

Cessna 172S Nav III

Flow Scan Study Guide

Note:

- These flow scans do not override the manufactures checklist.
- It is the Pilot In Commands responsibility to ensure that all aspects of the manufactures operating handbook are complied with.

About this Study Guide

In the cockpit of an aeroplane, the instruments and switches are arranged in specific locations based on the frequency of use, criticality, and other human factors considerations.

In order to facilitate a logical flow while initially configuring the plane, we follow a sequence of motor and eye movements. This is called a “flow-pattern”. This flow pattern can then be confirmed by verifying each item on the manufacturer's checklist for critical phases of the flight i.e. Before take-off. For example, it is critical that the fuel selector be placed in the BOTH position prior to take-off. If this is missed in the flow scan, it will be identified during the review of the manufacturer's checklist. This is critical when there is not a second crew member to cross check the pilot's actions. I.e. single pilot operations (most light aircraft). In a single-pilot light aircraft it is impractical to review the manufacturer's checklist in non-critical phases of flight, for example, before starting engine, starting engine and securing aeroplane (shutdown).

To utilise the flow scans effectively it is essential that the pilot has an understanding of the aircraft's systems.

Guidelines for Checklists

COCKPIT CHECKLISTS: CONCEPTS, DESIGN, AND USE

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1. Checklist responses should portray the desired status or the value of the item being considered, not just “checked” or “set.”
2. The use of hands and fingers to touch, or point to, appropriate controls, switches, and displays while conducting the checklist is recommended.
3. A long checklist should be subdivided to smaller task-checklists or chunks that can be associated with systems and functions within the cockpit.
4. Sequencing of checklist items should follow the “geographical” organization of the items in the cockpit, and be performed in a logical flow.
5. Checklist items should be sequenced in parallel with internal and external activities that require input from out-of-cockpit agents such as cabin crew, ground crew, fuelers, and gate agents. We note here that this guideline could conflict with No.3. and 4 above. In most cases where this occurs, this guideline (No. 5) should take precedence.
6. Critical checklist items such as flaps/slats, trim setting, etc., that might need to be reset due to new information (arriving after their initial positioning), should be duplicated on the ground phase checklists.
7. The completion call of a task-checklist should be written as the last item on the checklist, allowing all crew members to move mentally from the checklist to other activities with the assurance that the task-checklist has been completed.
8. Critical checklists, such as the TAXI checklist, should be completed early in the ground phase in order to decouple them from the takeoff segment.
9. Checklists should be designed in such a way that their execution will not be tightly coupled with other tasks. Every effort should be made to provide buffers for recovery from failure and a way to “take up the slack” if checklist completion does not keep pace with the external and internal activities.
10. Flight crews should be made aware that the checklist procedure is highly susceptible to production pressures. These pressures set the stage for errors by possibly encouraging substandard performance, and may lead some to relegate checklist procedures to a second level of importance, or not use them at all.

STARTING ENGINE FLOW SCAN



ITEMS 8 – 24 MAGNIFIED



G1000 PFD MAGNIFIED



STARTING ENGINE

1. Aircraft position – SUITABLE.
2. Fuel Selector - BOTH
3. Fuel Shut-off valve – IN.
4. Elevator trim – SET for take-off.
5. Wing flaps – UP.
5. Mixture – IDLE CUT-OFF.
6. Throttle – CLOSED.
7. Alternate static air – IN.
8. Circuit breakers – IN.
9. Ignition – Key in – OFF
10. STBY BATT Switch:
 - a. TEST – Hold for 10 seconds, verify that green TEST lamp does not go off.
 - b. ARM – Verify PFD comes on.
11. Engine Indicating System – CHECK PARAMETERS (Verify no red X's)
12. Bus Voltage – CHECK
 - a. E BUS – Minimum 24 volts
 - b. M BUS – 1.5 Volts or less
13. Bus Amps – CHECK
 - a. E BUS – Discharge
 - b. M BUS – No discharge
14. Master Switch (ALT and BAT) – ON
15. Avionics master – OFF.
16. Dimming rheostats – As required.
17. Beacon – ON.
18. NAV Lights – OFF.
19. Strobe lights – OFF.
20. Landing light – OFF.
21. Taxi Light – OFF.
22. Cabin Power 12 volt - OFF
23. Pitot heat – OFF.
24. Fuel pump – OFF.
25. Follow priming procedure.

