the warm-up procedure will be 2.5 minutes.
11. *[WSO]* Set DSCG (Digital Scan Converter Group) Mode Selector – RDR (Radar) or STBY (Standby), as desired.
12. *[WSO]* Set AN/ALE-40 Chaff Mode Switch – As required. We will set SGL (Single).
13. *[WSO]* Set AN/ALE-40 Flare Mode Switch – As required. We will set SGL (Single).

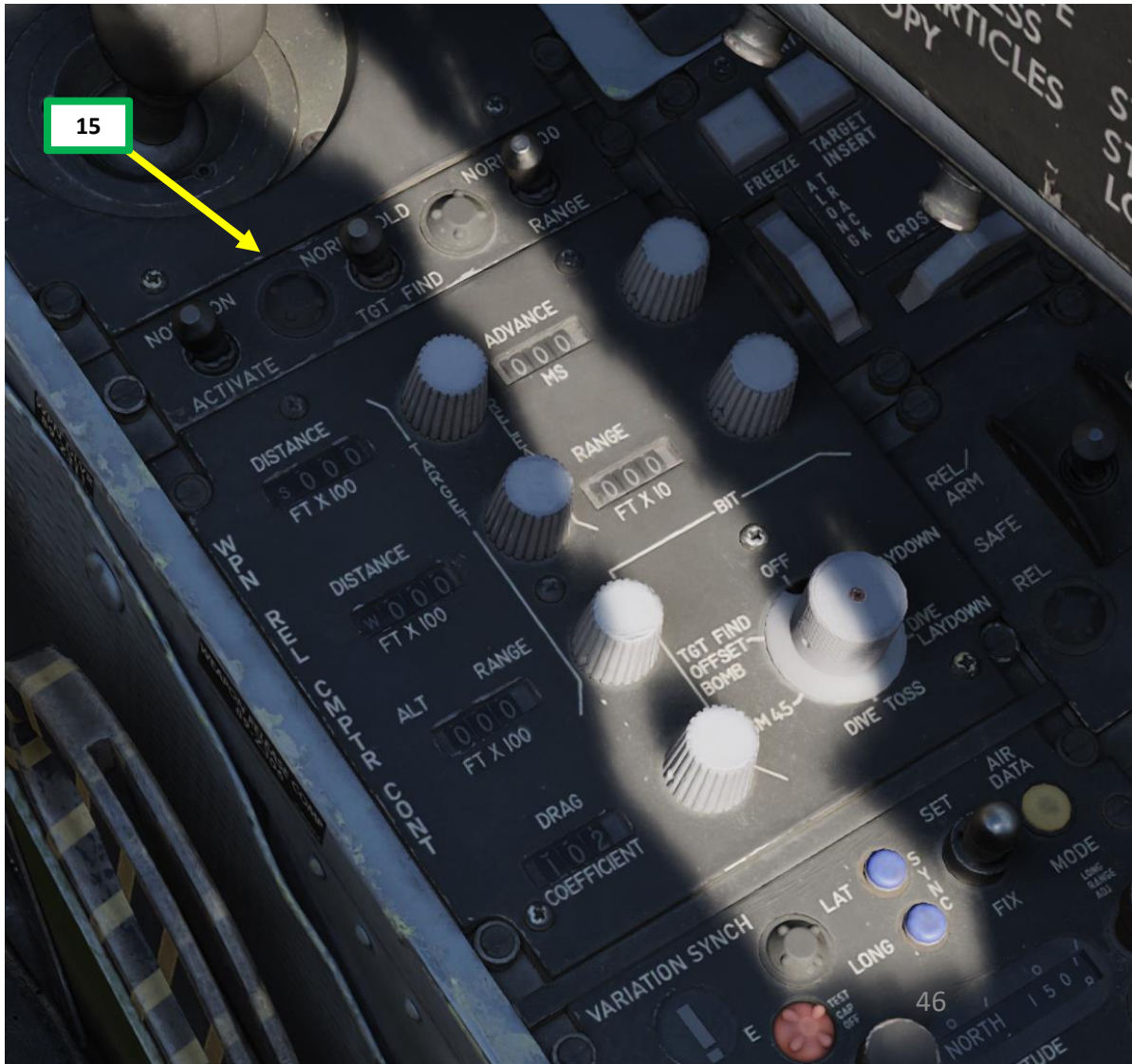






E – BEFORE TAXI (WSO)

14. [WSO] If AN/-AVQ-23 Pave Spike Targeting Pod is equipped:
   a) Set Target Designation Power On Button – ON.
   b) Set Target Designation Stow Button – ON. The pod's head is stowed when the button is illuminated.
15. [WSO] Set WRCS (Weapon Release Computer Set) Panel – As required based on mission parameters. *This step will be omitted for simplicity*.



E – BEFORE TAXI (WSO)

16. *[WSO]* Once all systems are set up, contact the pilot and let him know that the aircraft is ready for taxi.

PART 4 – START-UP PROCEDURE

ABBREVIATED CHECKLISTS

Checklist

Startup

Before engine start - PLT/WSO:

1.	Seat pins	Check removed and stowed
2.	Fore and aft area	Clear
3.	Fire guard	Posted
4.	Throttles	Off

Starting engies - PLT:

1.	External air	Connected - right *
2.	Engine master switches	On
3.	External air	On *
4.	10% RPM	
a.	Right ignition btn.	Press and hold
b.	Right throttle	Half then idle
5.	At lightoff	Release ignition btn.
6.	At 45% RPM	
a.	External air	Stop *
7.	Check parameters	
a.	EGT	220 - 420 °C
b.	Fuel flow indicator	800 - 1400 pph
c.	Idle RPM	65% +-1
d.	Right boost pump	30 PSI +-5
e.	Oil pressure	12 - 50 PSI
f.	Hydraulic pressure	Within limits
8.	Right generator	On
9.	Spoiler actuator	Check left *
10.	AAR door	Check *
11.	Left engine	Repeat steps 1-8 for left engine
12.	Right generator	Cycle - Off/On
13.	Bus tie open light	Out
14.	External air	Disconnect *
15.	External power	Disconnect *
16.	Interior check	Complete

Note: * indicate actions by ground crew

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Checklist

Before taxi

PLT:

1.	Comm & nav equipment	On and checked
2.	IFF	Standby
3.	Radar altimeter	On & check
4.	Altimeter and SPC	Set & check
5.	Speed brakes	Check *
6.	Slats and flaps	Check *
7.	Flight controls	Check *
8.	Slats and flaps	NORM
9.	ARI disengage	Check *
10.	Stab Aug switches	Engage and check *
11.	Reference sys select	PRIM (INS in NAV)
12.	Compass mode ctrl knob	SYNC
13.	AFCS	Check (if required)
14.	Stab Aug switches	Disengage
15.	Trim	Check and set * 1-3 units nose down
16.	Slats and flaps	Out and down *
17.	Optical sight	STBY/CAGE
18.	Pneumatic pressure	Check
19.	IFF	Check
20.	Radar altimeter	Check and set
21.	Wheel chocks	Remove *

WSO:

1.	Interior check	Complete
2.	Comm & nav equipment	On and checked
3.	Target designator	Power ON and stowed
4.	Radar BIT	Initiate
5.	WRCS BIT	Initiate
6.	NAV computer mode	As desired
7.	Altimeter and SPC	Set and checked

Taxi - PLT/WSO

1.	Wheel brakes	Test
2.	NWS	Engage and check
3.	Flight instruments	Check
4.	Oxygen diluter	As required

Note: * indicate actions by ground crew

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Checklist

Before Takeoff

PLT:

1.	Optical sight	Check
2.	Internal wing transfer	Normal
3.	Stab Aug switches	Engage
4.	Flight controls	Unrestricted (WSO confirm)
5.	Slats and flaps	Check out and down
6.	Anti-ice	As required
7.	Stab trim	Check 1-3 units nose down
8.	Fuel quantity	Check
Both 9.	Canopies	Close and check WSO then PLT
10.	Warning lights	Test
11.	Defog and temperature	As required
WSO 12.	Command selector	As breifed
Both 13.	Ejection seats	Arm

After RWY line-up

PLT:

1.	External transfer	As desired
2.	Anti skid	On and light out
3.	Compass heading	Check
4.	Pitot heat	On
5.	IFF	As required
Both 6.	Circuit breakers	Check - In
7.	Warning lights	Check

