Welcome to the MHI RJ (CRJ) Simulator!



Pilot Initial



CRJ-550 Instructor Whiteboard

Session 1

Flight Number 4501



Introductions

Names

Discuss Previous Experience

Exchange Telephone Numbers and/or Emails

Briefing Items

- Pre-Flight Slide Show
- Checklists & Callouts
- Normal Start
- Pushback and Taxi
- Normal Takeoff & Climb
- RNAV Departures
- FMS Entries & Reroutes
- Airwork Setup
- Steep Turns
- Stalls
- ILS Approach & Briefing
- Normal Landing

Success Tips

Maintain a Positive Mental Attitude!

Compartmentalize

- Put life problems in a “mental box” one hour prior to show time.
- Tell your instructor or management if you have unmanageable training distractors.

Work together chair flying profiles and rehearsing callouts

Plan your sleep periods

- Turn off all distractions
- Use the hour prior to going to sleep to study for your next lesson.

Eat sensibly

- Avoid large meals immediately prior to scheduled simulator times.
- Try to avoid sugar “rush” and “crash”, it’s a marathon – not a sprint.

Exercise daily

Checklist Review

- Two Types of Checklists
  - Read and Do
    - Performed Silently
    - Except for the Safety Check, a flow pattern may be used to place the required item in the proper position.
    - All items will be verified by reading the checklist and carrying out the appropriate action if necessary.
  - Challenge and Response
    - First done as a flow
    - The applicable items are completed from memory (recall) using a flow pattern.
    - **There IS a designated crewmember in the Expanded Checklist for every Challenge and Response Checklist.**

SOP 2-1.5

Safety Check

- Read and Do
- Performed
  - Every First Flight of the Day
  - After a Crew Change
  - Anytime electrical power has been interrupted or control panel switch selection is questionable.
- No Flow Allowed!
- Check Aircraft Log to make sure you have the correct aircraft and that it matches the ship number, no open write-ups, an airworthiness sign off, etc. Any doubts – call maintenance.

SAFETY CHECK	
Circuit Breakers	Closed
Nosewheel Steering	OFF
Hydraulic Pumps	OFF
Landing Gear Lever	Down
Flight Spoiler Lever	0
Slat/Flap Lever	Set to Actual Position
Radar	OFF
ADG Manual Release	Stowed
EMER FLAP	NORMAL
Battery Master	ON
APU/AC Electrics	As Required/Establish
AHRS (both)	MAG
IRS (if installed)	NAV
Hydraulic Pump 3A	As Required
Parking Brake	Reset/ON
FMS Initialization	Complete

SOP 2-4

Safety Check Practice

SAFETY CHECK	
Circuit Breakers	Closed
Nosewheel Steering	OFF
Hydraulic Pumps	OFF
Landing Gear Lever	Down
Flight Spoiler Lever	0
Slat/Flap Lever	Set to Actual Position
Radar	OFF
ADG Manual Release	Stowed
EMER FLAP	NORMAL
Battery Master	ON
APU/AC Electrics	As Required/Establish
AHRS (both)	MAG
IRS (if installed)	NAV
Hydraulic Pump 3A	As Required
Parking Brake	Reset/ON
FMS Initialization	Complete

SOP 2-4

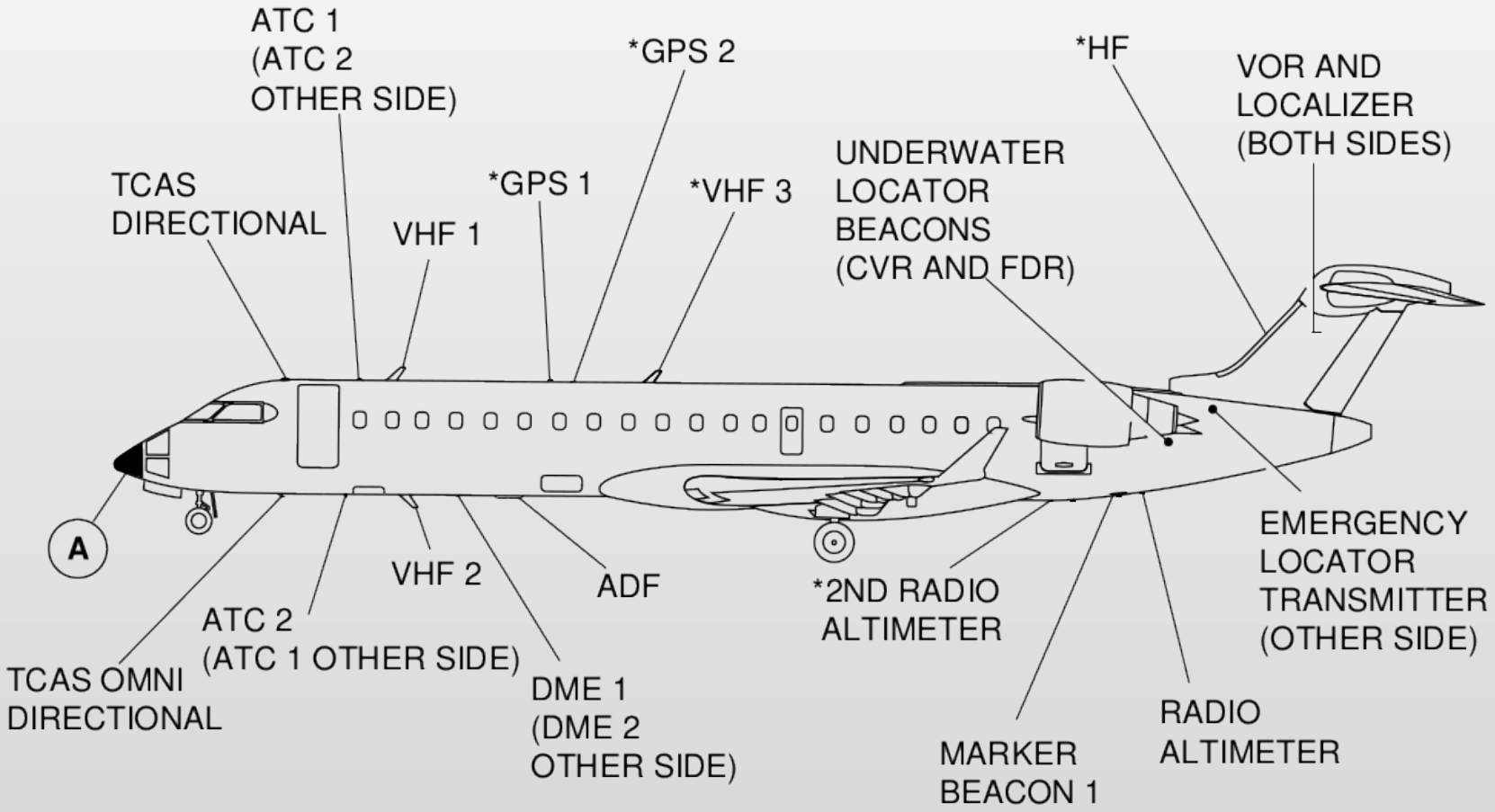
External Walkaround Inspection

Walkaround Inspection

- Hearing Protection
- Flashlight at night
- Comply with SSIM 1-4.3
- Be careful, de-ice fluids are slippery!
- Safety Check Complete & Nav Lights On

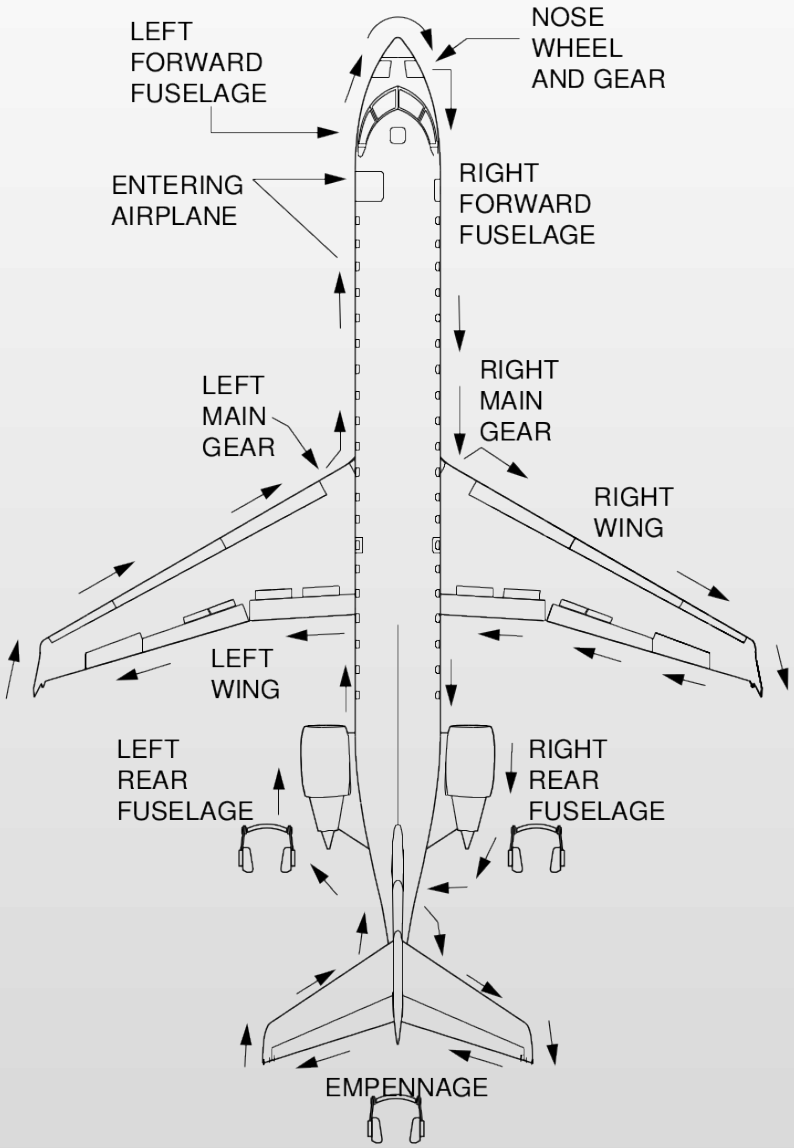
External Walkaround Inspection

Antennae Locations



External Walkaround Inspection

Start at the top of the boarding stairs, proceed in the direction indicated in the external walkaround sequence illustration and terminate at the bottom of the passenger stair unit.



External Walkaround Inspection

Even though not noted individually, the airplane and its visible components must be checked for the following:

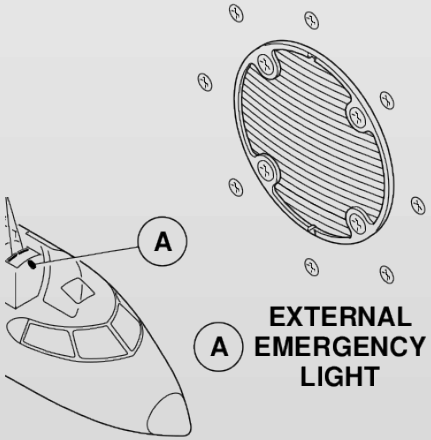
- Proximate area is free of potential FOD items.
- Passenger walkway and boarding stairs are safe and clear.
- Flight control surfaces are unobstructed.
- All vents, ports, intakes and exhausts are unobstructed.
- Tire condition and pressure are acceptable.
- All covers, plugs, picket/mooring lines removed.
- Pay particular attention to any evidence of fluid leaks from components, drains, panels, airplane skin and ground vicinity.
- Condition of skin (visible damage) on radome section, fuselage, wings, nacelles, pylons and empennage.
- All access panels and doors, not actually involved in maintenance, are secured.
- Pitot-static probes for evidence of freezing, severe discoloration, condition and security.