PRIMING – COLD START

1. Mixture – FULL RICH.
2. Throttle – FULL OPEN.
3. Fuel pump - ON for 3 SEC then OFF.
 - Fuel flow – MONITOR
4. Mixture – IDLE CUT-OFF.
5. Throttle – IDLE.

PRIMING – HOT START

NOT REQUIRED

26. Brakes – TEST & HOLD pressure.
27. Propeller – CHECK clear.
28. Ignition - START
29. On 2nd firing of a cylinder (not propeller rotation)
 - a. Starter – RELEASE.
 - b. Mixture – RICH.
 - c. Throttle – Low idle.

*NOTE: If the engine does not start after six rotations of the propeller release the starter.

AFTER START

1. Oil pressure – RISING within 30sec.
2. Vacuum – INDICATING.
3. M BUS – 0 or CHARGING.
4. Avionics master – ON.
5. Nav lights – As required.
6. Taxi light – As required.
7. Mixture – LEANED for taxi.
8. Intercom – SET.
9. Radios
 - a. Frequency SET.
 - b. Volume SET.
 - c. TEST.
 - d. Taxi call.
10. Taxiway – CLEAR.

AFTER START CHECKLIST COMPLETE

BEFORE TAKE-OFF FLOW SCAN



ITEMS 14 – 21 MAGNIFIED



G1000 PFD MAGNIFIED



BEFORE TAKE-OFF

1. Aircraft position.
 - a. INTO WIND
 - b. Propeller – CLEAR of stones
 - c. CLEAR BEHIND
2. Propeller – CLEAR of stones.
3. VHF Nav – Frequency's SET
4. VHF Com – Frequency's SET
5. Airspeed Indicator – ZERO
6. Attitude Indicator – ERRECT
7. Balance Ball – CENTRED.
8. Altimeter – QNH/QFE SET
9. G1000 ALT SEL – SET
10. HDG BUG – SET
11. CRS SEL – SET
12. CDI – SOURCE SEL
13. XPDR Code – SET
14. ALERTS – CHECK
15. Dimming rheostats – As required
16. Lights – As required
17. Cabin Pwr 12volt – OFF
18. Pitot heat –
ON IMC on departure
OFF VMC on departure
19. Fuel Pump – OFF
20. Magnetos – BOTH
21. Circuit breakers – IN
22. Alternate static - IN
23. Mixture – RICH
24. Check – CLEAR Behind.
25. Throttle – 1800 RPM.
26. Magnetos
 - a. RIGHT – CHECK drop.
 - b. Set BOTH.
 - c. LEFT – CHECK drop.
 - d. Set BOTH.
27. Oil Pressure – IN GREEN.
28. Oil Temperature – NORMAL.
29. Vacuum – IN GREEN.
30. Fuel Quantity.
 - a. Fuel quantity – SET.
 - b. Fuel quantity – SUFFICIENT
31. M BUS Amps– 0 or POSITIVE
32. Annunciator panel – NO ANNUCIATIONS.
33. Throttle – CHECK IDLE.
34. Throttle – SET 800-900 RPM.

35. STBY ASI – ZERO
36. STBY AI – ERECT
37. STBY ALT –
QNH/QFE SET
CROSS CHECK G1000 ALT
38. CABIN HEAT – As required
39. CABIN AIR – As required
40. Wing flaps
SET as required for take-off
CHECK position visually
41. Mixture – FULL RICH
42. Elevator trim – SET to take-off position.
43. Fuel Shut-off - IN
44. Fuel selector – BOTH
45. Seats – LOCKED and UPRIGHT.
46. Seat belts – SECURE
47. Doors – CLOSED and LOCKED
48. Flight Controls
 - a. CHECK correct sense
 - b. FULL and FREE Movement
49. CHECKLIST
 - a. Obtain and check
 - b. Stow

BEFORE TAKE-OFF CHECKLIST COMPLETE

AFTER LANDING & SHUTDOWN FLOW SCAN



ITEMS 2 – 9 MAGNIFIED



AFTER LANDING (BLUE)

1. Wing flaps – IDENTIFIED and UP
2. Elevator Trim – SET to take-off position
3. Mixture – LEANED for taxi
4. Transponder – STBY
5. Landing light – OFF
6. Taxi Light – As required
7. Strobe lights – OFF
8. NAV Lights – As required