Note: * indicate actions by ground crew

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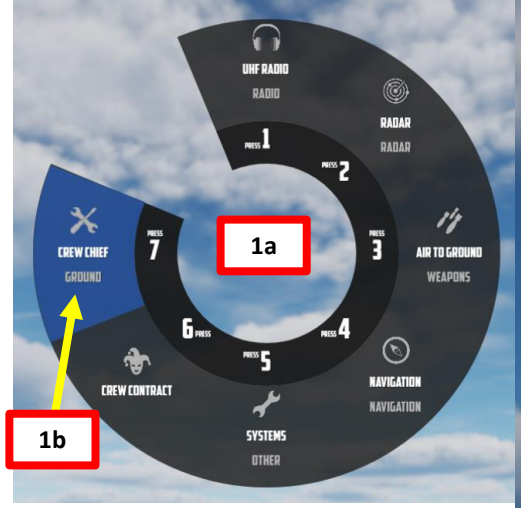
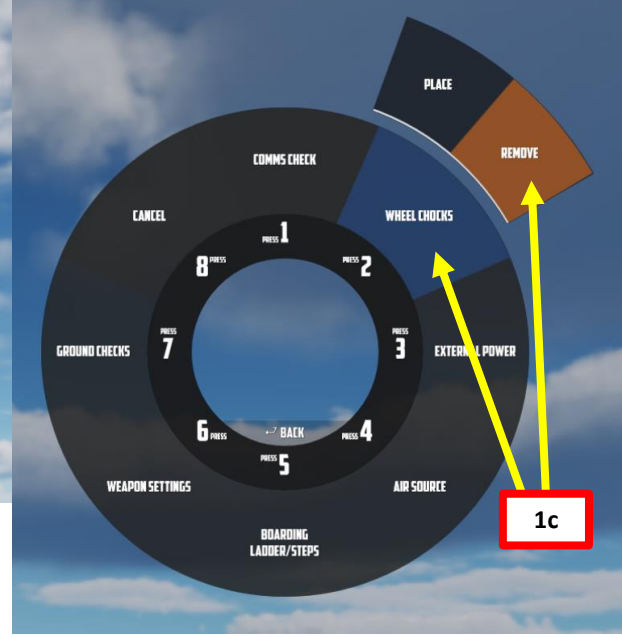
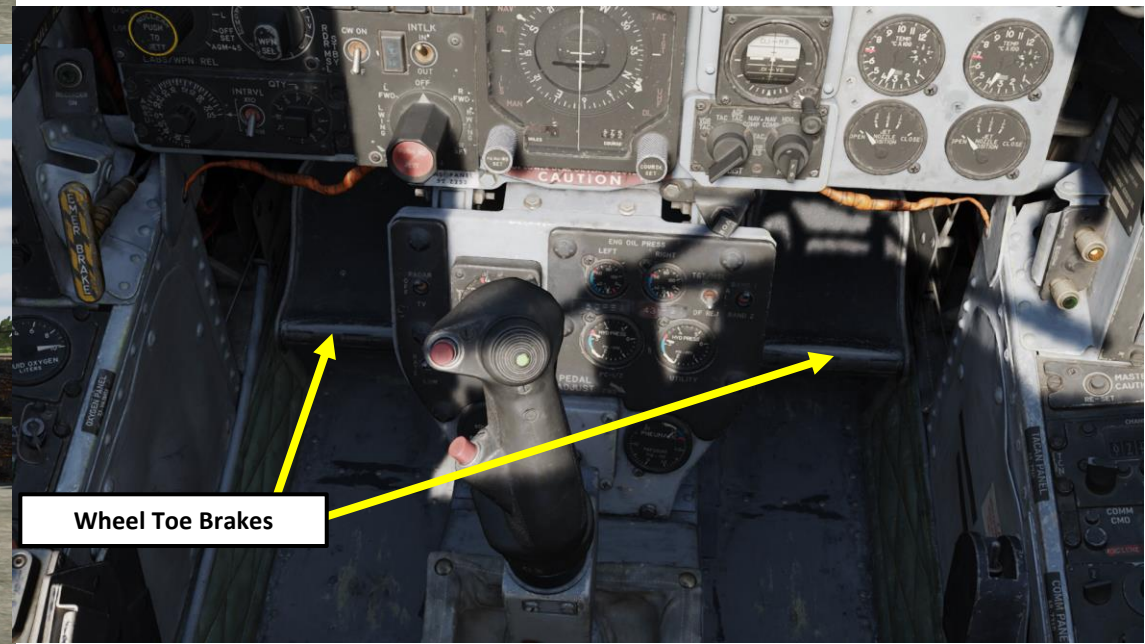
TAXI

1. *[P]* Request ground crew to remove wheel chocks.
   a) Open JESTER AI wheel by short-pressing “A”.
   b) Click on CREW CHIEF
   c) Click on WHEEL CHOCKS, then REMOVE
   d) Close JESTER AI wheel by long-pressing “A”.
2. *[P]* Hold wheel toe brakes and check braking action.

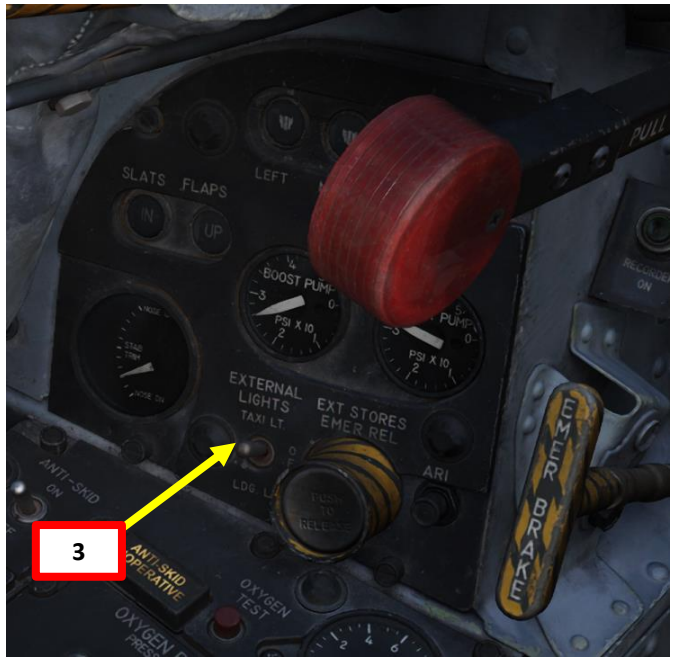


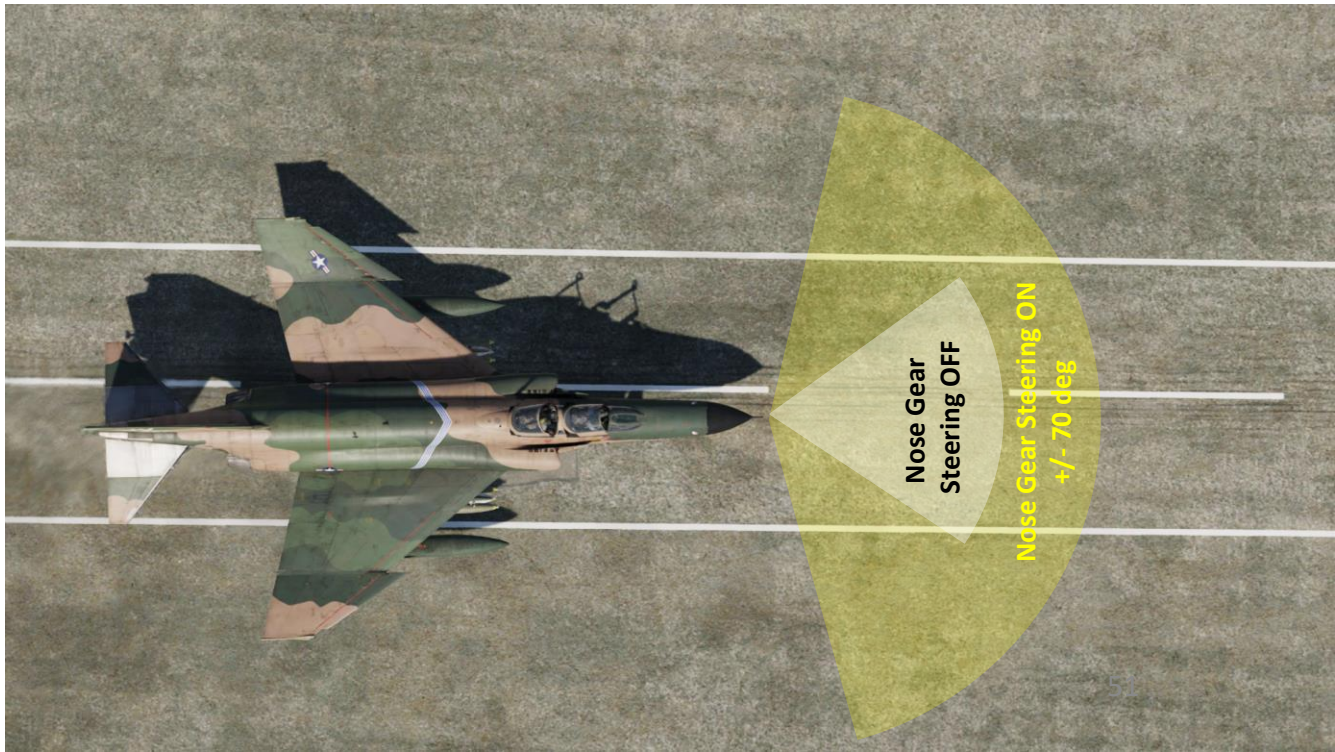




TAXI

3. *[P]* Set Taxi/Landing Light Switch – TAXI LT (UP)
4. *[P]* Release brakes, then slowly throttle up until aircraft starts moving.
5. *[P]* To perform a turn, press and hold the Nose Gear Steering Button on the stick (“N” binding) and use rudder pedals to turn in the desired direction. Steering limit of the nose gear is 70 deg from centerline in both direction. Release Nose Gear Steering Button when turn has been performed.
6. *[P]* Do not exceed 15 knots for taxi speed during turns.