FCOM 2 04-06-11

External Walkaround Inspection

Passenger door emergency light …. Check





External Walkaround Inspection

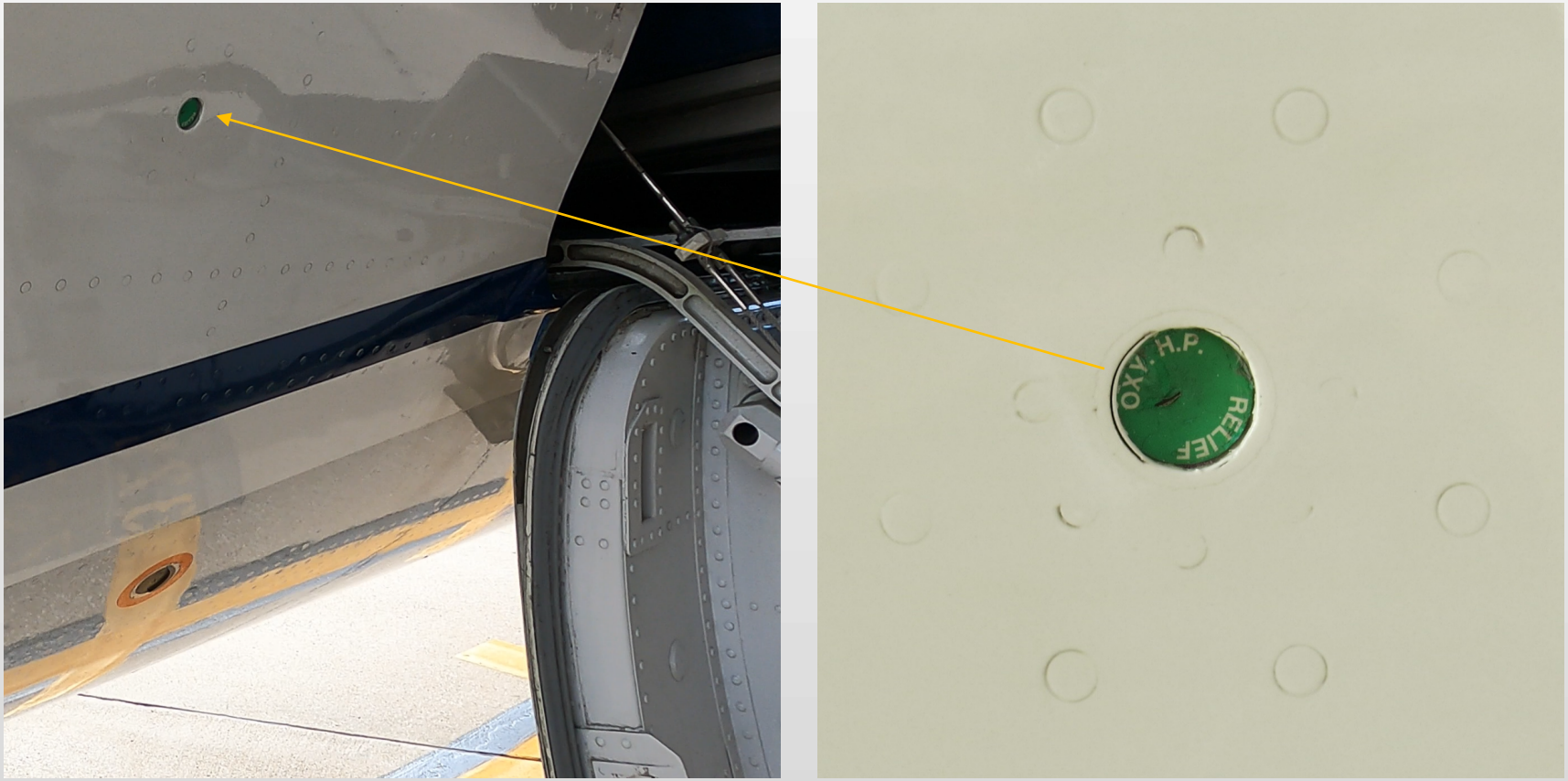
Alternate static port …. Clear





External Walkaround Inspection

Oxygen Blowout Plug …. Intact



External Walkaround Inspection
AOA Vane …. Check



External Walkaround Inspection

Standby pitot probe ..... Clear

Recall the general instructions to check pitot-static probes for evidence of freezing, severe discoloration, condition and security.



External Walkaround Inspection
Ice detector probe ….. Clear



External Walkaround Inspection

Pitot-static probe ….. Clear

Recall the general instructions to check pitot-static probes for evidence of freezing, severe discoloration, condition and security.

The fuselage skin in the vicinity of each static source must be free of damage



External Walkaround Inspection
RVSM Critical Area (GOM 3-1-10.13)

Check the condition of static sources (focus on the static ports and fuselage skin near the ports looking for wrinkling of skin, dents, scratches or anything that might adversely alter airflow near the static ports).

Any and all damages discovered in the RVSM critical area would be recorded (by MX) on form MX-50. A copy of form MX-50 is normally carried in the aircraft log can.



External Walkaround Inspection

Windshields, Windows …. Check

Wipers (2) …. Check



External Walkaround Inspection

Wheel chocks …. Installed



External Walkaround Inspection

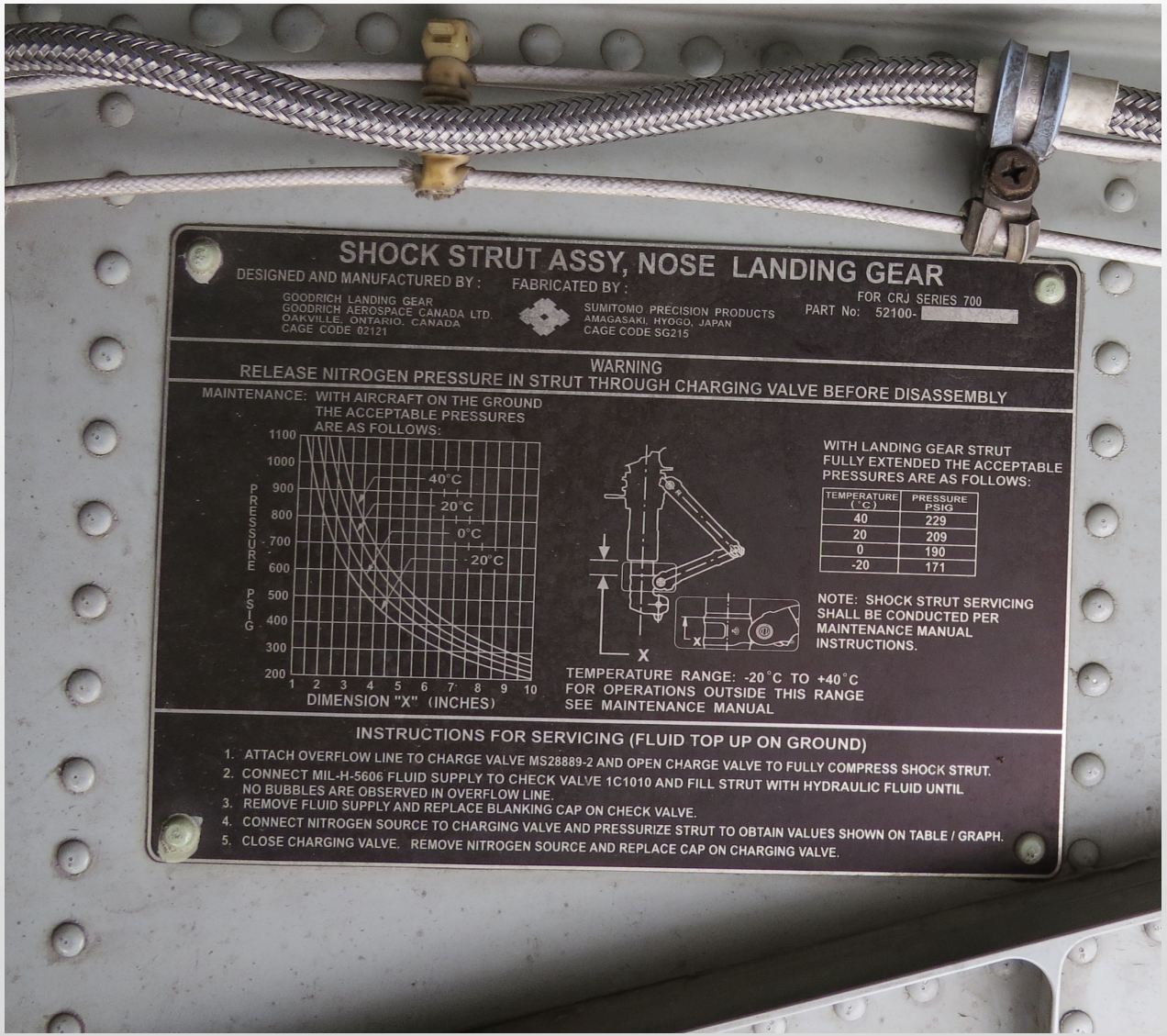
Nose landing light …. Check

Oleo extension …. Check



External Walkaround Inspection

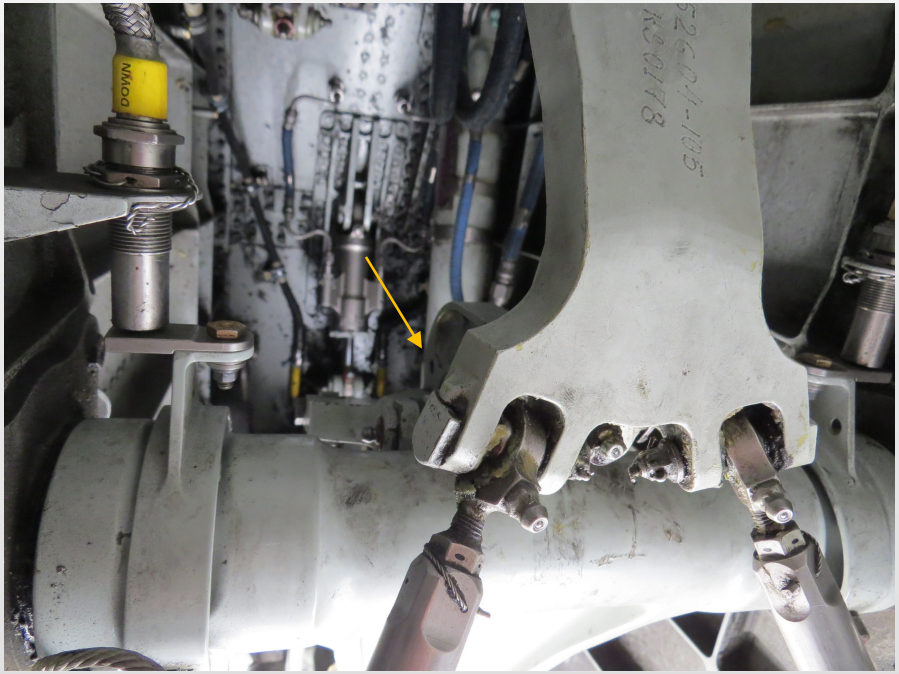
Just FYI, located in the nose gear well.

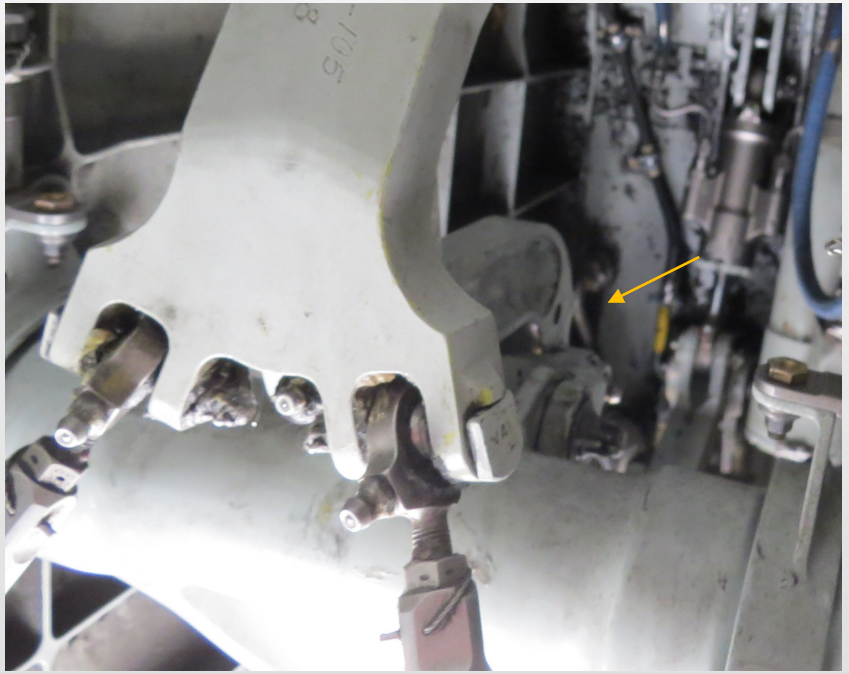


External Walkaround Inspection
Nosewheel scissors …. As required



External Walkaround Inspection
Downlock safety pin …. Remove





External Walkaround Inspection
ADG safety pin …. Remove



External Walkaround Inspection
Bay maintenance light …. Off



External Walkaround Inspection



External Walkaround Inspection

External AC power service door …. As required



External Walkaround Inspection
RVSM Critical Area (GOM 3-1-10.13)

Check the condition of static sources (focus on the static ports and fuselage skin near the ports looking for wrinkling of skin, dents, scratches or anything that might adversely alter airflow near the static ports).

Any and all damages discovered in the RVSM critical area would be recorded (by MX) on form MX-50. A copy of form MX-50 is normally carried in the aircraft log can.



External Walkaround Inspection

Pitot-static probe ….. Clear

Recall the general instructions to check pitot-static probes for evidence of freezing, severe discoloration, condition and security.

The fuselage skin in the vicinity of each static source must be free of damage



External Walkaround Inspection
Ice detector probe …. Clear



External Walkaround Inspection

TAT probe …. Clear, AOA vane …. Check



External Walkaround Inspection

Alternate static port …. Clear



External Walkaround Inspection

Galley service door emergency light …. Check



External Walkaround Inspection

Antennae ….
Check



Not an Antenna!

