Pilot New Hire
Systems Integration Training

Modules 5 & 6

Normal Procedures Reinforcement

Abnormal/Emergency Procedures

Objectives
Normal Procedures Reinforcement

- Know the normal procedures and profiles for Takeoff, Cruise, Approach, Landing, and Shutdown.
- Know how to properly complete the Normal Checklists associated with each phase of flight at the appropriate time.
- Obtain practice performing the Normal Procedures and Checklists for each phase of flight with an emphasis on callouts, responses, and profiles.
- Obtain practice using the FMS to perform different functions that may be necessary during normal line operations.

Objectives
Abnormal/Emergency Procedures

- Know how to navigate and complete the Abnormal and Emergency procedures in the QRH.
- Know the procedures and profiles for Emergency Descent, Smoke/Fire, Engine Failure, Single-Engine Approach, and Emergency Evacuations.
- Obtain practice using the Immediate Action Checklist and QRH to help manage Abnormal and Emergency Scenarios that may be encountered in the operation of the CRJ.
- Obtain practice performing profiles for Emergency Descents and Single-Engine Drift Down.

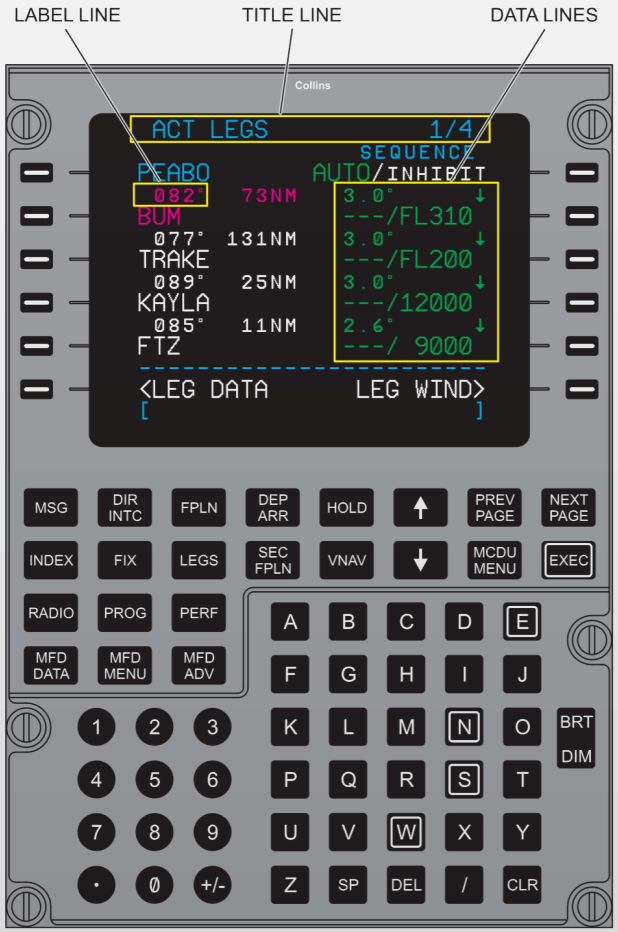
FMS Entries & Reroutes

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.

Later slides will introduce:

- FMS Waypoints
- FMS Tracking
- FMS Holding



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

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

Practice Dispatch Release and Clearance

- Dispatch release in the student handout
- Weather: 27010KT 1/2SM R18R/1800FT FG OVC002 20/15 A2992
- Aircraft: TOW 61,000 LBS, FUEL 9,000 LBS, MIN 8,000 LBS, RSV 2,088 LBS, TRIM 6.0
- Clearance: KMEM as filed, climb via the SID, maintain 5,000 expect FL190 in 10 min, Dep 124.15, Squawk 5523

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 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

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

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

Cross Bleed (Blue Checklist)

ENGINE START – CROSS-BLEED

BLEED VALVES..... AUTO

ECS page..... Select and monitor

Thrust lever (operating engine)..... Advance to achieve 42 psi to a maximum of 80% N_2

Engine..... START

NOTE

If thrust lever was advanced to achieve 42 psi, reduce to idle after starter cutout.

Abnormal Starts

What are the indications of, and what checklists do we call for the following?

L START VALVE or R START VALVE

L START ABORT or R START ABORT

NO STRTR CUTOUT

Engine Hot Start

Engine Hung Start

L or R ENG OIL PRESS

L ENG FIRE or R ENG FIRE

Post-Start Engine Limitations

- The engine must remain at IDLE until oil pressure reaches normal operating range.
- During all starts, do not exceed 75% N_1 for two (2) minutes after start, or until all operating indications are in the normal range, whichever is longer.