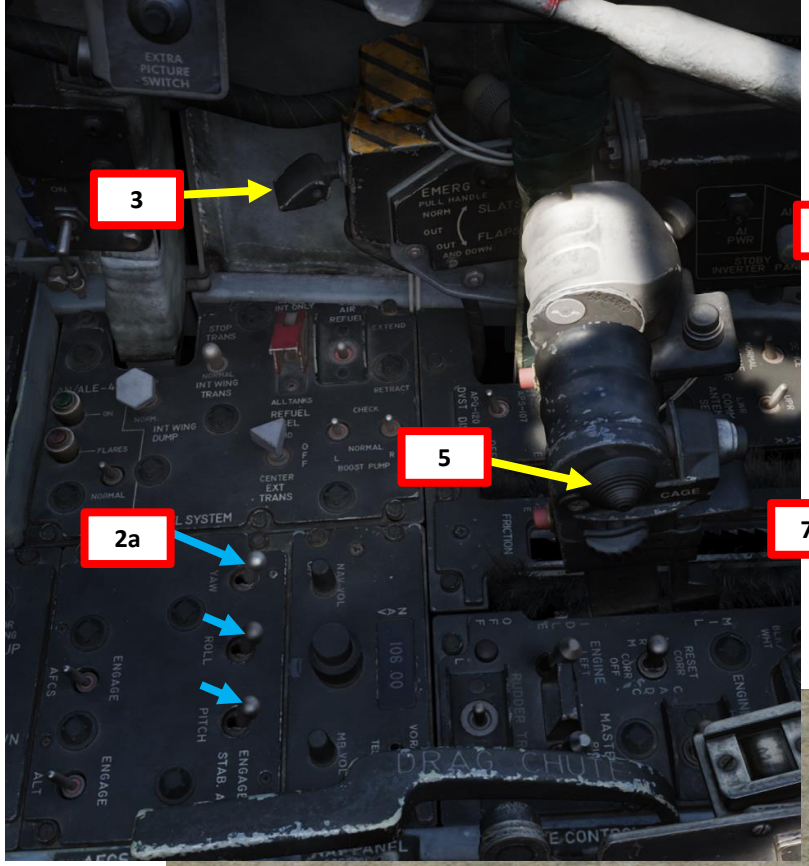


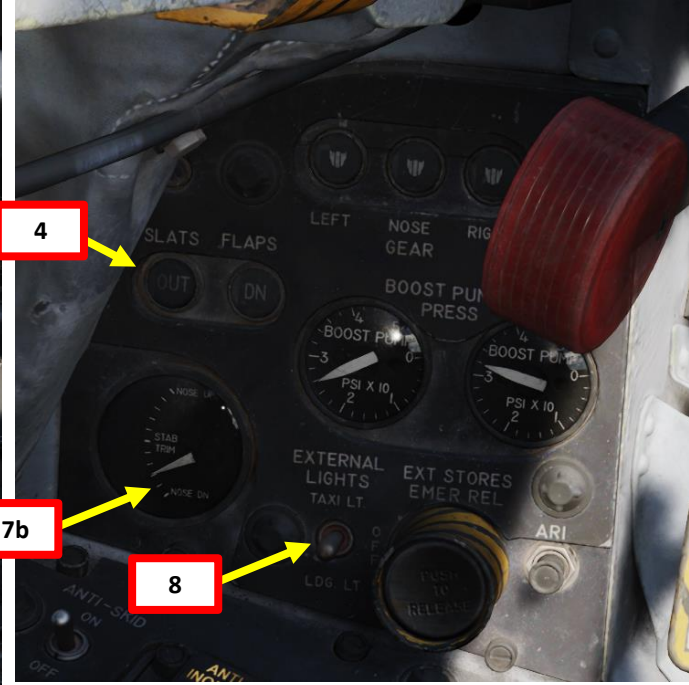
TAXI

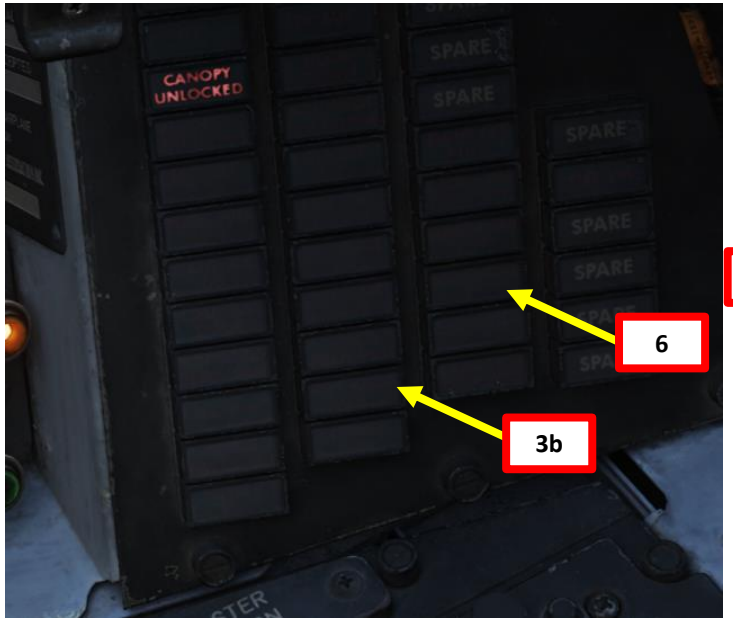
7. *[P]* While taxiing, JESTER will ask you if we are going low the mission. Based on your answer, his tolerance before ejecting due to a perceived risk of pilot CFIT (controlled flight into terrain) will be adjusted accordingly.
8. *[P]* Taxiing with open canopies was common practice for Phantom crews due to the abysmal air conditioning system. Heat inside the cockpit was a real problem on the ground since most of the available engine bleed air was used to cool off avionics. Maintain taxi speeds below 60 kts to prevent damage to the canopy operating mechanism.
9. *[P]* Adequate distance between aircraft must be maintained during formation taxi. An open canopy may be damaged by engine exhaust blast.
10. *[P]* When taxiing during high gross weight conditions, the turning radius should be increase to relieve excessive side loads on the main landing gear struts, wheels and tires.
11. *[P]* Hold short of the runway departure area and perform Before Takeoff checks.

BEFORE TAKEOFF

1. *[P]* Contact tower and obtain clearance for takeoff.
2. *[P]* On AFCS (Automatic Flight Control System) panel, set Yaw, Roll & Pitch Stability Augmentation System Switches – ON (FWD). Confirm PITCH AUG OFF light extinguishes.
3. *[P]* Set Flaps/Slats Control Lever – OUT & DOWN (FULLY DOWN)
4. *[P]* Check SLATS indication displays OUT and FLAPS indication displays DN (Down).
5. *[P]* Set Speed Brake Switch – IN/RETRACTED (FWD).
6. *[P]* Check SPEEDBRAKE OUT light is extinguished, then set Speed Brake Switch – NEUTRAL (MIDDLE).
7. *[P]* Check Pitch Trim is set to 3 Units Nose Down.
8. *[P]* Set Taxi/Landing Light Switch – OFF (MIDDLE).



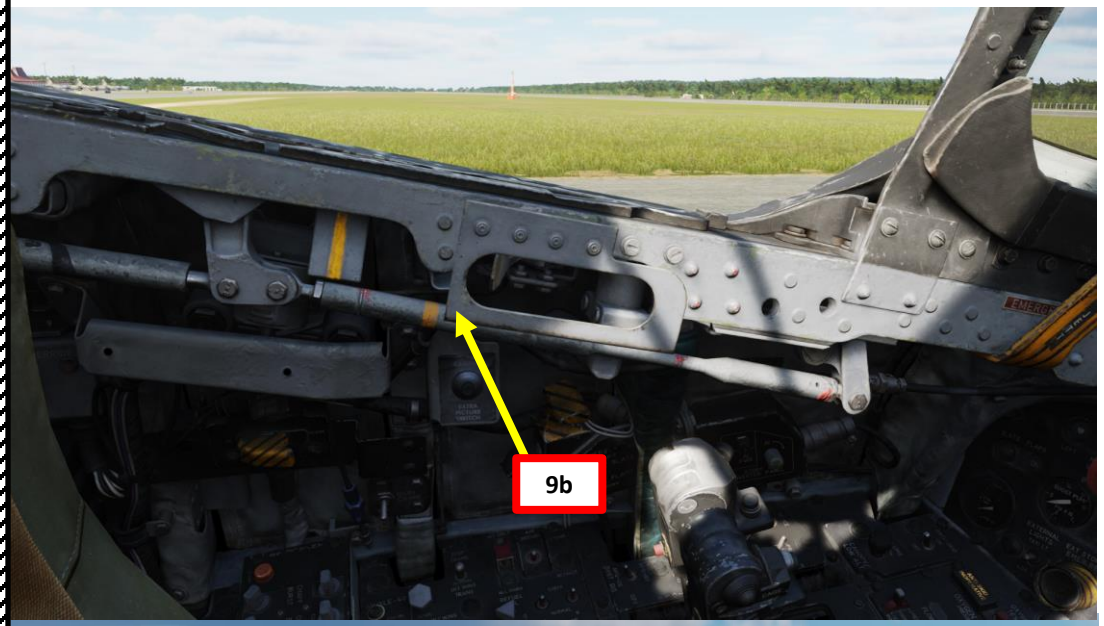


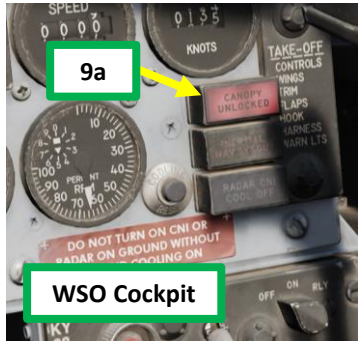


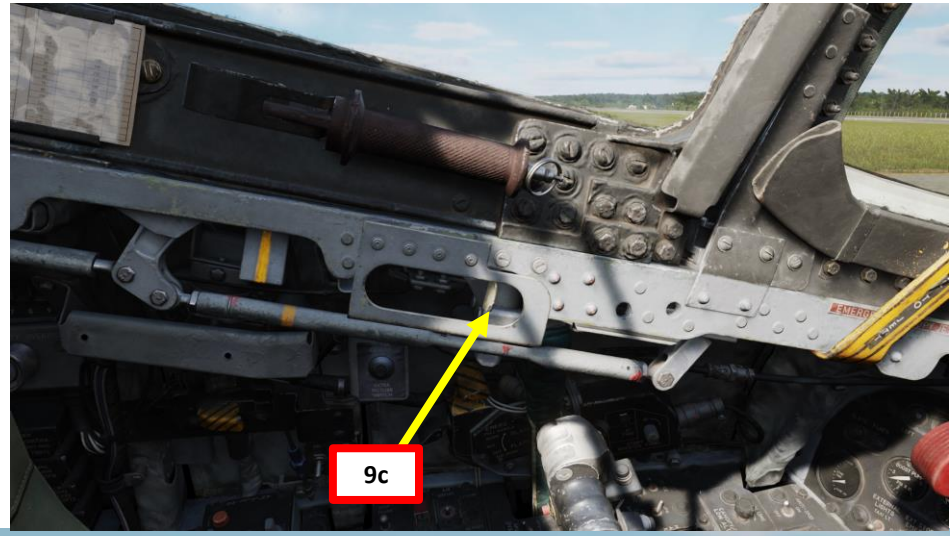
PART 5 – TAXI & TAKEOFF

BEFORE TAKEOFF

9. *[P+WSO]* Close canopy by setting the Canopy Control Lever FWD. Confirm CANOPY UNLOCKED light extinguishes. (WSO first, then Pilot)