External Walkaround Inspection

Beacon Light ….
Check



External Walkaround Inspection

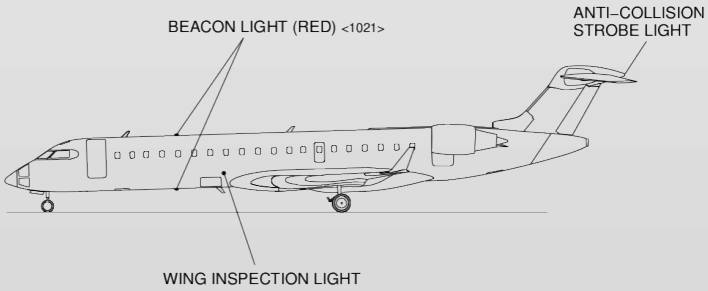


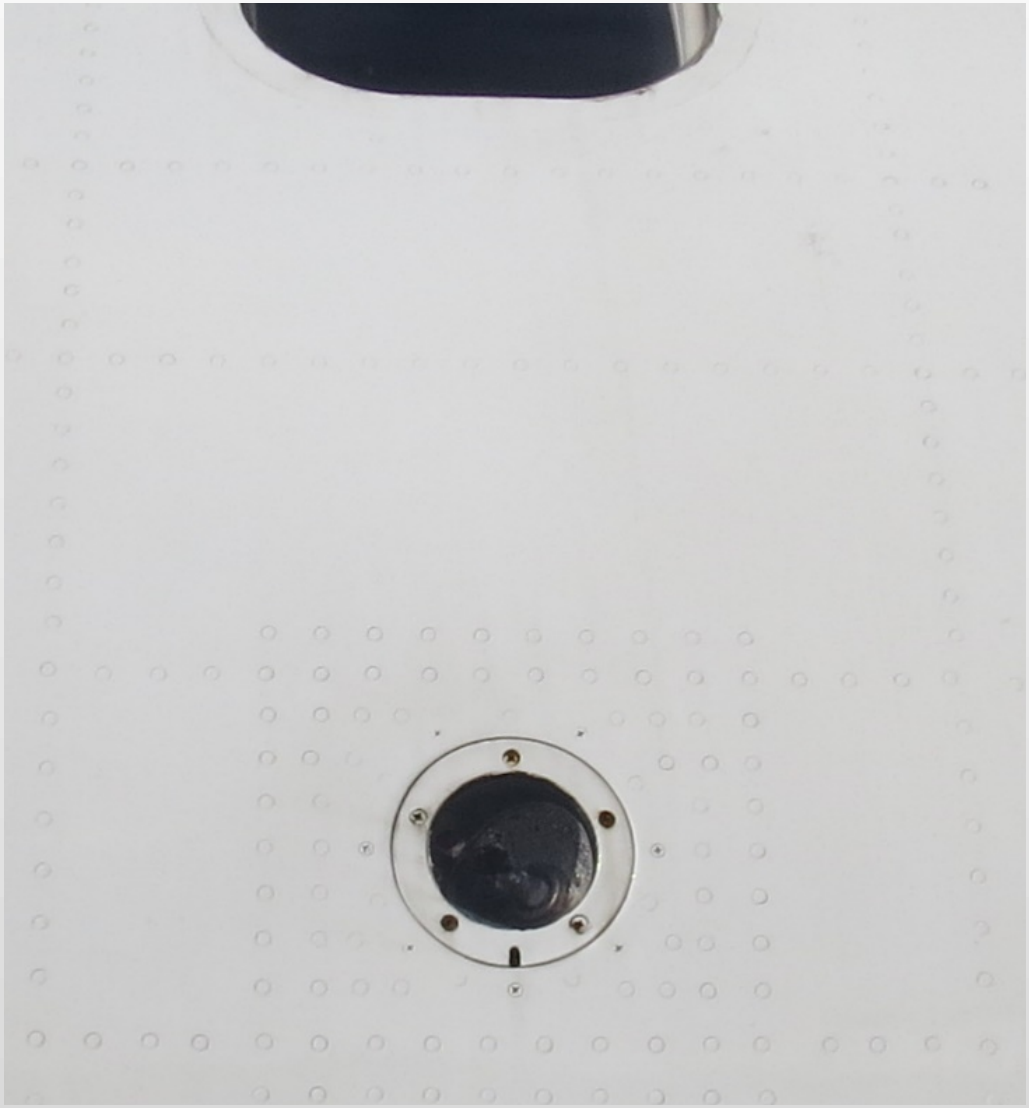
Overwing Emergency Lights

Wing Inspection Light

External Walkaround Inspection

Wing inspection lights …. Check





External Walkaround Inspection

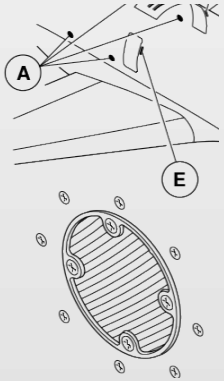
Landing/taxi lights …. Check

Which one is the taxi light? Remember “Taxi In” (Inboard)



External Walkaround Inspection

Overwing emergency lights (2) …. Check



Overwing emergency exit …. Secured



External Walkaround Inspection

Wheel chocks …. As required



External Walkaround Inspection

Oleo extension …. Check



External Walkaround Inspection

FYI - Main Landing Gear Data Plate



External Walkaround Inspection



Downlock safety pin …. Removed

External Walkaround Inspection
Leading edge slats …. Check



External Walkaround Inspection

Navigation and strobe lights …. Check



External Walkaround Inspection

Winglet …. Check

Static dischargers (9) …. Check



External Walkaround Inspection

Aileron ….
Check



External Walkaround Inspection

Lower wing surface …. Check



External Walkaround Inspection

Multi-function spoilers …. Check



External Walkaround Inspection

Flaps …. Check



External Walkaround Inspection

Upper wing surface …. Check
Wing anti-slip surface …. Intact



External Walkaround Inspection

Note the main landing gear door brushes.

There is a CDL performance penalty if missing.



External Walkaround Inspection

Engine cowls …. Check



External Walkaround Inspection

Engine cowls …. Check

Thrust reverser…. Stowed



External Walkaround Inspection

Right pylon ….
Check



External Walkaround Inspection

Antennae…. Check



External Walkaround Inspection

Tail bumper…. Check





External Walkaround Inspection

Horizontal stabilizer …. Check

Elevators…. Check

Static dischargers (15) …. Check



External Walkaround Inspection

Navigation and strobe lights …. Check



External Walkaround Inspection

Antennae …. Check



External Walkaround Inspection

- The Left Rear Fuselage, Left Wing and Left Main Gear are checked the same as the Right side.
- Baggage compartments may be open depending on ramp crew and time to departure.
- When you enter the airplane check the stairs and door area security.

Checklist Usage, SOP Sec 02

Two types of checklists

- Read and Do Checklists
  - Safety Check, Engine Start – Cross Bleed, Climb Check, After Landing, Terminating Check.
  - May use a flow pattern (except for Safety Check), After performing a “flow”, verify by the checklist
- Challenge and Response
  - First done as a flow (Originating, Before Start, etc.)
  - Memorize proper responses!

In the event that the reading of a checklist is interrupted for any reason, the checklist shall be restarted and completed in its entirety, unless the Captain and First Officer are both certain of the point of interruption.

Checklist Review

- The responses to all checklists are based on the following guidelines:
  - If the challenge is for panel status, the response is “Checked”
  - If the challenge is for a switch, state the position of the switch (e.g., “Hydraulic Pump 3A - OFF”)
  - If the challenge is for a system status, state the status (e.g., “APU - ON”)
  - If the challenge ends with the word “Test”, the response is “Complete”
- Checklist Interruption
  - In the event that the reading of a checklist is interrupted for any reason, the checklist shall be restarted and completed in its entirety, unless the Captain and First Officer are both certain of the point of interruption.

SOP 2-1.1

Originating Check

- Performed
  - Every First Flight of the Day
  - The Captain's first flight on the aircraft
  - Aircraft unattended by flight or cabin crew for any extended period of time
  - Maintenance has been done to the aircraft
- Items with an * are First Flight of the Day Only
- Challenge and Response

ORIGINATING CHECK		
Aircraft Logbook & Documents	Checked	BOTH
Emergency Equipment	Checked	CA
Safety & External Walkaround Checks	Complete	BOTH
Gear & Safety Pins	Removed/On Board	BOTH
Pedals, Seat & Harness	Adjusted	BOTH
Audio Warning Panel	Checked	F/O
Electrics	Checked	CA
*Fire Test	Complete	CA
Lights	Checked	CA
Fuel	Checked	CA
Bleeds	Checked	CA
APU	As Required	CA
Start Panel	Checked	CA
Hydraulics	Checked	CA
ELT	ARM/RESET	CA
Pressurization	Checked	F/O
Air-Conditioning	Checked	F/O
*Ice Detector Test	Complete	F/O
Windshield Heat	LOW	F/O
Emergency Lights	ARMED	F/O
Standby Compass	Checked	F/O
*Stall Test	Complete	F/O
Nosewheel Steering	OFF	CA
Clocks	Set	BOTH
EFIS Control Panels	Checked	BOTH
Instrument Panels	Checked	BOTH
EICAS & Standby Instrument	Checked	CA
*Anti-Skid Test	Complete	CA
*MLG Bay Overheat Test	Complete	CA
Upper Pedestal	Checked	CA
Thrust Lever Quadrant	Checked	CA
Avionics	Checked	CA
Starlink Power	On and Dark	CA
Trims	Checked	CA
Yaw Dampers	ENGAGED	CA
Source Select Panel	NORMAL	CA
Lower Pedestal	Checked	CA
FMS	SET	CA/F/O
RVSM Qualified	CHECKED	CA

SOP 2-6

Checklists
Originating Check Flow 1 of 2

- Captain
  - Documents and Logbook
    - VOR Check Done for the Day?
    - Open Write Ups?
    - Cabin deferrals, brief FA
  - Emergency Equipment
  - Adjust Seat
  - Nosewheel Steering Off
  - Clock
  - EFIS Control Panels
  - Instrument Panels
  - EICAS & Standby Instrument
  - Electrics
  - *Fire Test
  - Lights
  - Fuel

- First Officer
  - Review Logbook
  - External Walkaround
  - Adjust Seat
  - Initialize ACARS, Get ATIS
  - Audio Warning Panel
  - Clock
  - EFIS Control Panels
  - Instrument Panels
  - Pressurization
  - Air-Conditioning
  - *Ice Detector
  - Windshield Heat
  - Emergency Lights
  - Standby Compass
  - *Stall test

FMX 1-1.3

SOP 2-6, SOP 1-11, GOM 1-2.11

Checklists
Originating Check Flow 2 of 2

- Captain
  - Bleeds
  - APU
  - Start Panel
  - Hydraulics
  - ELT
  - *Anti-Skid Test
  - *MLG Bay Overheat Test
  - Upper Pedestal
  - Thrust Lever Quadrant
  - Avionics
  - Trims
  - Yaw Dampers
  - Source Select Panel
  - Lower Pedestal
  - FMS
  - RVSM
- First Officer
  - Clock
  - EFIS Control Panels
  - Instrument Panel

SOP 2-6, SOP 1-11, GOM 1-2.11

Checklists
Originating Check Practice

SOP 2-6, SOP 1-11, GOM 1-2.11

ORIGINATING CHECK		
Aircraft Logbook & Documents	Checked	BOTH
Emergency Equipment	Checked	CA
Safety & External Walkaround Checks	Complete	BOTH
Gear & Safety Pins	Removed/On Board	BOTH
Pedals, Seat & Harness	Adjusted	BOTH
Audio Warning Panel	Checked	F/O
Electrics	Checked	CA
*Fire Test	Complete	CA
Lights	Checked	CA
Fuel	Checked	CA
Bleeds	Checked	CA
APU	As Required	CA
Start Panel	Checked	CA
Hydraulics	Checked	CA
ELT	ARM/RESET	CA
Pressurization	Checked	F/O
Air-Conditioning	Checked	F/O
*Ice Detector Test	Complete	F/O
Windshield Heat	LOW	F/O
Emergency Lights	ARMED	F/O
Standby Compass	Checked	F/O
*Stall Test	Complete	F/O
Nosewheel Steering	OFF	CA
Clocks	Set	BOTH
EFIS Control Panels	Checked	BOTH
Instrument Panels	Checked	BOTH
EICAS & Standby Instrument	Checked	CA
*Anti-Skid Test	Complete	CA
*MLG Bay Overheat Test	Complete	CA
Upper Pedestal	Checked	CA
Thrust Lever Quadrant	Checked	CA
Avionics	Checked	CA
Starlink Power	On and Dark	CA
Trims	Checked	CA
Yaw Dampers	ENGAGED	CA
Source Select Panel	NORMAL	CA
Lower Pedestal	Checked	CA
FMS	SET	CA/F/O
RVSM Qualified	CHECKED	CA

Checklists
Before Start

- Performed
  - After ATC Clearance and aircraft refueling is completed.
- Challenge and Response

BEFORE START CHECK		
EFB Checklist	Complete	BOTH
Logbook & OFP Review	Complete	BOTH
Crew O_2 & Masks/Smoke Goggles	Checked (Qty)	BOTH
Passenger Signs	ON	F/O
LDG ELEV	Set	F/O
Altimeters	(----) Set/Cross Checked	BOTH
FMS	Set/AUTOTUNE	BOTH
Radios/Navaids	Set for Departure	CA
ADSB	GJS _____ Set	CA
Thrust Reversers	Armed	CA
Departure briefing	Complete	CA

	Oxygen Bottle Size	
Number of Crew	77 cu ft	50 cu ft.
2	810	1180
3	1110	1630

SOP 2-8, EDG 1-2.7

Checklists
Before Start Flow

- Captain
  - Determine PF/PM
  - Oxygen Masks
  - Oxygen Quantity
  - Altimeters
  - FMS
  - Radios / Navaids
  - Thrust Reversers
  - If PF:
    - Departure Briefing
    - Verify Legs
- First Officer
  - Oxygen Mask
  - Passenger Signs
  - Landing Elevation
  - FMS
  - If PF:
    - Departure Briefing
    - Verify Legs

SOP 2-8, SOP 1-11, GOM 1-2.11

LIDO Tips and Plates

Proactive LIDO chart, plate and document setup can save a lot of time and minimize document selection errors.