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 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

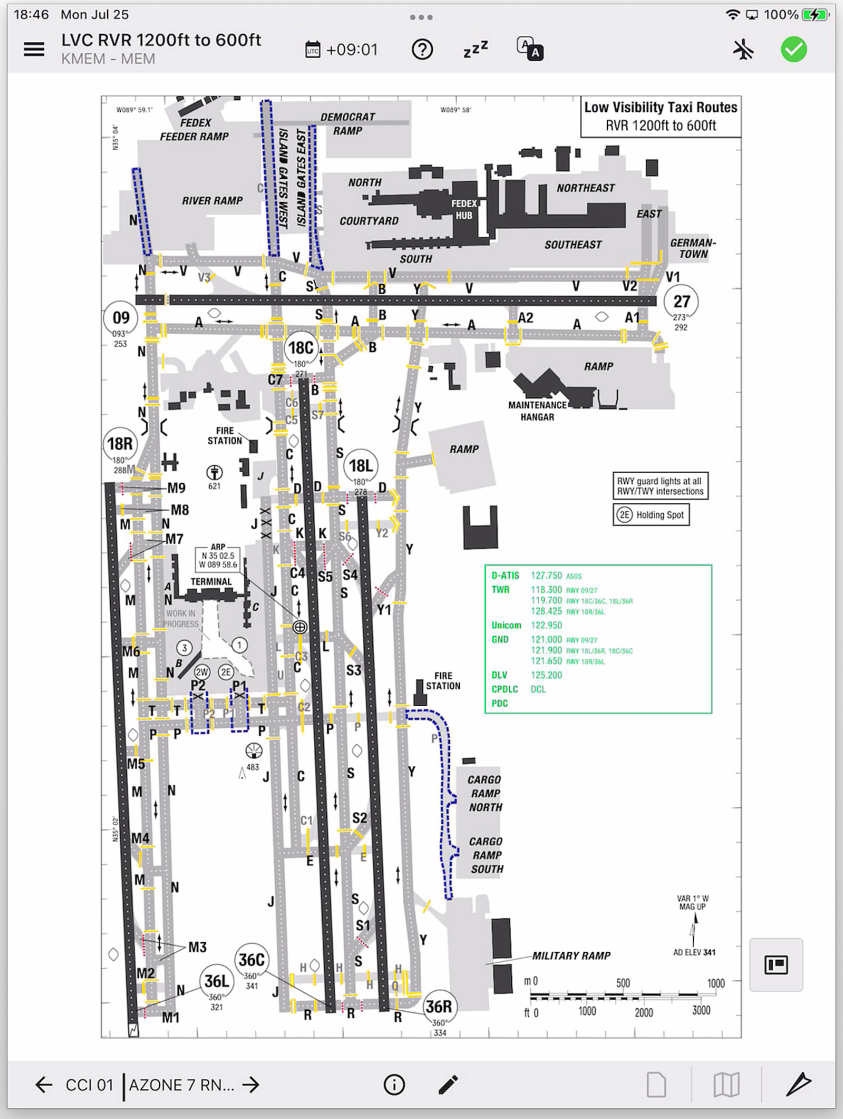
SOP 2-10

Low Visibility Taxi

GOM 3-1.4.1

Extra caution should be used during the taxi of aircraft during times of low visibility. These items should include, but not limited to: not using checklists, extra awareness in location on the airport (referencing the airport diagram low visibility taxi charts), attention to signage, using available references in the cockpit (heading indications), development/briefing of the planned taxi route, transcription of taxi instructions, not stopping on a runway, use of standard read back instructions (using full call sign and flight number).

Maintaining a sterile cockpit should alleviate all unwanted distractions, make sure to read back all changes in taxi clearances. When in doubt ask, better to ask and be certain, than to be involved in an incursion. Be sure that both crewmembers are aware of aircraft position and direction at all times, and that if you are unsure about any aspect of the taxi, to clarify. The PIC should brief the SIC that if he feels there is an imminent danger of an incursion, to feel free to stop the aircraft.