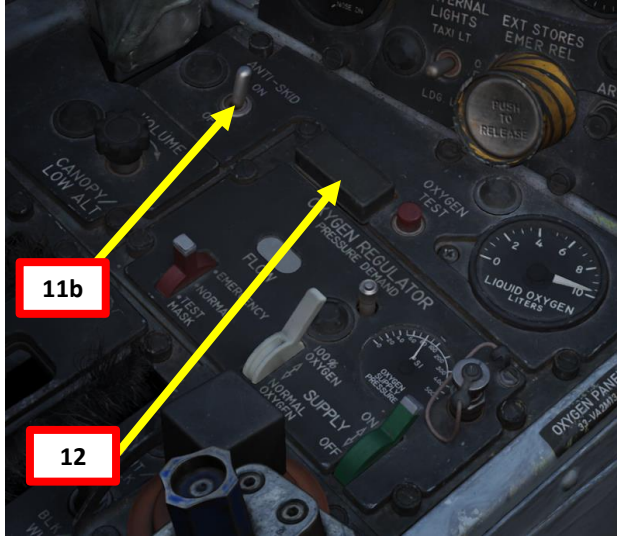






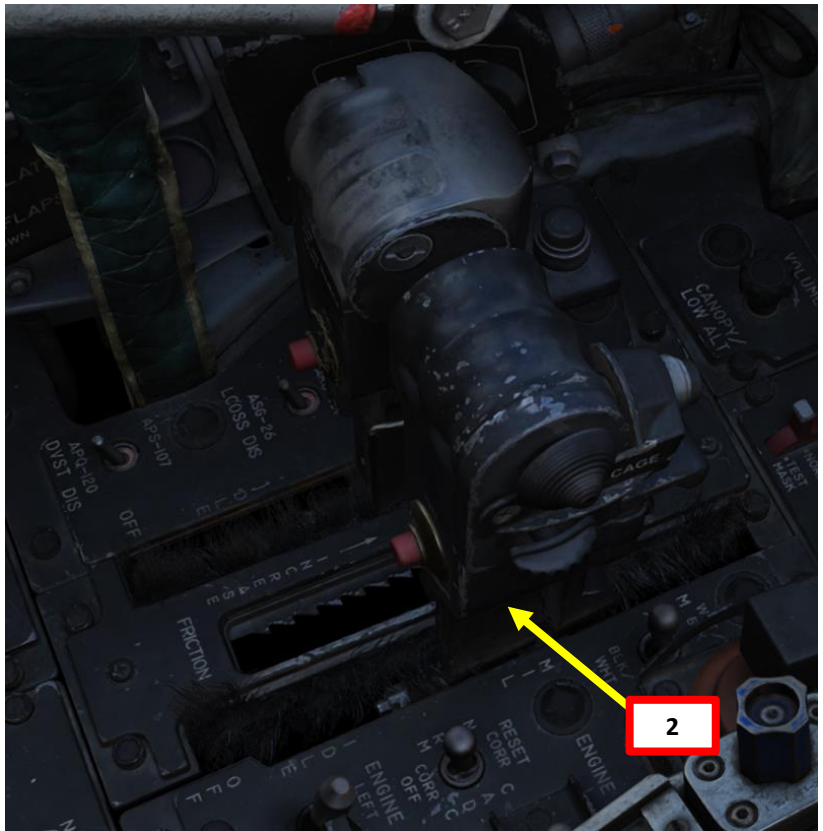
BEFORE TAKEOFF

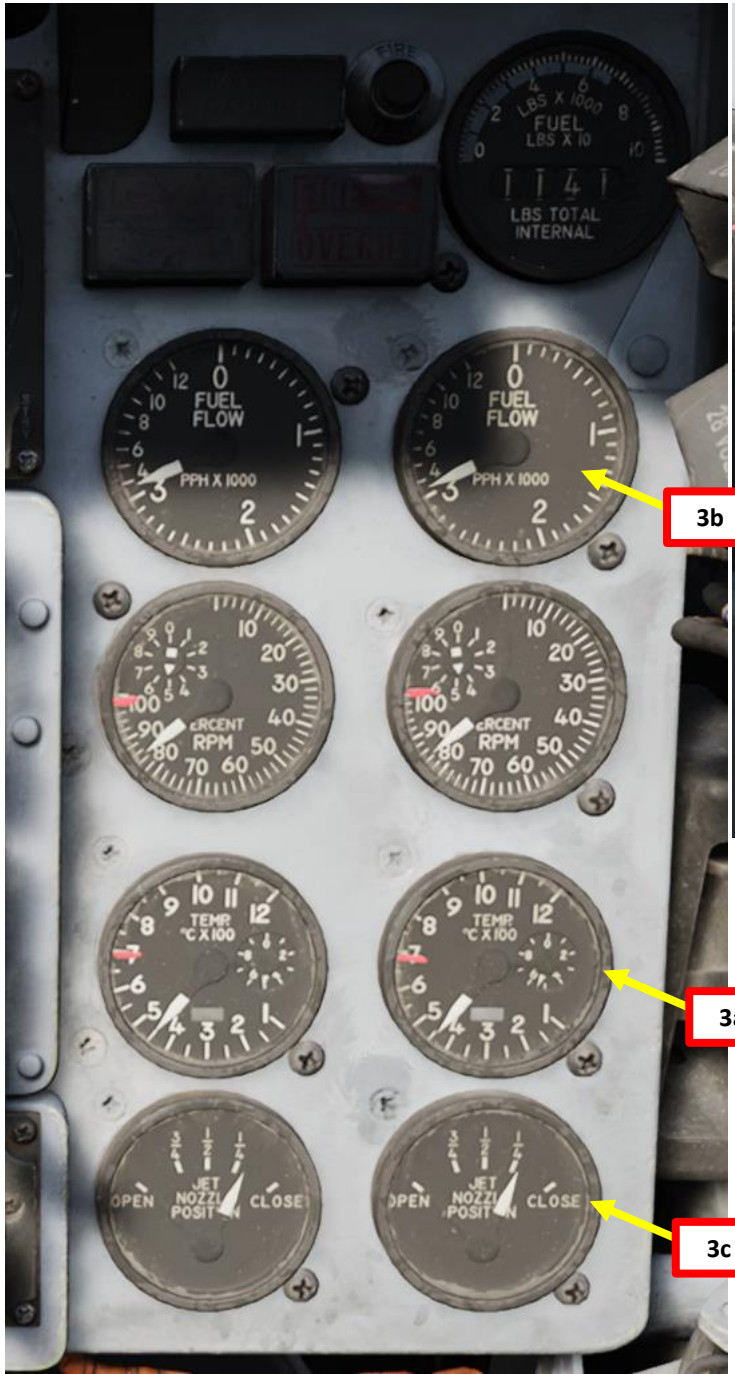
10. *[P]* Line up on the runway.
11. *[P]* Set Anti-Skid Switch – ON (FWD).
12. *[P]* Confirm ANTI-SKID INOPERATIVE light is extinguished.
13. *[P]* Set Pitot Heat Switch– ON (FWD)
    - *Note: The Pitot Heat switch should always be turned on before takeoff but not for longer than one minute as it could damage the instrument.*
14. *[P]* Set your IFF (Identify-Friend-or-Foe) Transponder Master Selector to NORMAL.
15. *[P+WSO]* Check Circuit Breakers – IN
16. *[P+WSO]* Check Warning Lights – OUT

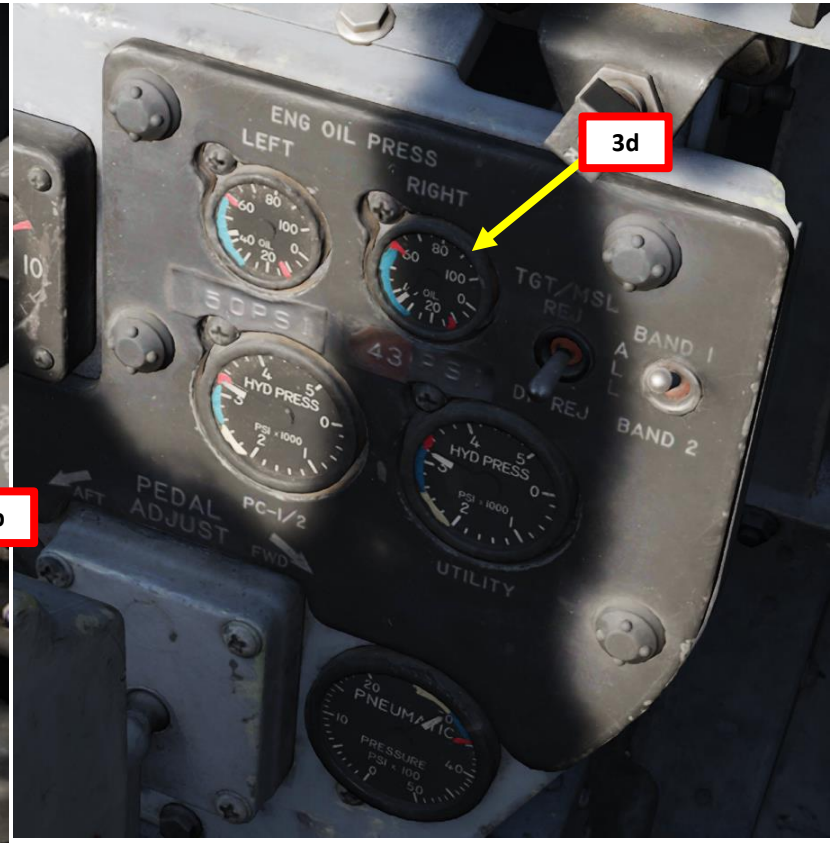


TAKEOFF

1. *[P]* Apply wheel brakes.
2. *[P]* Throttle up to 85 % RPM.
3. *[P]* Check engine parameters.
   a) Exhaust Gas Temperature: 220 to 420 deg C
   b) Fuel Flow Indicator: 800 to 1400 lbs/hour (pph)
   c) Nozzles: 1/4 Open
   d) Engine Oil Pressure: 30 to 40 psi
4. *[P]* Release wheel brakes.
5. *[P]* Throttle up to MIL (Military) Power
6. *[P]* Engine Gauges – Check