Please set up your LIDO Charts for this lesson.

```
DISPATCH RELEASE
OFP 1                                                  26OCT2021 2138Z
-----------------------------------------------------------------------
IFR FLT G7 4501      KMEM/MEM   STD 2200Z   ETD 2200Z
                     KMEM/MEM   STA 2300Z   ETA 2246Z
AIRCRAFT TAIL NO N521GJ / CRJ/8C5B1
PERF FACTOR 0.0

BY SIGNING, I BELIEVE THAT THIS FLIGHT CAN BE MADE W/ SAFETY

DX SIGNATURE A. DISPATCHER          PHONE +1 555 555 5555 DESK 112
CA-         A              D.B COOPER

-------------- FLIGHT PLAN SUMMARY 7551 KMEM KMEM --------------
            TIME   FUEL              ALTN TIME DIST ALT    BURN
BURN        0200    5003     T/O
MSAP        0005     200     DEST1
RESERVE     0045    2297
MIN FUEL            7500
TAXI OUT    0015     205
MIN GATE            7705
CONT        0005     295               PLANNED  MAX ALLOWABLE
TOTAL               8000     PAX LOAD       50  BOW     45101
LDG FUEL    0053    2743     PAYLD       10500  MPAYLD  12956
                             ZFW         55601  MZFW    59000
                             TOW         61000  MTOW    65000
                             LDG WGT     58544  MLDG    61000
                             RAMP WGT    61205  MRMP    66000

NO TANKERING RECOMMENDED
LOSS FOR EXTRA FUEL USD/1000 LBS.   4.99

OPERATION MODES                          CLB CRZ DES
  CLIMB     290/.74         AVG WND CMP  T4  H1  H8
  CRUISE    320/.77         AVG TMP CMP  P11 P13 P09
  DESCENT   290/.74         AVG CRZ WIND 306 / 13
-----------------------------------------------------------------------
FMS ROUTE
-KMEM/18R N0400F140 SELPH7 OHULO DCT MEM DCT KMEM/36L
-----------------------------------------------------------------------
                   TERRAIN CLEARANCE CHECK
                   -----------------------
DD CHECK - TERRAIN CHECK COMPLETED WITH NO LIMITATIONS

DP CHECK - TERRAIN CHECK COMPLETED WITH NO LIMITATIONS
-----------------------------------------------------------------------

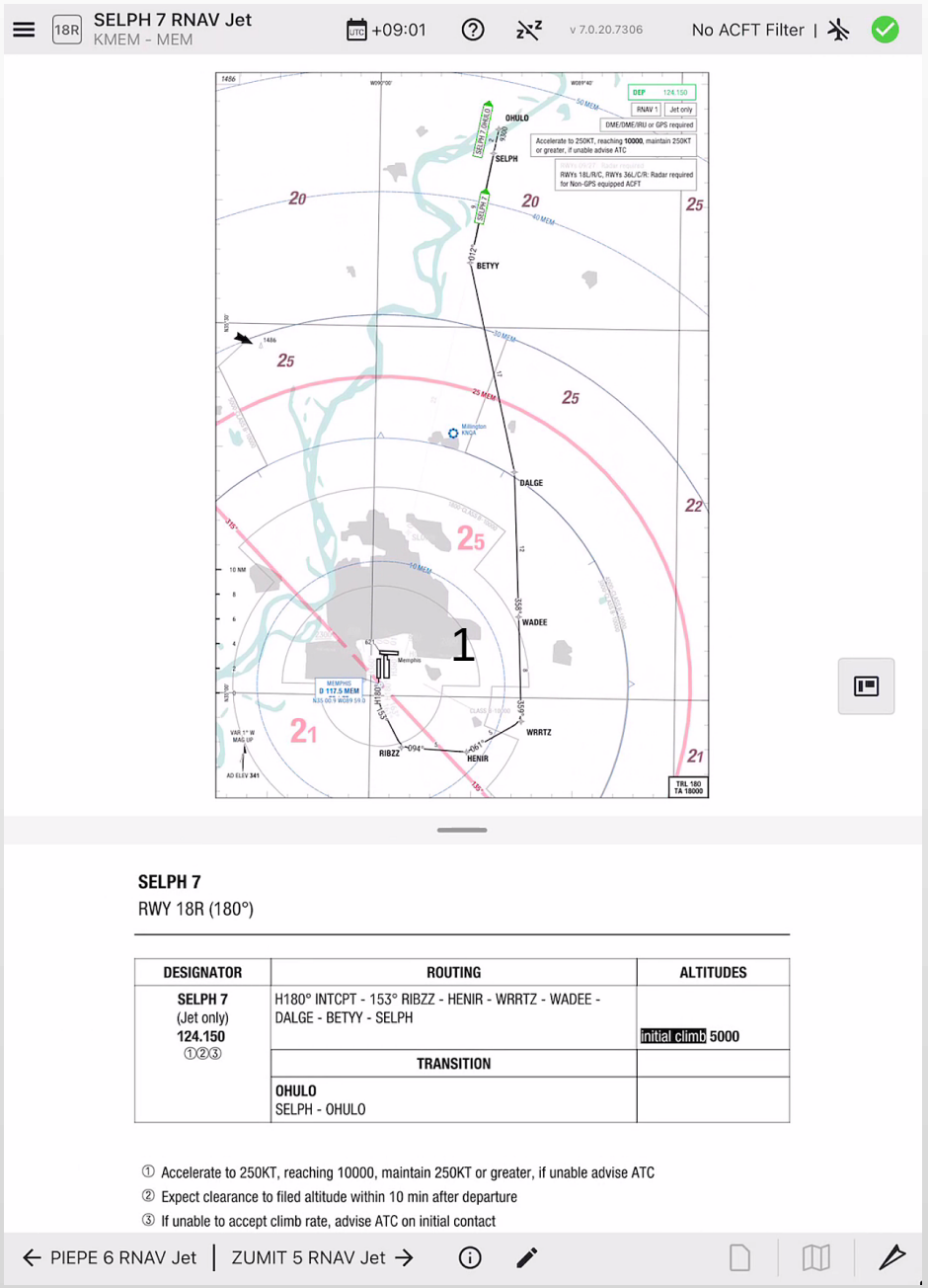
* DMI LIST ****** REFER TO MEL/CDL FOR ALL ITEMS ***************
* NONE                                                          *
***********************************************************************

------------------------DISPATCH REMARKS-------------------------
SIMULATOR TRAINING FLIGHT, FUEL FROZEN
-----------------------------------------------------------------------
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RNAV Departures

RNAV departures require entering the correct departure and runway in the FMS and then verifying the departure against the current LIDO SIDPT and/or SID chart.

Always read the departure notes.
Always verify the FMS.



Checklists
Before Start Practice

BEFORE START CHECK		
EFB Checklist	Complete	BOTH
Logbook & OFP Review	Complete	BOTH
Crew O_2 & Masks/Smoke Goggles	Checked (Qty)	BOTH
Passenger Signs	ON	F/O
LDG ELEV	Set	F/O
Altimeters	(----) Set/Cross Checked	BOTH
FMS	Set/AUTOTUNE	BOTH
Radios/Navaids	Set for Departure	CA
ADSB	GJS _____ Set	CA
Thrust Reversers	Armed	CA
Departure briefing	Complete	CA

SOP 2-8, SOP 1-11, GOM 1-2.11

Checklists
Cleared to Start

- Performed
  - After flight deck door is closed.
  - Prior to push
- Prior to any aircraft movement the CA will confirm that all passengers are seated
- The Rotating Beacon will be used to notify the ground crew that the cabin and flight crew are prepared for pushback
- Challenge and Response

CLEARED TO START CHECK	
Personal Electronic Devices.....OFF	BOTH
APU/AC Electrics.....ON/Checked	CA
Papers.....On Board	CA
Doors.....Closed/Locked	CA
Beacon.....ON	CA
Fuel pumps & Qty..... ON, (Qty)	CA
Hydraulic pumps..... AUTO/ON	CA
Parking brake.....As required	CA

Note: This is your last chance to make sure that the nosewheel steering is off, ground power removed, beacon is on, and the seat belt and no smoking signs are on prior to aircraft movement. Checking events have ended here.

SOP 1-2.9.7, SOP 2-9

Checklists
Cleared to Start Flow

- Captain
  - Personal Electronic Devices Off
  - Papers on Board
  - Fuel Pumps On
  - Hydraulic Pumps Auto/On
  - Beacon On
  - Nosewheel Steering Off
  - APU/AC Electrics On
  - Let the FO know if you will do a single or dual engine taxi, then ask the FO to call for push.
- First Officer
  - Personal Electronic Devices Off

SOP 2-8, SOP 1-11, GOM 1-2.11

Checklists
Cleared to Start Practice

CLEARED TO START CHECK	
Personal Electronic Devices.....OFF	BOTH
APU/AC Electrics.....ON/Checked	CA
Papers.....On Board	CA
Doors.....Closed/Locked	CA
Beacon.....ON	CA
Fuel pumps & Qty..... ON, (Qty)	CA
Hydraulic pumps..... AUTO/ON	CA
Parking brake.....As required	CA

SOP 1-2.9.7, SOP 2-9

Normal Start

Usually, the right engine is started first. On the first flight of the day, however, the left engine is started first to verify the fuel check valve.

The following engine instrument verification is required (silent):

Oil pressure : Verify increasing

ITT : Verify below 120°C

N_2 20%: L or R thrust lever to IDLE

L or R AUTO IGNITION msg: Appears

Fuel flow: Verify increasing

Note: Many Checklists have (On the ground) or (In flight), make sure you use the correct checklist.

Light-off : Verify increase in ITT (if looks like it may exceed 815°C, abort and call for QRH **2 START ABORT**, if it exceeded 815°C then call for QRH **Engine Hot Start**)

N_2 50%: Verify L or R ENGINE START status message disappears
(if not call for QRH 2 **NO STRTR CUTOUT**)

L or R AUTO IGNITION msg: Disappears

The following parameters indicate a **stable engine** at ISA:

N_2 :	55 – 65% rpm
Fuel flow :	Approximately 480 lbs/hr
Oil pressure:	Greater than 25 psi

Engine Starts and Malfunctions

Other ways of starting engines and engine start malfunctions will be discussed and practiced in the next lesson.

Homework:

Please review Starter Limitations, External Air start and Cross Bleed Start procedures in QRH 1.

Also review Low Oil Press, Start Abort, Hot Start, No Starter Cutout in QRH 2. What checklist will you call for if the engine does not accelerate to IDLE values?