AFTER LANDING CHECKLIST COMPLETE

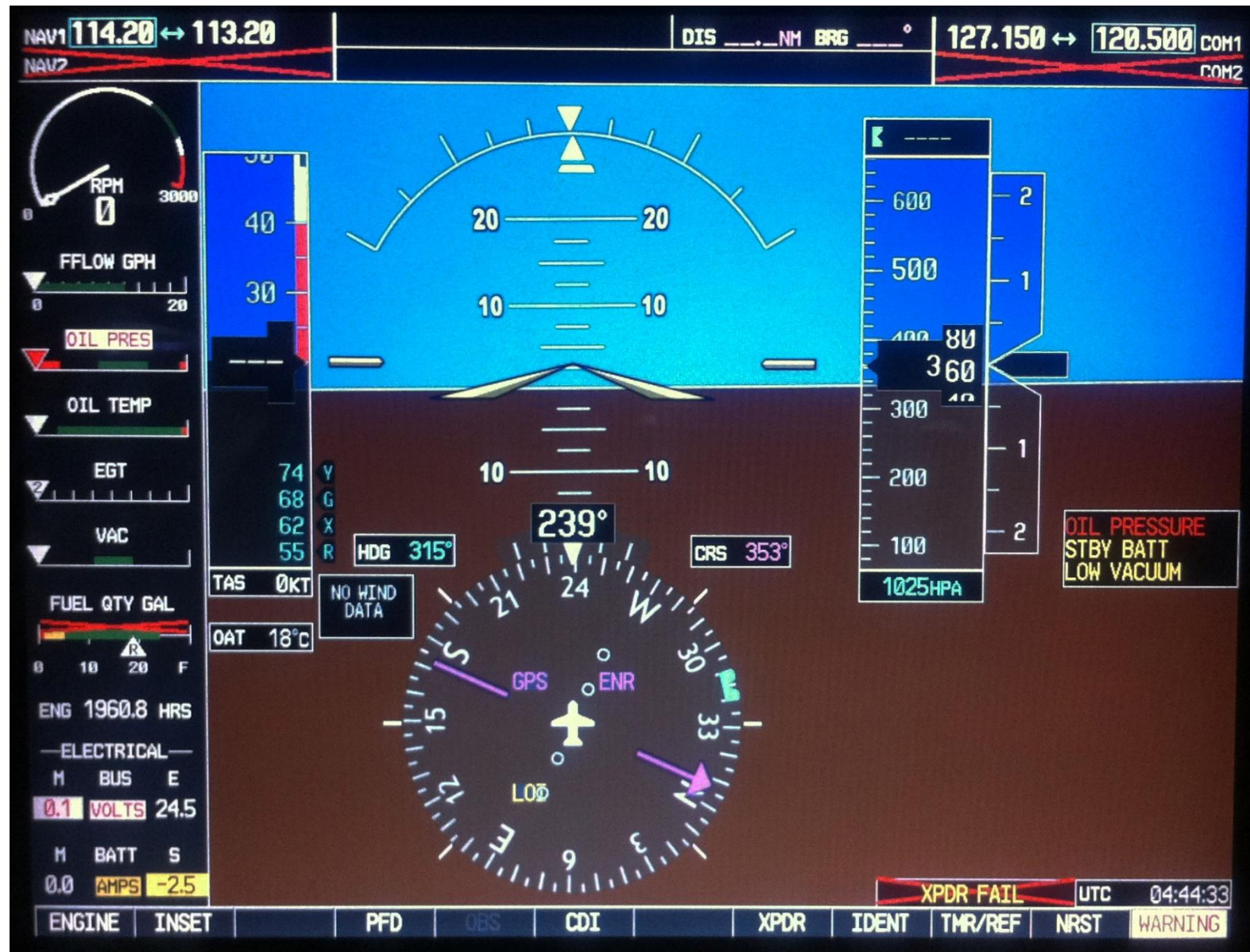
SHUTDOWN (RED)

1. Throttle – Low idle.
2. Avionics master – OFF.
3. Nav lights – OFF.
4. Strobe lights – OFF.
5. Taxi light – OFF.
6. Landing light – OFF.
7. Cabin Pwr 12volt – OFF
8. Pitot Heat - OFF
9. Magnetos
 - a. RIGHT – Listen for drop.
 - b. Set BOTH.
 - c. LEFT – Listen for drop.
 - d. Set BOTH.
10. Mixture – IDLE CUT-OFF.
11. Fuel selector
 - a. Level ground – BOTH.
 - b. Slope – LEFT or RIGHT.
12. Ignition – OFF
13. KEY – REMOVE.
14. Master – OFF.
15. Control lock – INSTALL.