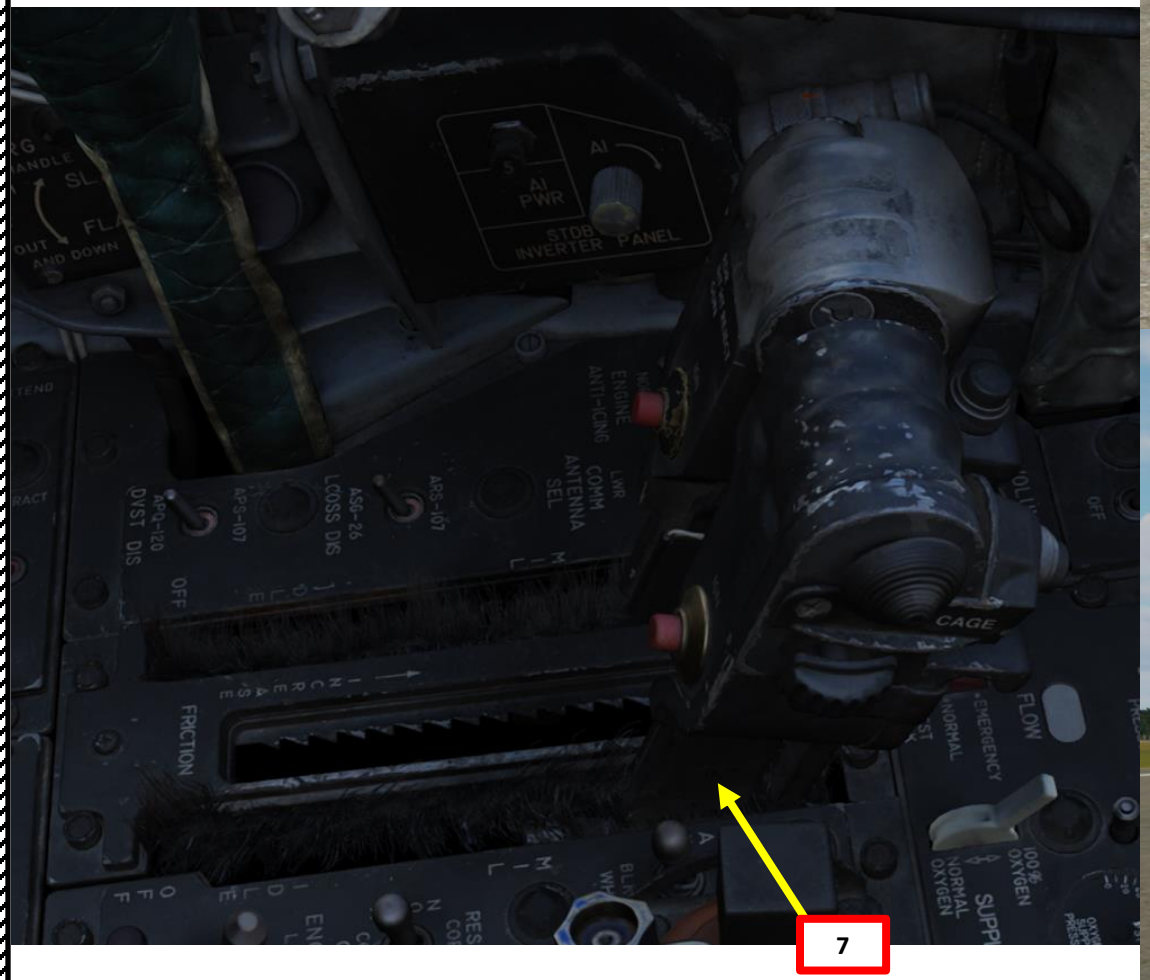






TAKEOFF

7. *[P]* Throttle up to Afterburner
8. *[P]* Nose Gear Steering must be disengaged prior to accelerating to 70 kts.
    - *Note: Rapid full aft movement of the stick between takeoff airspeed and 30 knots below takeoff airspeed may result in the stabilator hitting the runway with the possibility of stabilator actuator damage.*

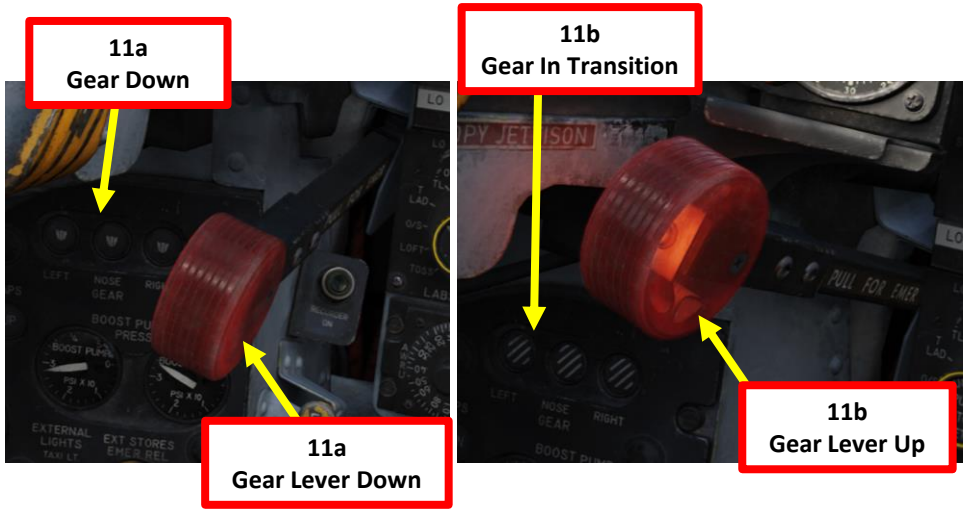


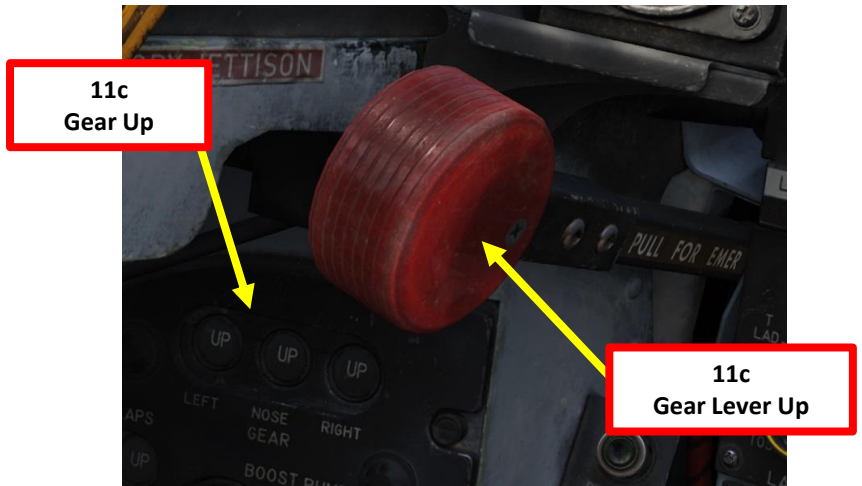
TAKEOFF

9. *[P]* Pull aft on the stick at 80 kts.
10. *[P]* Maintain 10 deg to 12 deg Pitch Attitude. Trim as required.

TAKEOFF

11. *[P]* After rotation and attaining a positive rate of climb, set Landing Gear Lever – UP.
    - *Note: The landing gear and gear doors should be completely up and locked before the gear limit airspeed of 250 knots is reached. Otherwise, excessive air loads may damage the landing gear mechanism and prevent subsequent operation.*
12. *[P]* The AUX AIR DOORS, WHEELS, and MASTER CAUTION lights may illuminate momentarily as the landing gear and flaps are retracted.



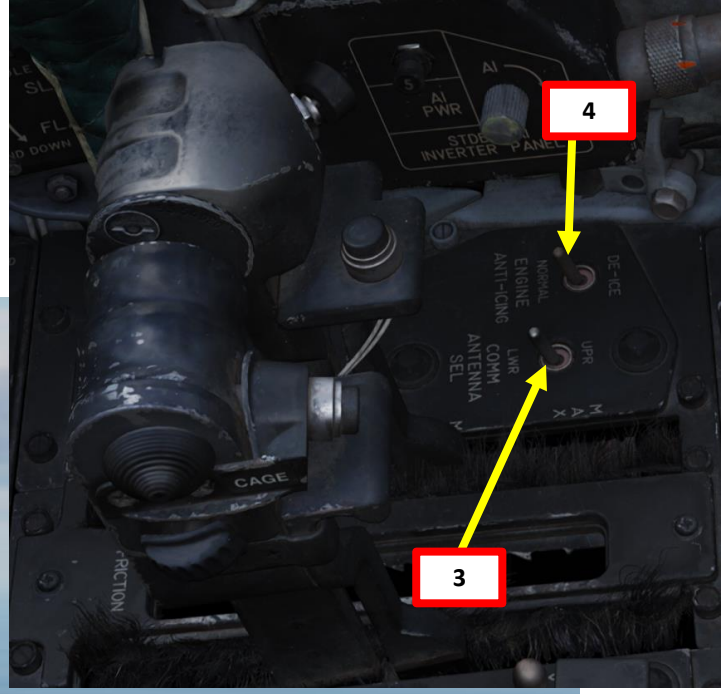


TAKEOFF

13. *[P]* Accelerate to 180 kts, then set Flaps/Slats Control Lever – NORM (FULLY UP)
    - *Note: Rudder jumps may occur during flap retraction with a lateral stick input. If an audible chattering occurs during slats flaps retraction (associated with slat flap and utility hydraulic pressure indicator fluctuating in unison), maintain airspeed below 250 knots and cycle slats flaps.*
14. *[P]* Check SLATS indication displays IN and FLAPS indication displays UP.

CLIMB

1. *[P]* Throttle back off afterburner, then adjust pitch attitude between 10 and 12 deg while accelerating to 350 kts.
2. *[P]* Climb at 350 kts; adjust aircraft pitch to maintain climb speed until reaching cruising altitude.
3. *[P]* During the climb, it may be necessary to place the antenna selector switch to the LWR (Lower) position to maintain ground communication.
4. *[P]* Set Engine Anti-Icing (De-Ice) Switch – As required.