Checklists
After Start

- Performed
  - After engine(s) stabilizes.
  - Prior to taxi
- After starting an engine, all items in the after start checklist shall be accomplished, even if the Captain elects to utilize one-engine taxi procedures.
- Items marked with a (D) are delayed engine start items. The items marked with a (D) shall be accomplished again after starting the second engine.

AFTER START CHECK	
*Fuel Check Valve ..... Checked	CA
Bleeds/Packs ..... AUTO/ON	F/O
(D) Anti-ice ..... As Required	F/O
Probes ..... ON	F/O
Transponder ..... As Required	F/O
(D) APU/Electrics ..... As Required/Checked	CA
(D) Flex Thrust ..... As Required	BOTH
Flaps ..... (--°) Indicating	BOTH
Flight Controls ..... Checked	F/O
----------	---------
Rudder ..... Checked	CA
Nosewheel Steering ..... ARMED	CA
Brake Temp ..... Checked	CA

SOP 2-10

Checklists
After Start Flow

- Captain
  - Fuel Check Valve
    (1st Flight of the Day)
  - Monitor push team and direct their disconnect once you have at least one engine started.
  - Call for Flaps and After Start
  - Once push team is clear
    - Rudder Check
    - Nosewheel Steering On
    - Brake Temperature

- First Officer
  - Has started one or both engines as directed by the Captain
  - Anti-Ice as required
  - Probes on
  - Transponder on PF position
  - Flaps when directed by the Captain
  - Flight Controls Checked

SOP 2-10

Checklists
After Start Practice

AFTER START CHECK	
*Fuel Check Valve ..... Checked	CA
Bleeds/Packs ..... AUTO/ON	F/O
(D) Anti-ice ..... As Required	F/O
Probes ..... ON	F/O
Transponder ..... As Required	F/O
(D) APU/Electrics ..... As Required/Checked	CA
(D) Flex Thrust ..... As Required	BOTH
Flaps ..... (--°) Indicating	BOTH
Flight Controls ..... Checked	F/O
----------	---------
Rudder ..... Checked	CA
Nosewheel Steering ..... ARMED	CA
Brake Temp ..... Checked	CA

SOP 2-10

Taxiing

- **Taxi Diagrams Out and On**
- **Write Down ALL Clearances**
- **FO performs the Before Takeoff Check when CA asks for it.**

Checklists
Before Takeoff

- Above the line is normally performed during taxi after flight attendant reports “Cabin Secure”. In low-visibility, high threat, etc. perform with aircraft stopped and parking brake set.
- Below the line is completed when cleared to line up and wait or cleared for takeoff
- Challenge and Response

BEFORE TAKEOFF CHECK	
T/O Fuel Qty/Balance ..... _Req _OB/CHKD	FO/CA
Fuel Crossflow .....MAN/Off	F/O
Flight Attendant .....Advised	F/O
Transponder/TCAS .....ON/AUTO	F/O
Radar/Terrain .....As Required	F/O
Flaps..... (_°) Set for Takeoff	BOTH
Takeoff data ..... Set	F/O
Trims .....Engaged, Zero & (_._)	CA
Flight Instruments.....Checked	BOTH
Takeoff Briefing .....RWY_ /Complete	PF
Runway Change Check ..... Complete/Not Required	F/O
----------	---------
CONFIRM RUNWAY_____/HDG Bug Set.....CONFIRMED/SET	FO/CA
Lights & Strobes.....As Required	CA
Ignition/Anti-ice .....As Required	F/O
CAS ..... Checked/Clear	FO/CA
T/O Config .....OK	CA

SOP 2-13

Checklists
Before Takeoff Flows

- Captain
  - Above the Line
    - Flaps
  - Below the Line
    - Lights & Strobes
    - CAS
- First Officer
  - Above the Line
    - Fuel Crossflow Manual
    - Call Flight Attendant, hear “Cabin Secure”
    - Transponder / TCAS
    - Radar / Terrain
    - Flaps
  - Below the Line
    - Ignition / Anti-Ice
    - CAS

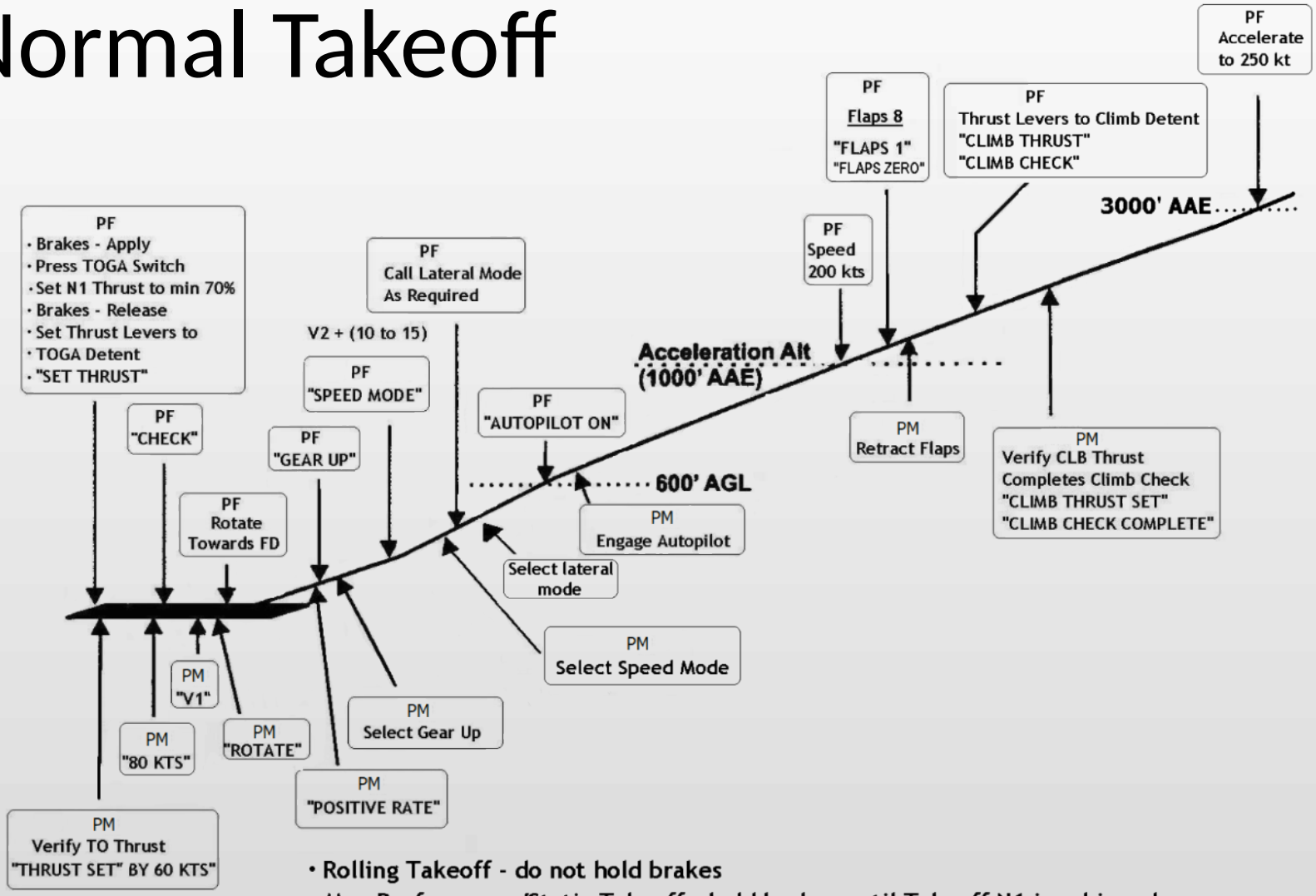
SOP 2-13

Checklists
Before Takeoff Practice

BEFORE TAKEOFF CHECK	
T/O Fuel Qty/Balance ..... _Req _OB/CHKD	FO/CA
Fuel Crossflow .....MAN/Off	F/O
Flight Attendant .....Advised	F/O
Transponder/TCAS .....ON/AUTO	F/O
Radar/Terrain .....As Required	F/O
Flaps..... (_°) Set for Takeoff	BOTH
Takeoff data ..... Set	F/O
Trims .....Engaged, Zero & (_._)	CA
Flight Instruments.....Checked	BOTH
Takeoff Briefing .....RWY_ /Complete	PF
Runway Change Check ..... Complete/Not Required	F/O
----------	---------
CONFIRM RUNWAY_____/HDG Bug Set.....CONFIRMED/SET	FO/CA
Lights & Strobes.....As Required	CA
Ignition/Anti-ice .....As Required	F/O
CAS ..... Checked/Clear	FO/CA
T/O Config .....OK	CA

SOP 2-13

Normal Takeoff



- Rolling Takeoff - do not hold brakes
- Max Performance/Static Takeoff - hold brakes until Takeoff N1 is achieved
  or
  hold brakes until 75% N1 is achieved

SEP14

Checklists
Climb Check

- Silent Read and Do except for confirming Altimeters.
- Normally completed after the aircraft is clean and climb power is selected.

CLIMB CHECK	
Landing Gear.....UP	PM
Flaps .....ZERO	PM
Fuel Crossflow..... AUTO	PM
Bleeds & APU ..... SET	PM
Thrust Reversers ..... OFF	PM
CAS .....Checked/Clear	PM
Prior to 29,000' Altimeters .....Checked	BOTH

SOP 2-15.3

Climb Speeds

Sea Level to 10,000’	250 KIAS
10,000’ and above	Long Range Climb - 250 KIAS/M 0.70✸
	Normal Climb - 290 KIAS/M 0.74
	High Speed Climb - 320 KIAS/M 0.77

- *Use of Long Range Climb is prohibited above FL320
- The minimum all engines operating climb speed/Mach above grid MORA is 250 KIAS to FL320, then accelerate in the climb to attain no less than Mach 0.74 by FL350
- Above FL350, climb at NO LESS than Mach 0.74
- If unable to maintain the minimum climb Mach specified above, and unable to maintain a minimum rate of climb of 500’ per minute, level-off and/or request a lower altitude from ATC. The aircraft has reached its effective service ceiling for the current conditions.

SOP 2-15.5

Cruise Speeds

- Below 15,000 MSL – applicable approach speed
- Above 15,000 MSL: At no time should the aircraft be flown at less than **Mach .70** or driftdown speed, whichever is higher.
- The driftdown speed is based on the aircraft's weight and altitude and may be found in the speed cards located in the CRJ QRH Volume 1. This will provide adequate protection from stall while maneuvering up to at least 1.3g.

SOP 1-6.3.3, 2-16.2

Cruise Checks

- Cruise Fuel Check: As stated in GOM 3-2.2.17, Captains on flights scheduled for flight times of one (1) hour or more must record the actual fuel burn and actual time from brake release on the flight plan at the first fix beyond the top of climb (ToC)