SHUTDOWN CHECKLIST COMPLETE

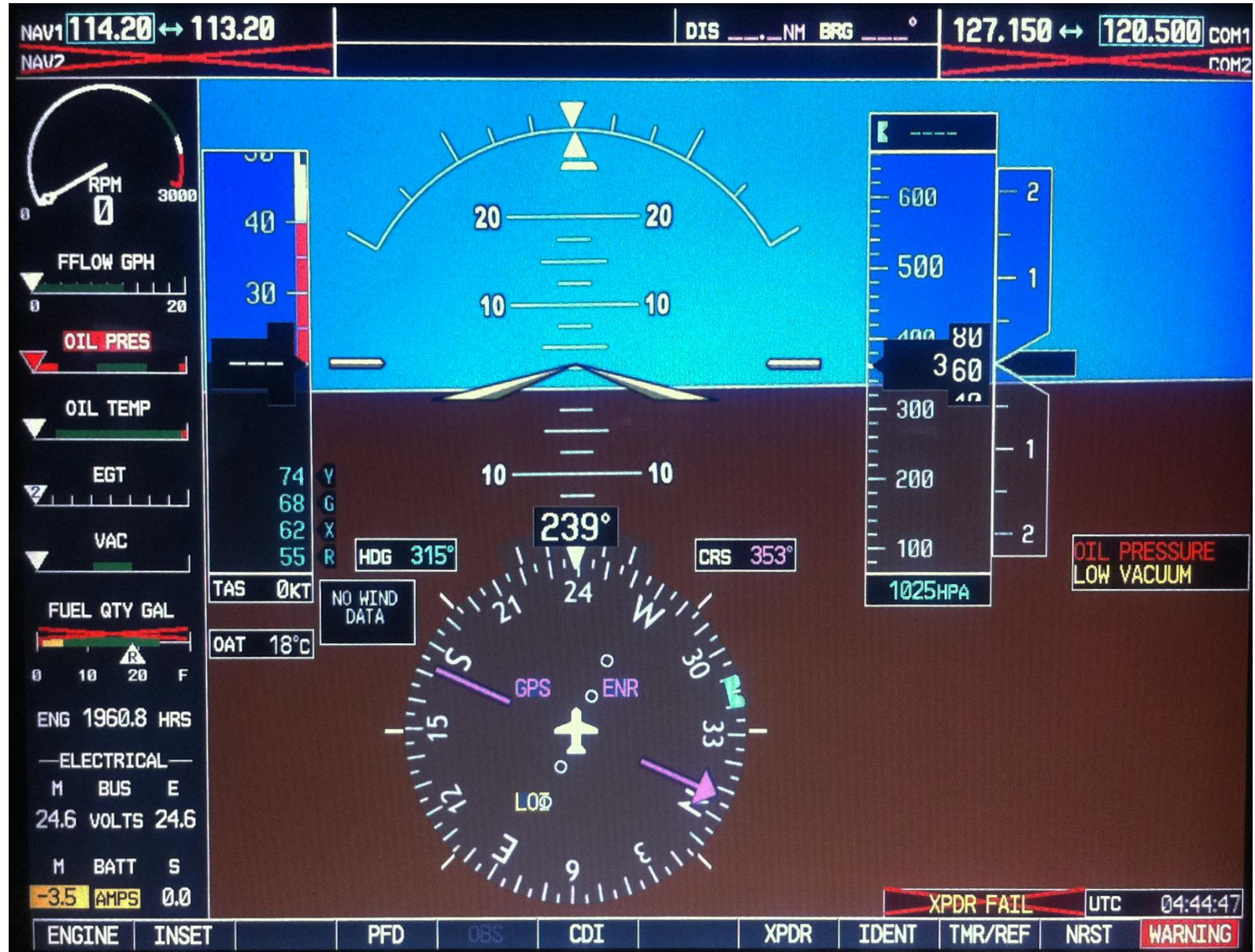
G1000 PFD

Standby Battery **ON**, Master **OFF**, Avionics **OFF**



G1000 PFD

Standby Battery **ON**, Master **ON**, Avionics **OFF**



G1000 PFD

Standby Battery **ON**, Master **ON**, Avionics **ON**



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