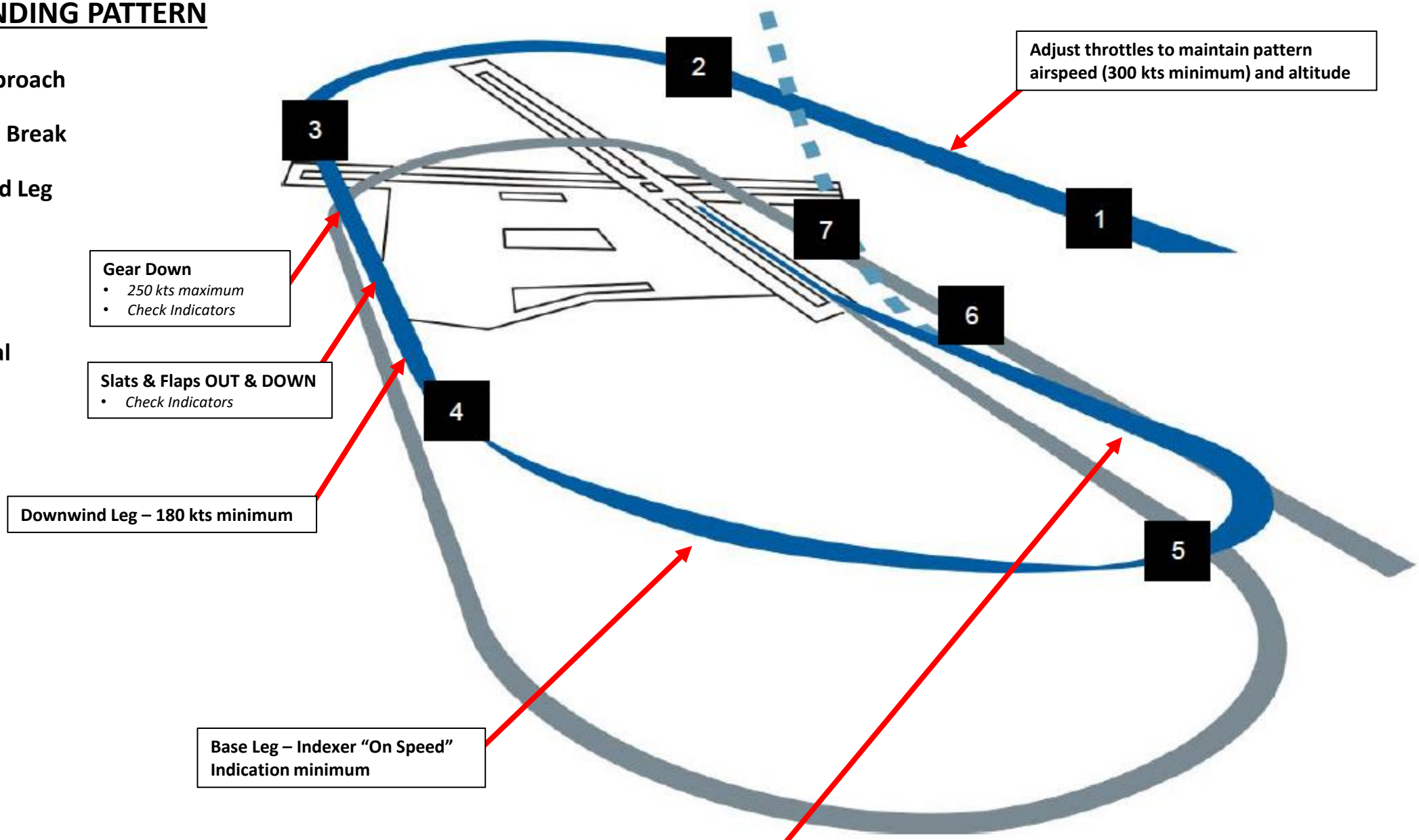
CRUISE

1. *[P]* Cruise is typically performed between Mach 0.7 and 0.9 depending on drag index.

PART 6 – LANDING

VISUAL LANDING PATTERN

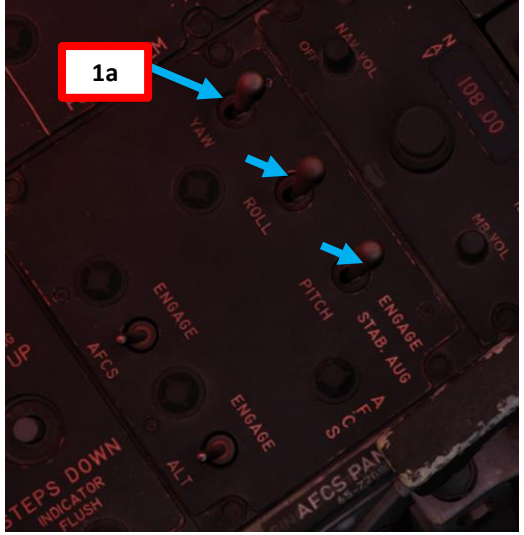
1. Initial Approach
2. Overhead Break
3. Downwind Leg
4. Base Turn
5. Final Turn
6. Short Final
7. Roll-Out

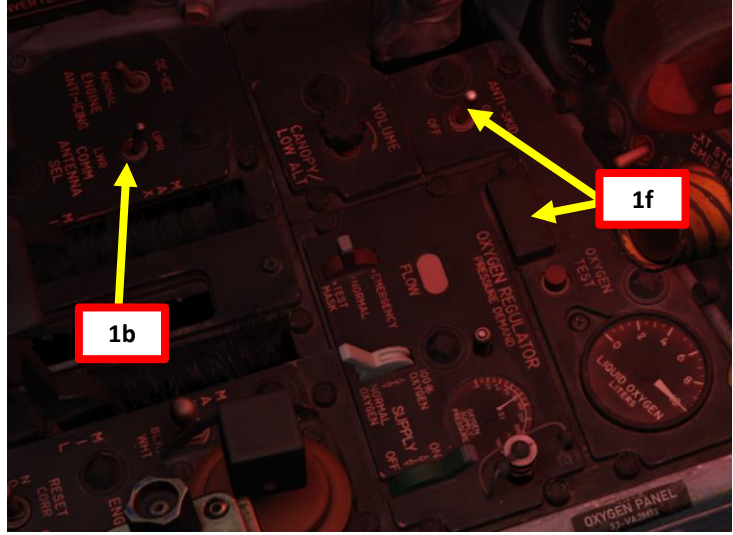


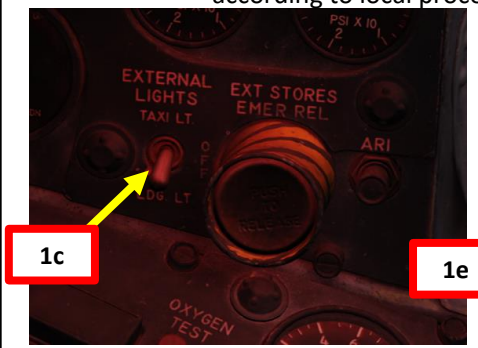
VISUAL LANDING

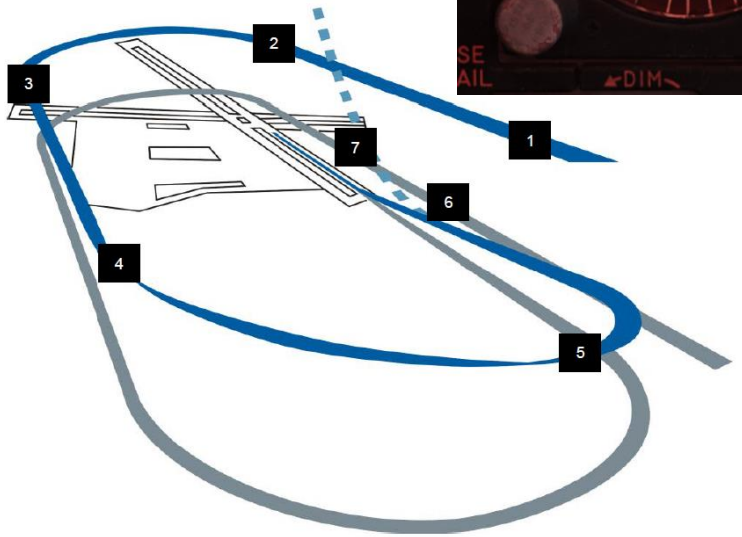
VISUAL LANDING

1. **Initial Approach**
   a) On AFCS (Automatic Flight Control System) panel, check Yaw, Roll & Pitch Stability Augmentation System Switches are ON (FWD). Confirm PITCH AUG OFF light is extinguished.
   b) Set Communication Antenna Select Switch – UPR.
      - *Note: Anti-Skid and nosewheel steering may malfunction while transmitting on the lower antenna due to electromagnetic interference.*
   c) Set Taxi/Landing Light Switch – LDG LT (DOWN)
   d) Set Optical Sight Mode – STANDBY (or CAGE).
   e) Set Radar Altimeter Low Altitude Warning Setting – As desired.
   f) Check Anti-Skid Switch is ON (FWD) and confirm ANTI-SKID INOPERATIVE light is extinguished
   g) Align your aircraft with the landing runway at 1500 ft above ground level (or according to local procedures) and maintain 300 kts.





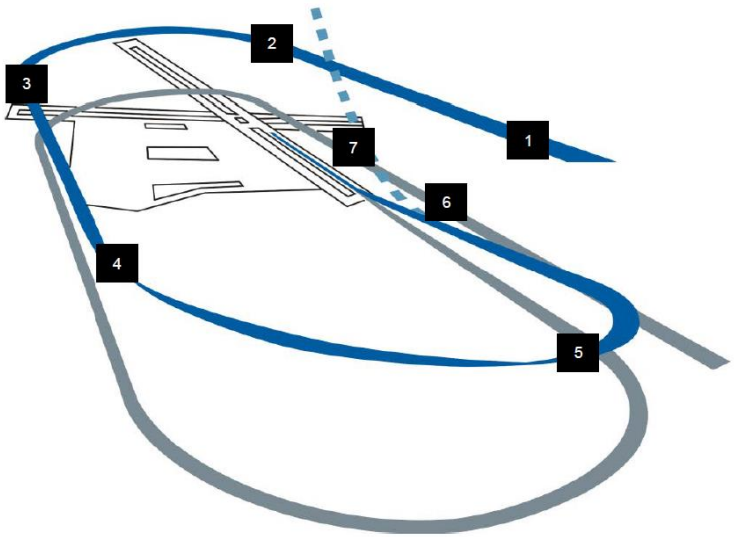




VISUAL LANDING

2. Overhead Break

a) Break left or right over the desired touchdown point
b) Reduce throttle – as required
c) Deploy Speed Brakes if required
d) Fly the break pulling approx. 3 to 4 Gs.
e) Maintain a level turn



VISUAL LANDING

3. Downwind Leg

a) Roll out on the downwind leg opposite the landing heading at about 200-220 kts and 1500 ft AGL. **Do not exceed 250 kts.**

b) Avoid buffet throughout the landing pattern. Adjust power as necessary to attain allowable gear lowering airspeed.