- Cruise Altimeter Check: When operating in RVSM airspace, both primary and stand-by altimeters should be cross-checked at least once per hour. At a minimum, the two primary altimeters should agree with a maximum difference of 200’ or less. If there is a difference greater than 200’, the altimetry system should be reported to ATC as being suspect, and a discrepancy entered in the aircraft logbook.
- ATC Shortcuts: No GoJet aircraft shall be operated more than 50nm off any shoreline during normal operations.

SOP 2-16.5, 2-16.7, 2-16.9,

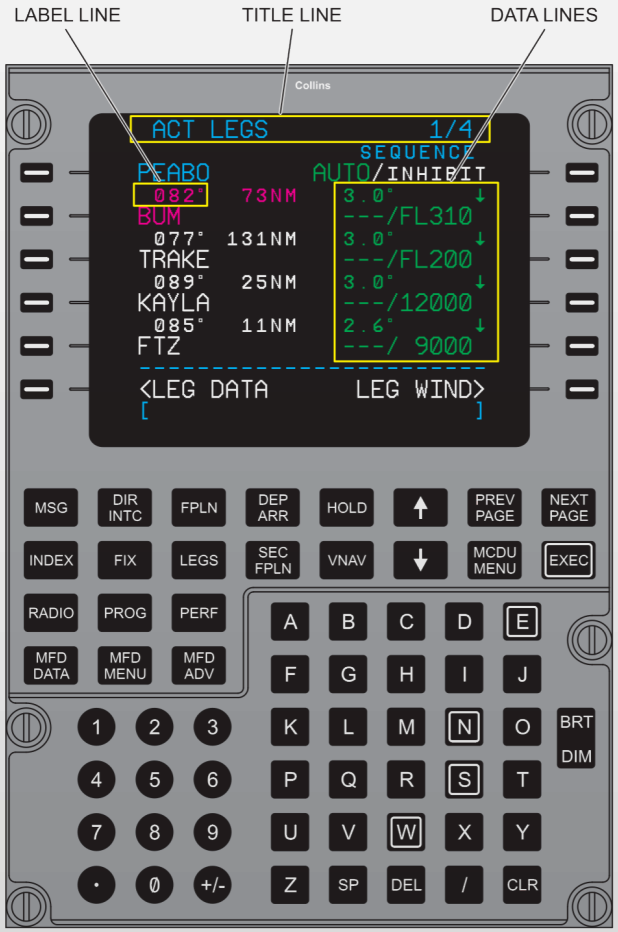
FMS Entries & Reroutes

For this lesson FMS Initialization and Flight Plan Entry will be Instructor Demonstration.

Next lesson and follow-on lessons, each PM will set up the FMS, please let your instructor know when you start programming the FMS so your entries can be observed.

The following slides will introduce:

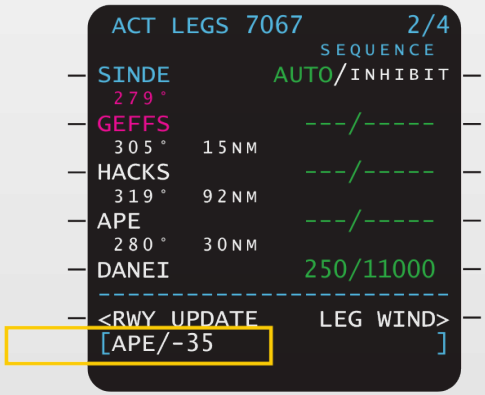
- FMS Waypoints
- FMS Tracking
- FMS Holding



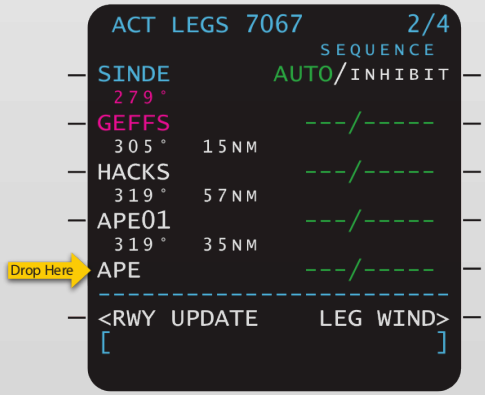
FMS – Waypoints

Along Course Waypoints

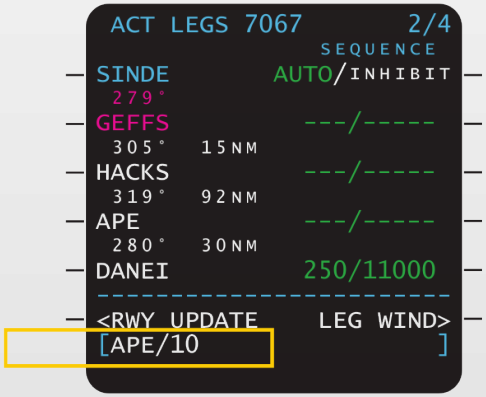
1. Create the waypoint, 35 nm this side of APE in the scratchpad:
   APE/-35



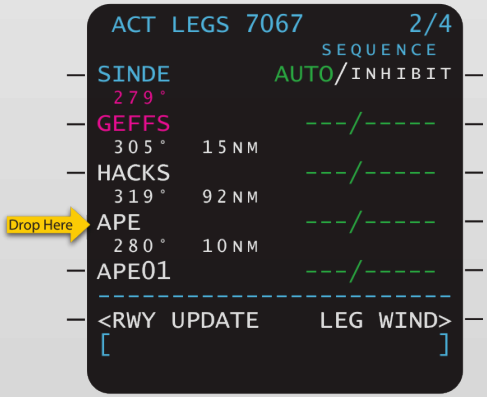
2. Drop on top of the waypoint on which it was based:
   The FMS will "auto-place" the waypoint where it belongs.



3. Create the waypoint, 10 nm on the other side of APE in the scratchpad:
   APE/10



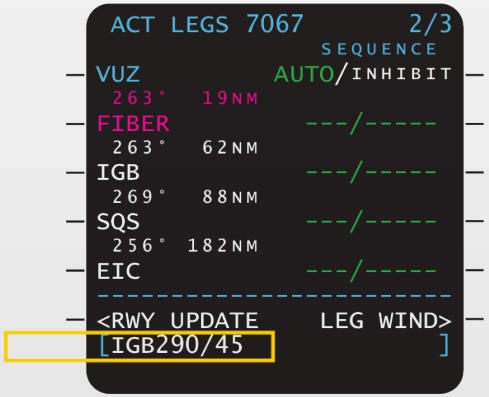
4. Drop on top of the waypoint on which it was based:
   The FMS will "auto-place" the waypoint where it belongs.



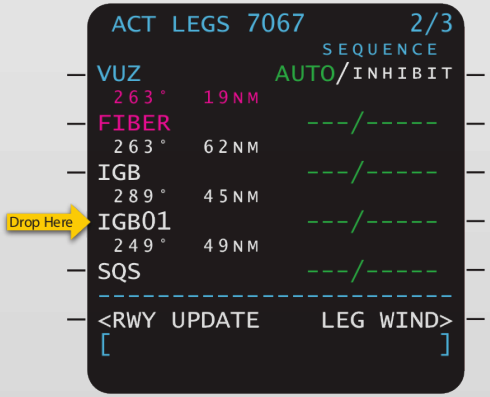
FMS – Waypoints

Place/Bearing/Distance

1. Create a waypoint on the IGB VOR Radial 290 at 45 DME:
   IGB290/45

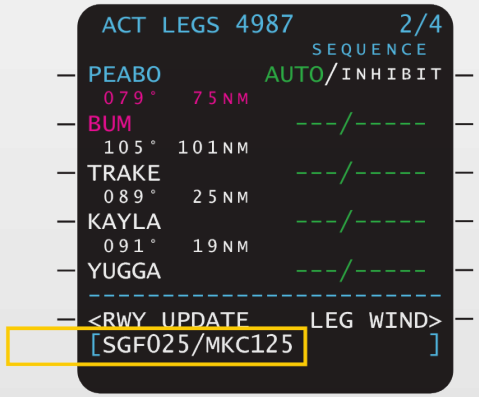


2. Drop the waypoint where it belongs:
   The FMS will **not** "auto-place" the waypoint.

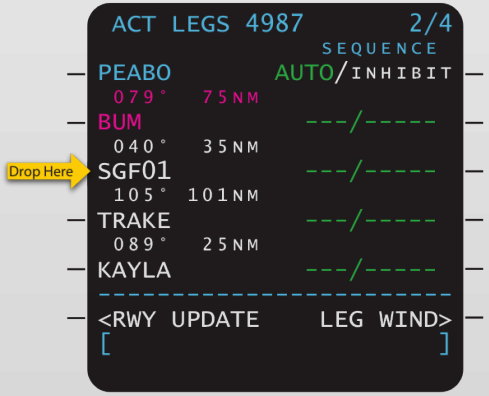


Place Bearing/Place Bearing

1. Create a waypoint at the crossing of the SGF VOR Radial 025 and the MKC VOR Radial 125:
   SGF025/MKC125

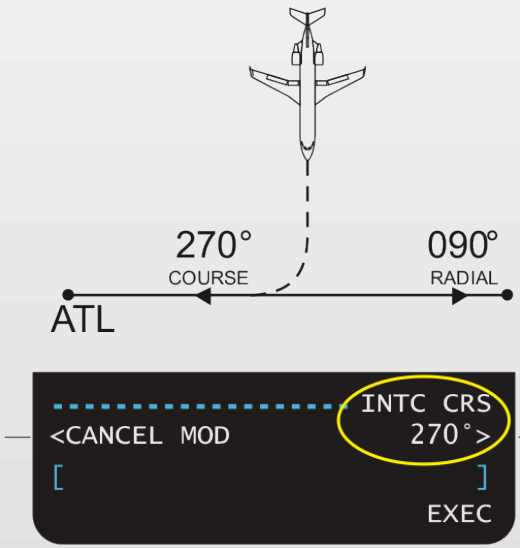


2. Drop the waypoint where it belongs:
   The FMS will not "auto-place" the waypoint.



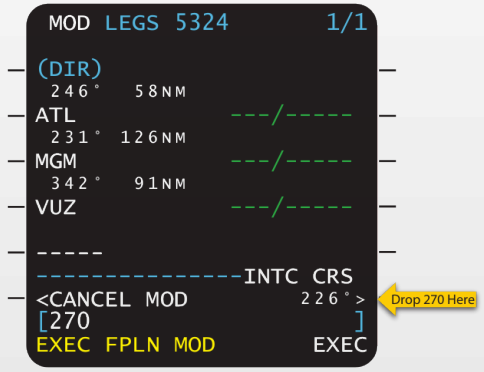
FMS – Tracking

Track a Radial Inbound

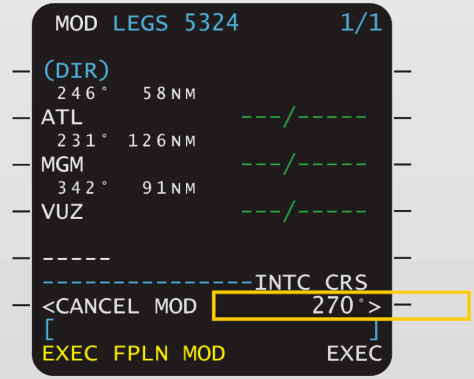


Example: "Fly heading 180. Intercept and track inbound on the ATL 090 degree radial."

1. On the LEGS page:
   Place the fix in the TO line (line select 2L).



2. On the INTC CRS line (line select 6R):
   Place the inbound course (in this case, 270).

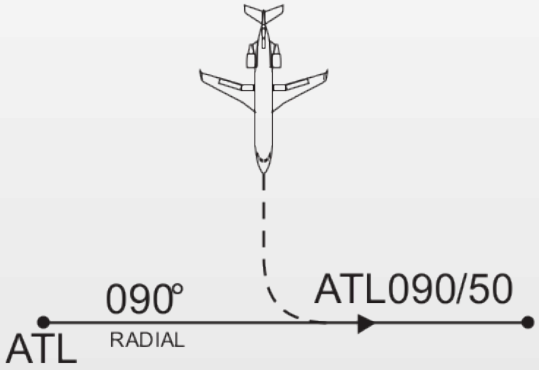


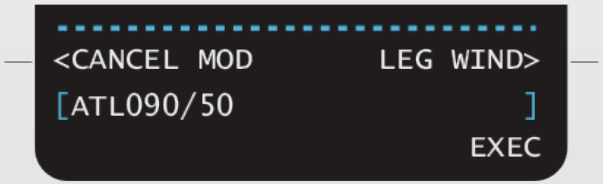
Tracking the 090 degree radial inbound results in a 270 degree course.

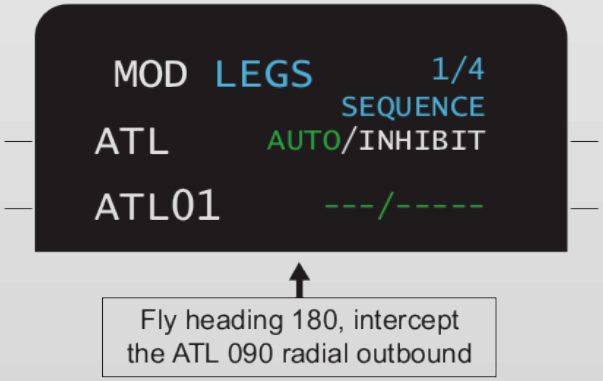
When you first put something in the TO line (line select 2L), the FMS assumes you want to fly direct to that fix. If you do not want to fly direct, you must define how you want to arrive at that fix.

FMS – Tracking

Track a Radial Outbound



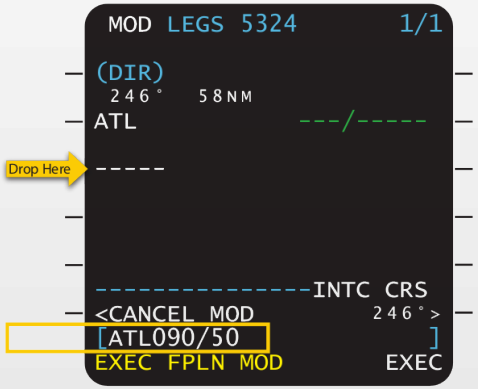




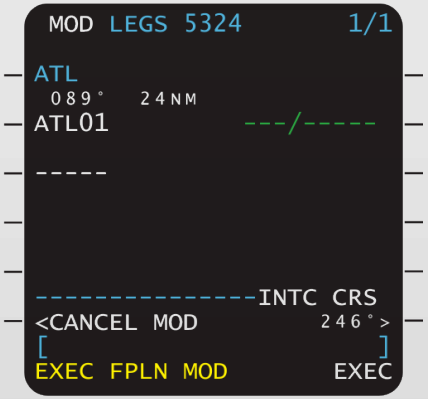
Example: "Fly heading 180. Intercept and track outbound on the ATL 090 degree radial."

On the LEGS page:

1. Create a waypoint on the intended radial that is far enough out that you will not reach it.
2. ATL090/50



3. Insert the waypoint directly after the NAVAID upon which the radial is based.



4. If the intercept will be after the NAVAID, put it behind you by dropping it in the FROM line (line select 1L).

The FMS cannot track away from a waypoint. To track outbound, you must create a fix that lies along the intended course. The distance is arbitrary, but must be far enough that it will never be reached.

FMS – Holding

Holding at a Waypoint on the Flight Plan

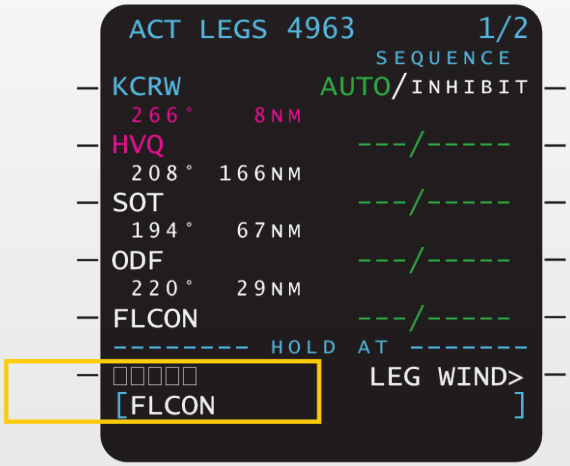
The only holds pre-programmed into the FMS are those that are part of Instrument or Missed Approach Procedures. When a hold waypoint is selected, the FMS defaults to hold on the inbound or current heading, right-hand turns, and 1.0 or 1.5 minutes legs, depending on altitude. These defaults could appear very similar to the published hold.

Always verify that the selected holding course, turn direction, and leg length match your clearance.

S.A.F.E: Speed, Altitude, Fuel, EFC

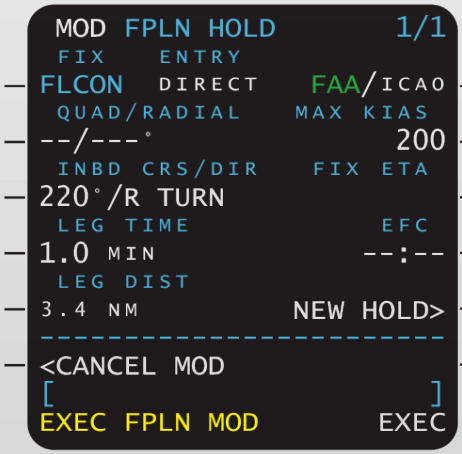
From the LEGS page:

1. Select the HOLD function key on the CDU.
2. The HOLD AT field will display at line select 6L.



If one or more holds are already programmed into the FMS, the ACT FPLN HOLD page or ACT HOLD LIST page will be displayed. In this case, push NEW HOLD.

- Select the waypoint from the flight plan (in this case FLCON) and drop it on the HOLD AT line (line select 6L).



FMS – Holding

Holding at a Waypoints Not on the Flight Plan

From the LEGS page:

1. Push the HOLD key

2. If the ACT FPLN HOLD page or the ACT HOLD LIST page is showing, push NEW HOLD.

3. Insert the waypoint in the HOLD AT prompt.

4. Select the waypoint the HOLD will precede.

5. Change the defaults to match your clearance as required.

FMS – Holding
Present Position Holding

From the LEGS page

1. Push the HOLD key.

2. If the ACT FPLN HOLD page or the ACT HOLD LIST page is showing, push NEW HOLD.

3. Push the PPOS line select key to show the HOLD page with the present position as the holding fix.

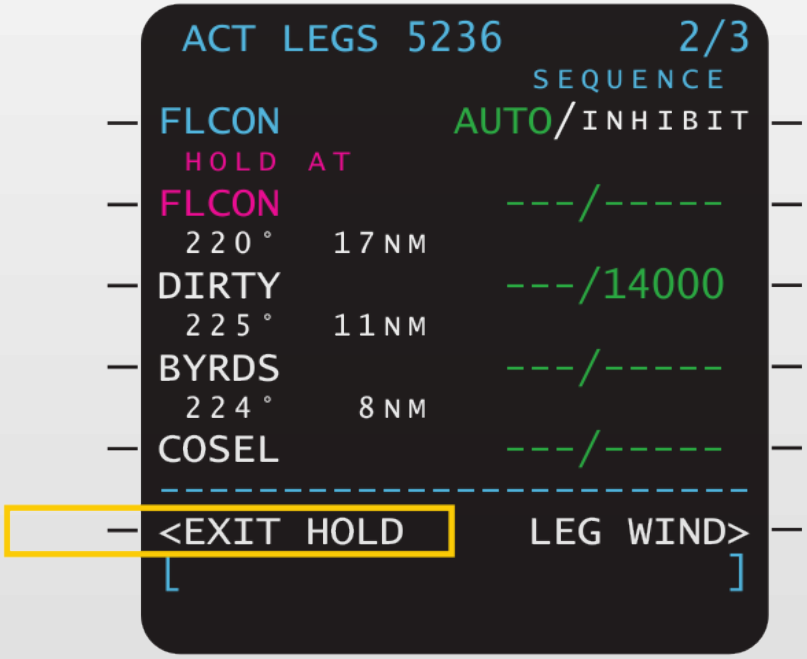
4. Change the defaults to match your clearance as required.

FMS – Holding
Exit Holding

From the LEGS page:

1. Select EXIT HOLD (line select 6L); or

2. Place another waypoint in the flight plan on the TO line (line select 2L).



Airwork Introduction

SOP Section 1-5

Stalls

- Clean
- Takeoff
- Landing

Steep Turns

Baseline Pitch and Power Settings for Straight and Level Flight at 5,000ft/Clean

Speed	Approximate Pitch	Approximate Thrust
250	1 - 1 ½ degrees	59% N1
200	4 degrees	54% N1 (Land the Spaceship)

Aircraft Configuration for Airwork

	Steep Turns	Clean Stall	Takeoff Stall	Landing Stall
Approx. Thrust	64% N1	45% N1	45% N1	45% N1
Flaps	0	0	20	45
Gear	Up	Up	Down	Down
Autopilot	Off	Off	Off	On
Flight Director	Off	On	Off	On