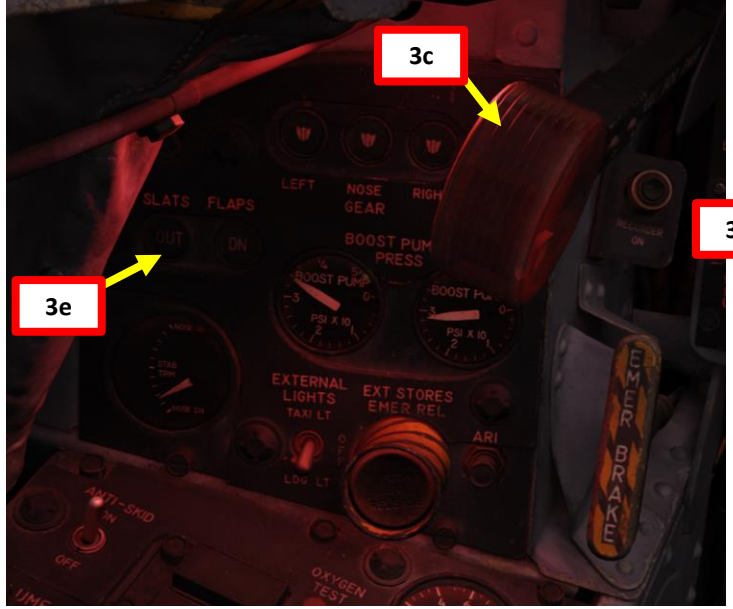
c) Extend landing gear.

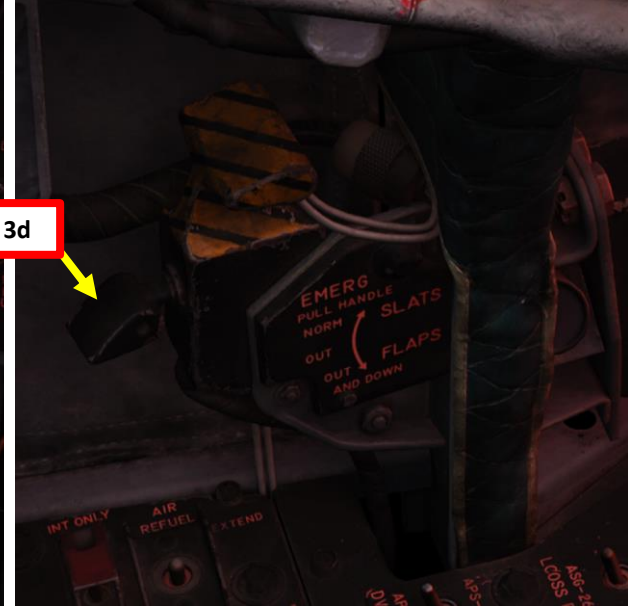
d) Set Flaps/Slats Control Lever – OUT & DOWN (FULLY DOWN).

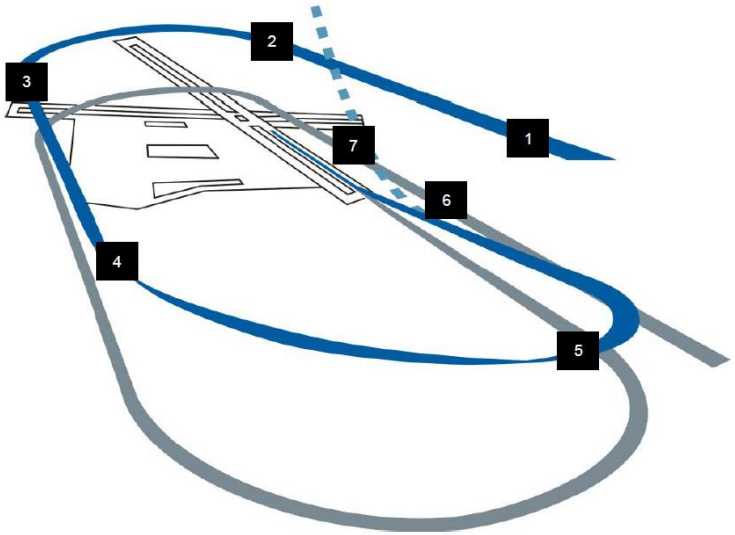
e) Check SLATS indication displays OUT and FLAPS indication displays DN (Down).

- *Note: Actual flap extension may not occur until slowing to 210 knots.*

f) Reduce speed **(180 kts minimum)** as required to prevent excessive airspeed buildup in the base turn

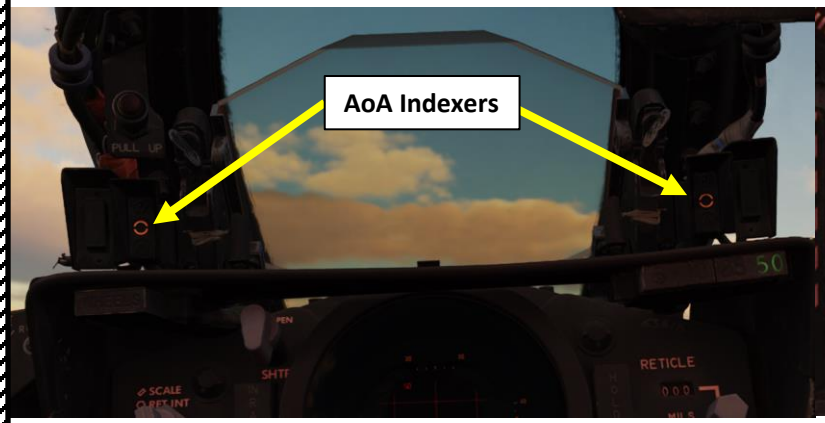


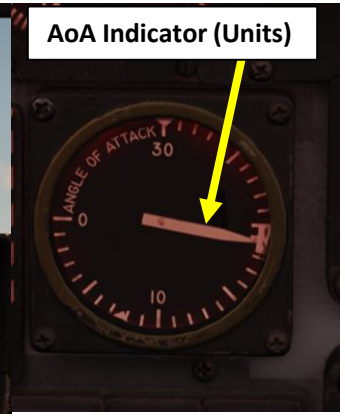


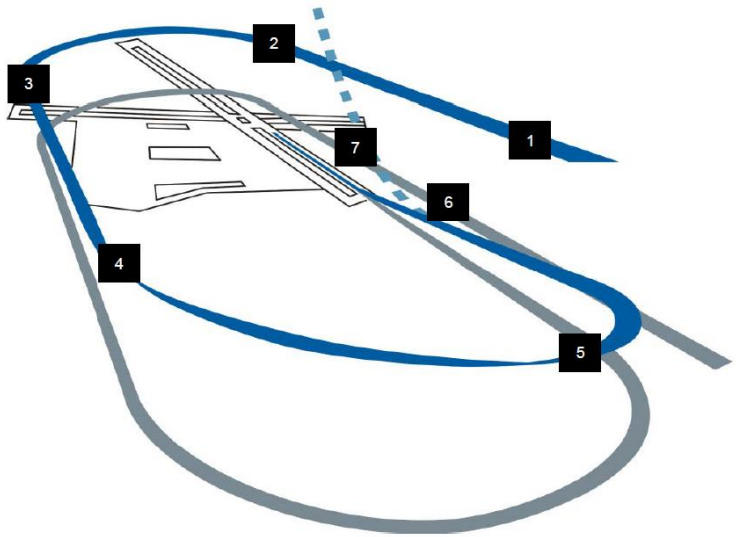


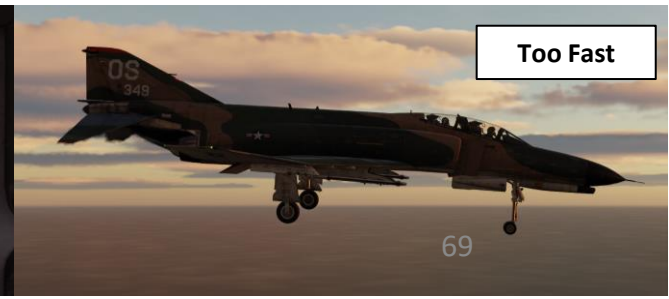
VISUAL LANDING

4. **Base Turn**
   a) Initiate base turn when your wingtip is at a 45 deg angle from the runway edge.
   b) Trim aircraft pitch to set a ON SPEED Angle of Attack (AoA), which is 19.2 units. Use the following to determine ON SPEED AOA:
      - AoA Indexer (doughnut = On Speed)
      - AoA Indicator (angle of attack in units)
      - AoA aural tone system indicates an on-speed approach with steady tone played at medium pitch.



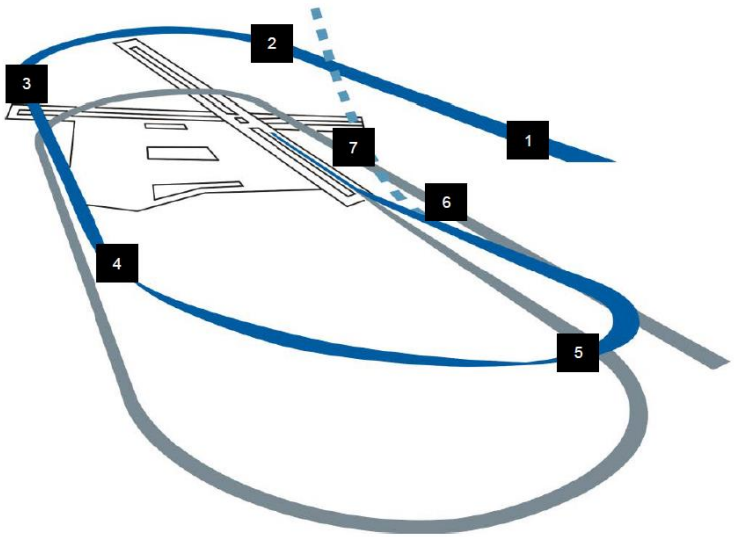






VISUAL LANDING

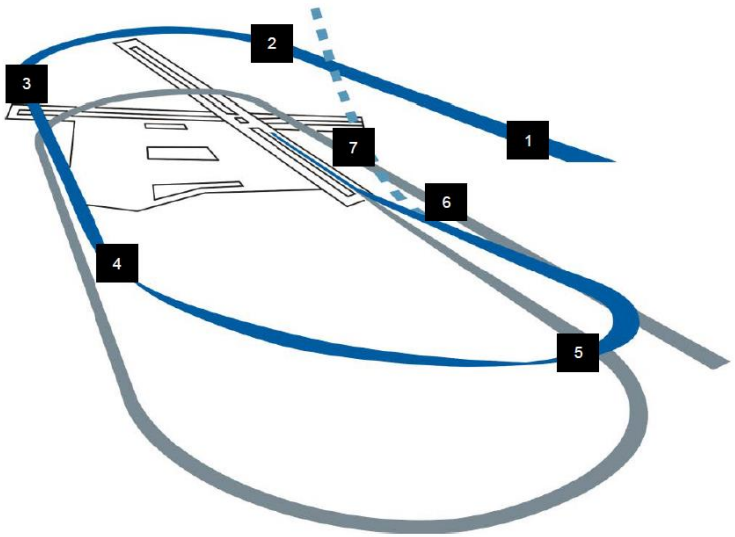
5. **Final Turn**
   a) Use throttle to control rate of descent while using the stick to maintain a 19.2 units AoA through the turn.
   b) Roll out on final and raise the nose to maintain proper glide path (300 ft AGL, 1 nm from the touchdown point)



VISUAL LANDING

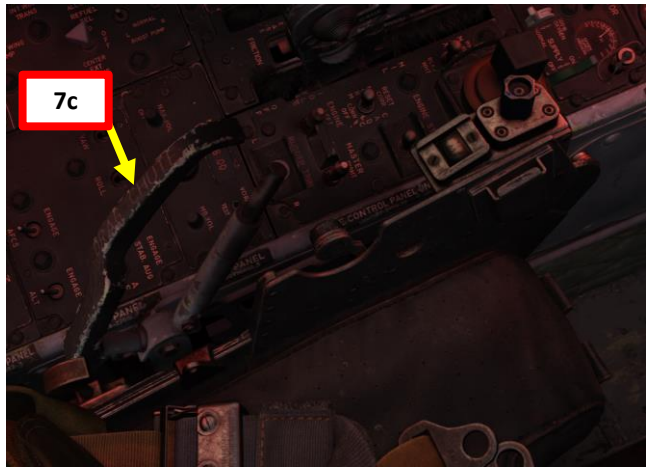
6. **Short Final**
   a) When on final, align the center of the sight glass with the runway threshold to ensure proper glidepath (3 deg glide slope) while maintaining 19.2 deg AOA.
   b) Use throttle to control rate of descent and glide slope while using the stick to maintain a 19.2 units AoA.
   c) If too high on glide slope, reduce power, establish a new glide slope, then add power to maintain glide slope when captured.
   d) If too low on glide slope, add power, hold on speed and reduce power to maintain glide slope when captured.

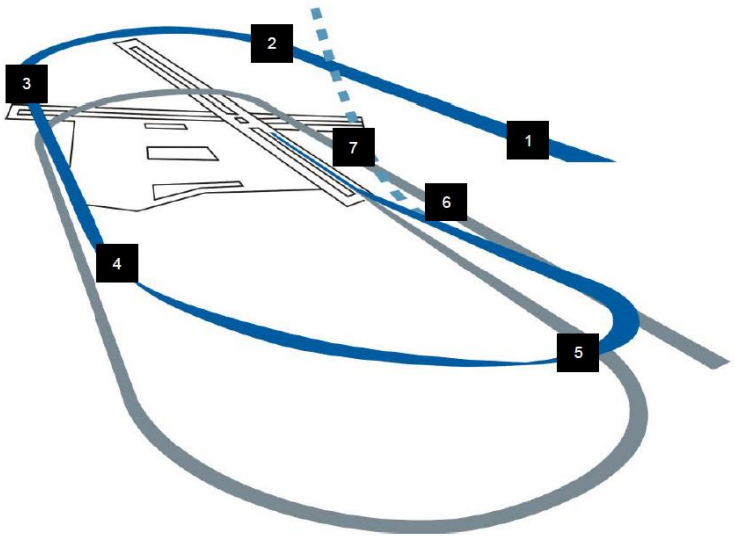
Approach Speed Formula: Final approach airspeed is approximately 142 kts at a gross weight of 33000 lbs + 2 knots for each 1000 lbs above 33000 lbs



VISUAL LANDING

7. **Roll-Out**
   a) Flare at 20 ft by gently pulling the stick aft and let the aircraft touchdown.
   b) At touchdown, reduce power to IDLE.
   c) Pull Drag Chute Lever to deploy drag chute (“P” binding).





VISUAL LANDING

7. Roll-Out

d) Use full aft stick to help decelerate.

e) Use rudder and ailerons for directional control down to 70 knots, then use differential braking. Nose gear steering should not be required for directional control in light crosswind conditions. However, if rudder, aileron, and/or differential braking are not effective in maintaining directional control, use nose gear steering as required. Engage nose gear steering only with the rudder at or near neutral.

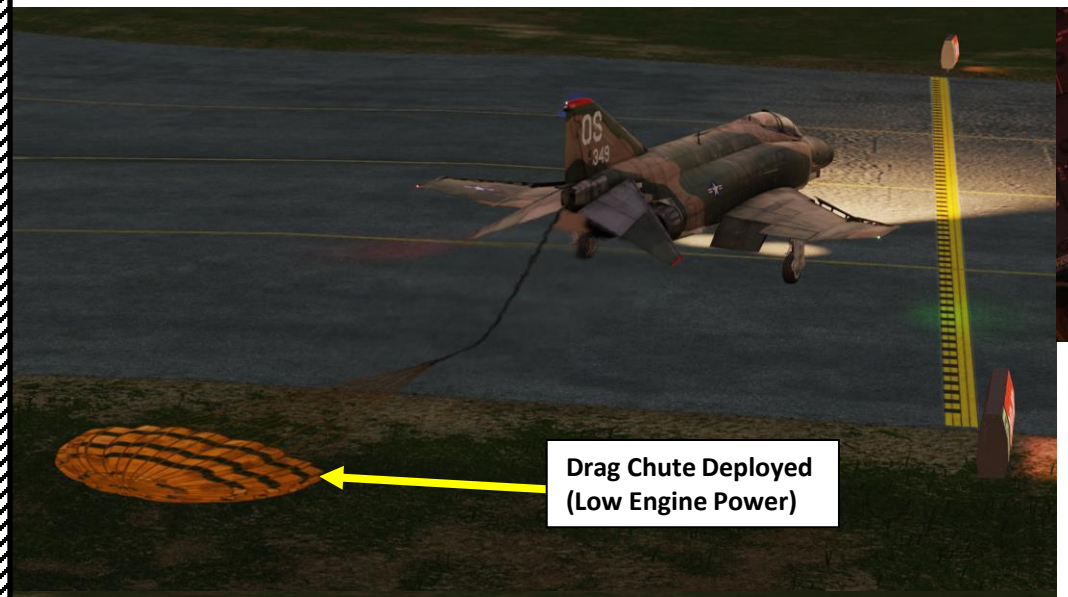
f) Gently tap wheel brakes when below 70 kts until you come to a full stop.

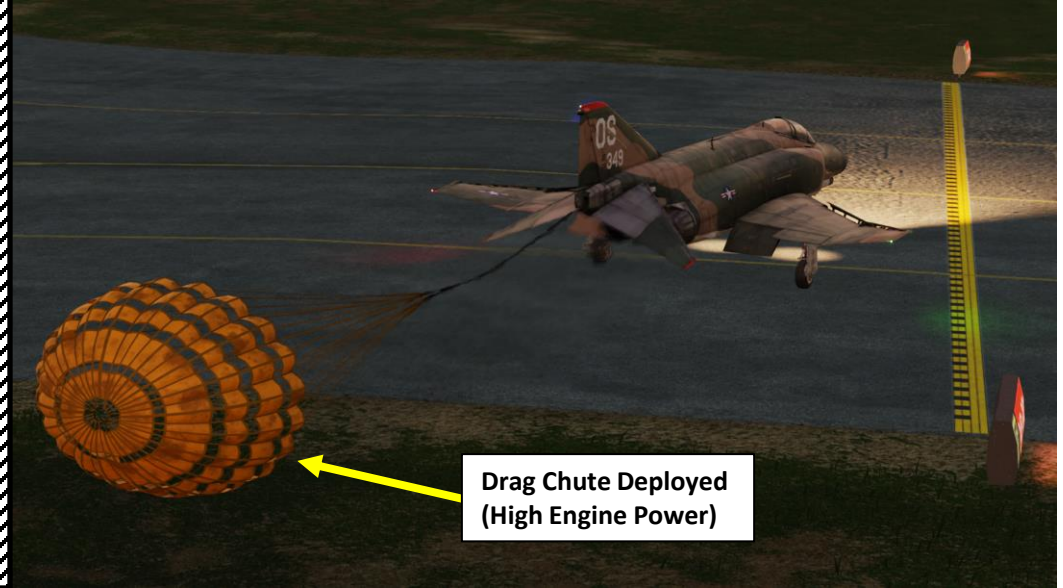
VISUAL LANDING

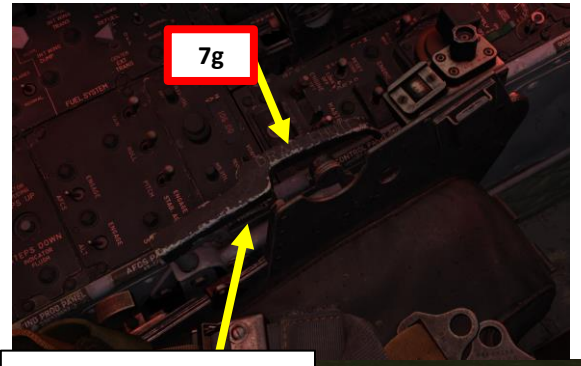
7. Roll-Out

g) When able, push Drag Chute Lever back IN to jettison drag chute.

- *Note: Drag chute should not be jettisoned on the runway or a taxiway. A popular technique is to leave it on the side of a taxiway by appropriately orienting the aircraft, inflating the chute with the engines and then releasing it in the desired direction.*







VISUAL LANDING

7. Roll-Out

h) Taxi to the parking area and shutdown aircraft.

AFTER LANDING

If you have landed and want to go on another mission, don't forget to use the ground crew for refueling and re-arming. Once refueling/rearming is complete, the ground crew will install a new drag chute and replenish various expendables.