Speed Brakes	Closed	Open	Closed	Closed
Bank Angle	45°	0	20° @ 150kts	0
Pink Bug	250	200	200	200
Blue Bugs	n/a	n/a	V2(ga) 136	V2ga 136
			VT 179	VT 179

Steep Turns

The objective of the steep turn maneuver is to familiarize pilots with the airplane handling characteristics and improve the instrument panel scan. **Steep turns will be done with autopilot and flight director off**. Brief PM to call 15 degrees prior to start your rollout.

Entry:

- stabilizes aircraft at 250 KIAS
- smoothly roll the aircraft into a 45° bank turn
- increase N 1 by approximately 2% to 3%, (approximately 62-63%)
- use approximately 3° nose-up pitch to maintain altitude

Recovery:

15° prior to desired heading, start rolling out and reduce thrust as necessary to maintain 250 KIAS.

Stalls: Clean

The clean stall is meant to simulate an approach to stall condition during the normal cruise phase of flight. The airplane should be **configured in the cruise configuration without the use of the autopilot (Flaps – 0, Gear – UP).**

Aircraft buffet, uncommanded roll, stick shaker activated and/or stall warbler on:

1. Autopilot ..... Disengage, if required
2. Pitch attitude ..... Lower nose to reduce angle of attack
3. Thrust levers ..... Advance to MAX POWER
4. Roll attitude ..... Wings level
5. FLIGHT SPOILER ..... RETRACT

After airspeed increases and stall warning goes out:

6. Pitch attitude ..... Adjust to minimize altitude loss
7. Thrust levers and aircraft configuration ..... Adjust as required

Note 1: It is essential that the AOA be immediately reduced, even if this means a loss of altitude.

Note 2: Avoid abrupt or aggressive pitch control inputs during recovery. Inappropriate recovery inputs can result in a secondary stall.

Note 3: Height loss resulting from high AOA recovery, especially at cruise altitude and/or low initial thrust conditions, can be significant.

Stalls: Takeoff

The Takeoff Stall is meant to simulate an approach to stall in the takeoff phase of flight. The aircraft should be **configured for a flaps 20 takeoff without the use of the autopilot (Gear – DOWN, Flaps - 20, Left/Right Bank**).

Aircraft buffet, un-commanded roll, stick shaker activated and/or stall warbler on:

1. Autopilot	Disengage, if required
2. Pitch attitude	Lower nose to reduce angle of attack
3. Thrust levers	Advance to MAX POWER
4. Roll attitude	Wings level
5. FLIGHT SPOILER	RETRACT

After airspeed increases and stall warning goes out:

6. Pitch attitude	Adjust to minimize altitude loss
7. Thrust levers and aircraft configuration	Adjust as required

Note 1: It is essential that the AOA be immediately reduced, even if this means a loss of altitude.

Note 2: Avoid abrupt or aggressive pitch control inputs during recovery. Inappropriate recovery inputs can result in a secondary stall.

Note 3: Height loss resulting from high AOA recovery, especially at cruise altitude and/or low initial thrust conditions, can be significant.

Stalls: Landing

The Landing stall is meant to simulate an approach to stall in the landing configuration. The aircraft should be **configured for landing with the autopilot on (Gear – DOWN, Flaps – 45)**.

Aircraft buffet, un-commanded roll, stick shaker activated and/or stall warbler on:

1. Autopilot	Disengage, if required
2. Pitch attitude	Lower nose to reduce angle of attack
3. Thrust levers	Advance to MAX POWER
4. Roll attitude	Wings level
5. FLIGHT SPOILER	RETRACT

After airspeed increases and stall warning goes out:

6. Pitch attitude	Adjust to minimize altitude loss
7. Thrust levers and aircraft configuration	Adjust as required

Note 1: It is essential that the AOA be immediately reduced, even if this means a loss of altitude.

Note 2: Avoid abrupt or aggressive pitch control inputs during recovery. Inappropriate recovery inputs can result in a secondary stall.

Note 3: Height loss resulting from high AOA recovery, especially at cruise altitude and/or low initial thrust conditions, can be significant.

Checklists
Descent

- The Banana Bar and the Snowflake are your friends, use them. Otherwise, plan 3 miles per thousand feet and advance the TOD point by 2 miles for each 10 knots of tailwind, and by 2 miles for each 1,000 feet of anti-ice use.
- Normally, descent is initiated with partial cruise thrust at high altitude (approximately 80% N 2) and in the clean configuration (no flight spoilers).
- If a descent at “pilot’s discretion” is given by ATC and the altitude change is 6,000’ or less, the PF shall initiate the descent immediately unless the immediate descent would take you into inclement weather.
- Unless otherwise instructed by ATC, plan to arrive at 10,000 AGL, 30 miles from the airport at 250 KIAS.

SOP 1-9.11.1, 2-16.5, 2-16.7, 2-16.9

Checklists
Descent Speeds

Descent Speed Schedule		
10,000’ and above	Long Range Descent	– M 0.70/250 KIAS
	Normal Descent	– M 0.74/290 KIAS
	High Speed Descent	– M 0.77/320 KIAS
Below 10,000’	250 KIAS	

SOP 2-16.5, 2-16.7, 2-16.9,

Checklists
In Range

- Normally performed after descending below 18,000’.
- Challenge and Response

IN RANGE CHECK	
Sterile Light ..... ON	PF/PM
LDG ELEV ..... Set	PM
Fuel ..... Checked	PF
Altimeters ..... (----) Set/Cross Checked	BOTH
Radar/Terrain ..... As Required	PM
CAS ..... Checked/Clear	BOTH
Landing Data ..... Set/Checked	BOTH
Approach Briefing ..... Complete	PF

SOP 2-13

Checklists
In-Range Flows

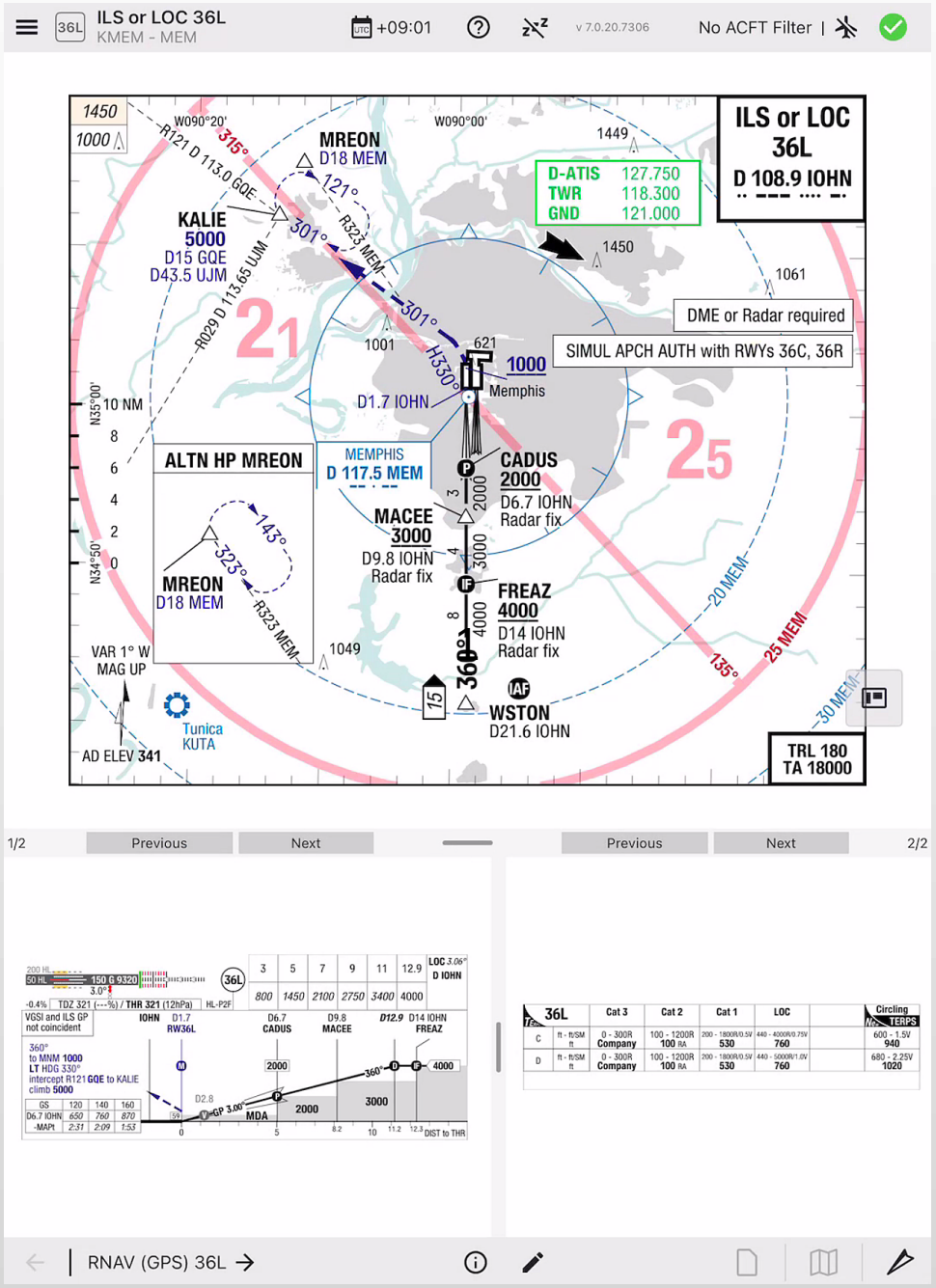
- At or before the In-Range Check
- † FMS arrival and approach programming
- ‡ Transfer of controls to PM is optional during low workload and low threat environments with the autopilot engaged.
- Note: The approach should be loaded in the FMS, when available, to aid in situation awareness, but must be loaded in the FMS when the FMS is used to navigate the approach procedure (i.e., GPS approach, VOR approach in white needles, etc.).
- Vref may be inserted as a speed constraint on the LEGS page abeam the runway or missed approach point, depending on the approach flown.
- • With PF concurrence, execute the FMS modification if appropriate.
    - It is mandatory that both pilots verify all FMS lateral and vertical programmed information against the current published procedures.
    - If a discrepancy exists between the FMS and the published procedure, the published procedure must be used.
    - As a general rule, any time the NAV data is selected to FMS (white needles) the respective radio should be in AUT (autotune).
    - Any changes to an approach after the initial briefing should be re-briefed in accordance with this section

Approach Preparation	
PF	**PM**
—	Get ATIS
—	Set landing data: V_{REF}, V_{2GA}, V_T
—	Preset approach frequencies on RTUs
Select bearing pointers (if applicable)	
Set final course	
Set DDA/MDA	
—	† Program the FMS
‡ Transfer control to PM, do not transfer Flight Director	‡ Take control
Brief approach and verify FMS & RTUs	—
‡ Take control	‡ Transfer control to PF

SOP 2-18.1

Approach Briefing

Please brief this approach:

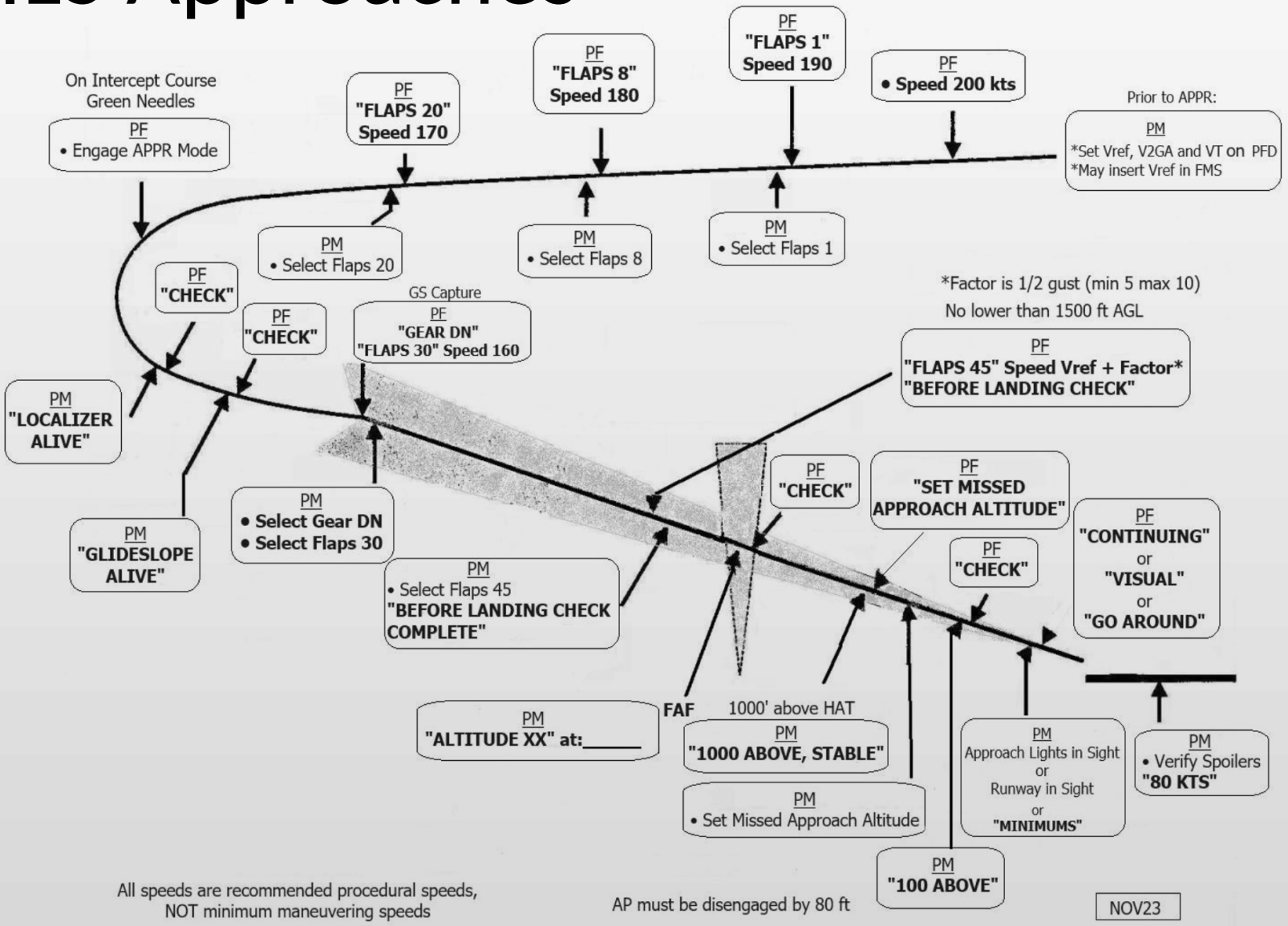


Checklists
In Range Practice

IN RANGE CHECK	
Sterile Light ..... ON	PF/PM
LDG ELEV ..... Set	PM
Fuel ..... Checked	PF
Altimeters ..... (----) Set/Cross Checked	BOTH
Radar/Terrain ..... As Required	PM
CAS ..... Checked/Clear	BOTH
Landing Data ..... Set/Checked	BOTH
Approach Briefing ..... Complete	PF

SOP 2-13

ILS Approaches



Checklists
Before Landing

- Normally performed after final gear and flaps selection
- Pilot Monitoring Flow
  - Flight Attendant Chime (just press the Chime button, you do not have to select PA first)
  - Arm Thrust Reversers

BEFORE LANDING CHECK	
Flight Attendant ..... Advised	PM
Thrust Reversers ..... ARMED	PF
Landing Gear ..... Down	Both
Flaps ..... (--°) indicating	Both
Flight Spoilers ..... Stowed	Both

SOP 2-21

Checklists
After Landing

- Performed by the FO when the aircraft is clear of the active runway.
- Read and Do

AFTER LANDING CHECK	
APU ..... As Required	F/O
Radar ..... OFF	F/O
Flaps ..... Up	F/O
Lights & Strobes ..... As Required	F/O
Probes ..... OFF	F/O
Trims ..... Zero & 7.0	F/O

SOP 2-22

Checklists
Shutdown Check

- Taxiing in just short of gate, FO reaches up to seat belt sign.
- As the parking brake is set, the seat belt sign is turned off.
- Once the chocks are in, the seat belt sign is selected on and off, letting the FA know it is safe to open the main cabin door.
- Challenge and Response

SHUTDOWN CHECK		
Chocks & Brakes	As Required	CA
Electrics	Set	CA
*Fuel Check Valve	Checked	CA
Thrust Levers	Shut Off	CA
Transponder	STBY	F/O
Seat Belts	OFF	F/O
Anti-ice	OFF	F/O
Fuel Pumps	OFF	CA
Hydraulic Pump 3A	As Required	CA
Beacon	OFF	CA
Nosewheel Steering	OFF	CA

SOP 1-6.9.11, 2-23

Checklists
Shutdown Check Flow

- Captain
  - Chocks & Brakes
  - Electrics
  - *Fuel Check Valve
  - Bleed Valves Closed
  - Thrust Levers Shut Off
  - Bleed Valves Auto
  - Fuel Pumps Off
  - Hydraulic Pump 3A Off
  - Beacon Off
  - Nosewheel Steering Off
- First Officer
  - Transponder Standby
  - Seat Belts Off
  - Anti-Ice Off

SOP 2-23.1

Checklists
Shutdown Check Practice

SHUTDOWN CHECK		
Chocks & Brakes	As Required	CA
Electrics	Set	CA
*Fuel Check Valve	Checked	CA
Thrust Levers	Shut Off	CA
Transponder	STBY	F/O
Seat Belts	OFF	F/O
Anti-ice	OFF	F/O
Fuel Pumps	OFF	CA
Hydraulic Pump 3A	As Required	CA
Beacon	OFF	CA
Nosewheel Steering	OFF	CA

SOP 2-22

Checklists
Terminating Check

- Can be performed by either pilot
- Read and Do

TERMINATING CHECK		
Recirc Fan	OFF	CA
Chocks & Brakes	In & ON	CA
Starlink Power Switch	OFF ILLUMINATED	CA
Thrust Reversers	OFF	CA
IRS 1 & 2 (if equipped)	OFF	CA
Emergency Lights	OFF	CA
Windshield Heat	OFF	CA
CARGO Switch	OFF	CA
Hydraulic Pumps	OFF	CA
External Lights	OFF	CA
APU START	OFF	CA
APU PWR/FUEL	OFF	CA
DC Service	OFF	CA
External AC Power Switch	OFF	CA
Battery Master	OFF	CA
Dome Lights	OFF	CA
Boarding Lights	OFF	CA

SOP 2-24

After Landing

Taxi Diagrams Out and On

Write Down ALL Clearances

FO performs the After Landing Checklist when CA asks for it.

On the first shutdown of the day, the fuel check valve verification will be accomplished. Normally this task should be performed by the F/O.

Left Engine ..... Shut down

L & R BOOST PUMPS switchlights..... OFF

Ensure L FUEL LO PRESS and L & R FUEL PUMP caution message display.

If after two (2) minutes and the FUEL LO PRESS caution message is still not displayed:

Ensure engine hazard area is clear

Left engine ..... Dry motor (30 seconds max)

L FUEL LO PRESS caution message should be displayed during motoring as the residual fuel pressure is reduced.

Debrief

- ✓ How did you do as Pilot Flying?
- ✓ How did you do as Pilot Monitoring?
- ✓ Instructor Feedback
- ✓ Review and Initial Training Forms
- ✓ Homework

Engine Failures in Flight

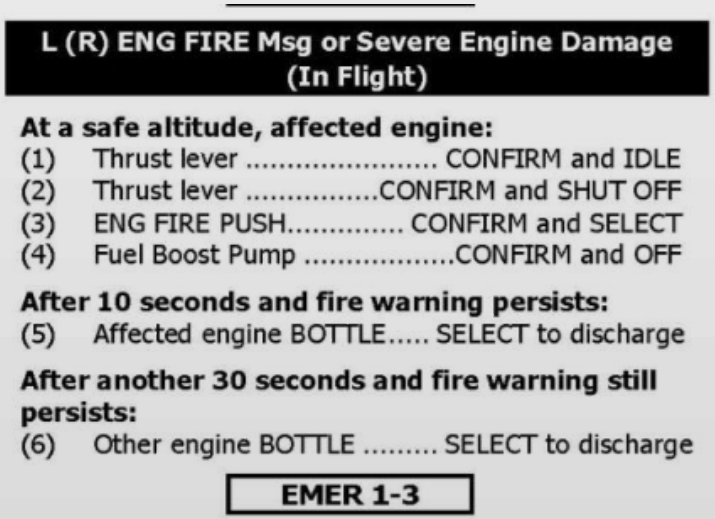
Engine Flameout (L ENG FLAMEOUT or R ENG FLAMEOUT)

- Not on the Immediate Action Checklist, refer to the QRH (Abnormal 1-15)
- Check for oil pressure and quantity, fans turning (N_1 and N_2), no unusual noises or vibrations, etc.
- Restartable

Engine Damage & Engine Fire

- On the Immediate Action Checklist
- Not Restartable

SOP Section 1-4.23.5 provides a sample dialog for a Left Engine Fire Indication.



L (R) ENG FIRE Msg or Severe Engine Damage (In Flight)

At a safe altitude, affected engine:

(1) Thrust lever ..... CONFIRM and IDLE
(2) Thrust lever .....CONFIRM and SHUT OFF
(3) ENG FIRE PUSH..... CONFIRM and SELECT
(4) Fuel Boost Pump .....CONFIRM and OFF

After 10 seconds and fire warning persists:

(5) Affected engine BOTTLE..... SELECT to discharge

After another 30 seconds and fire warning still persists:

(6) Other engine BOTTLE ..... SELECT to discharge

EMER 1-3

Next Lesson – HOMEWORK!

- ❑ What do you need for a 600 RVR Takeoff?
- ❑ Read QRH 2 ABNORM 1-1 through 1-11, 1-15.
- ❑ Please review Starter Limitations, External Air start and Cross Bleed Start procedures in QRH 1.
- ❑ Also review Low Oil Press, Start Abort, Hot Start, No Starter Cutout in QRH 2. What checklist will you call for if the engine does not accelerate to IDLE values?
- ❑ Review Non-Precision Approaches and CANPA in the SOP.
- ❑ Callouts for the 2 Engine Missed Approach.