Taxiing

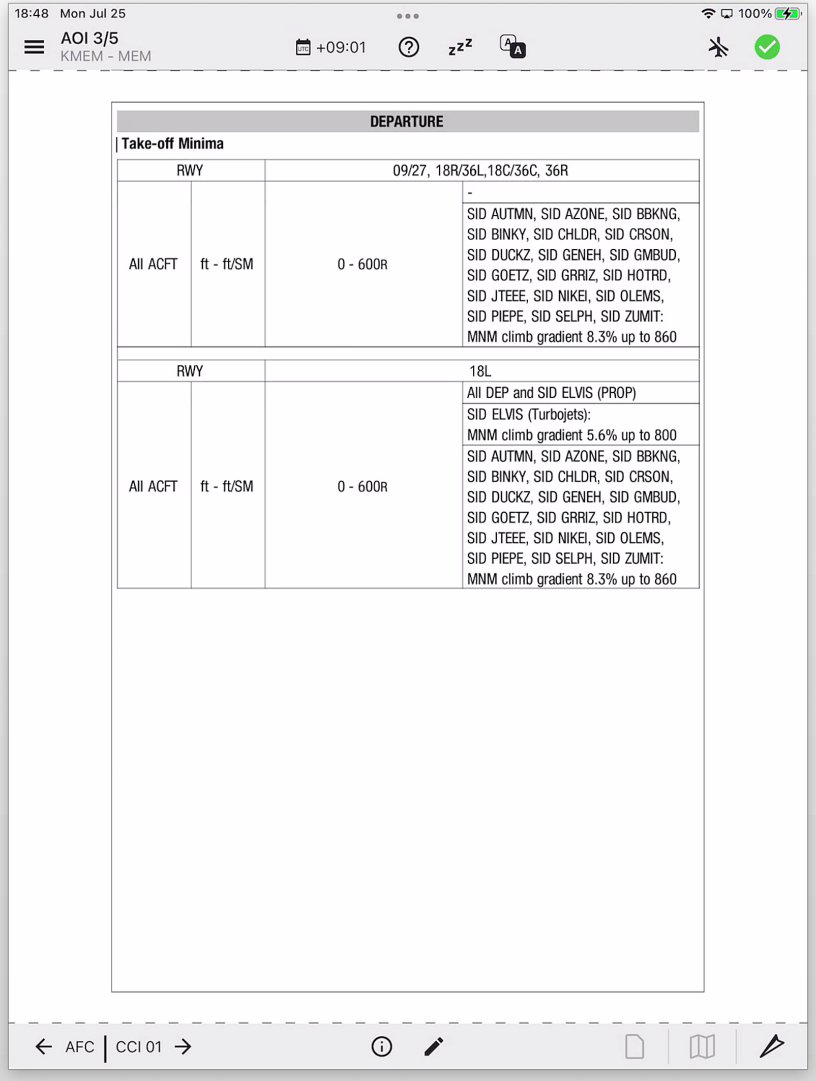
- **Taxi Diagrams Out and On**
- **Write Down ALL Clearances**
- **FO performs the Before Takeoff Check when CA asks for it.**

Low Visibility Takeoff

SOP 1-4.19

Except as otherwise allowed by the GOM, the CA will make the takeoff when weather is below landing minimums. Prior to takeoff the CA shall brief the F/O on the following:

- Current reported RVR or visibility and the visibility required for takeoff (from operations specifications and approach plates).
- Filed takeoff alternate.
- Any other particular items concerning the flight, (e.g., MEL items, CAS messages, etc.)



DEPARTURE

Take-off Minima

RWY		09/27, 18R/36L,18C/36C, 36R	
All ACFT	ft - ft/SM	0 - 600R	-
			SID AUTMN, SID AZONE, SID BBKNG, SID BINKY, SID CHLDR, SID CRSON, SID DUCKZ, SID GENEH, SID GMBUD, SID GOETZ, SID GRRIZ, SID HOTRD, SID JTEEE, SID NIKEI, SID OLEMS, SID PIEPE, SID SELPH, SID ZUMIT: MNM climb gradient 8.3% up to 860
RWY		18L	
All ACFT	ft - ft/SM	0 - 600R	All DEP and SID ELVIS (PROP)
			SID ELVIS (Turbojets): MNM climb gradient 5.6% up to 800
			SID AUTMN, SID AZONE, SID BBKNG, SID BINKY, SID CHLDR, SID CRSON, SID DUCKZ, SID GENEH, SID GMBUD, SID GOETZ, SID GRRIZ, SID HOTRD, SID JTEEE, SID NIKEI, SID OLEMS, SID PIEPE, SID SELPH, SID ZUMIT: MNM climb gradient 8.3% up to 860

Low Visibility Takeoff

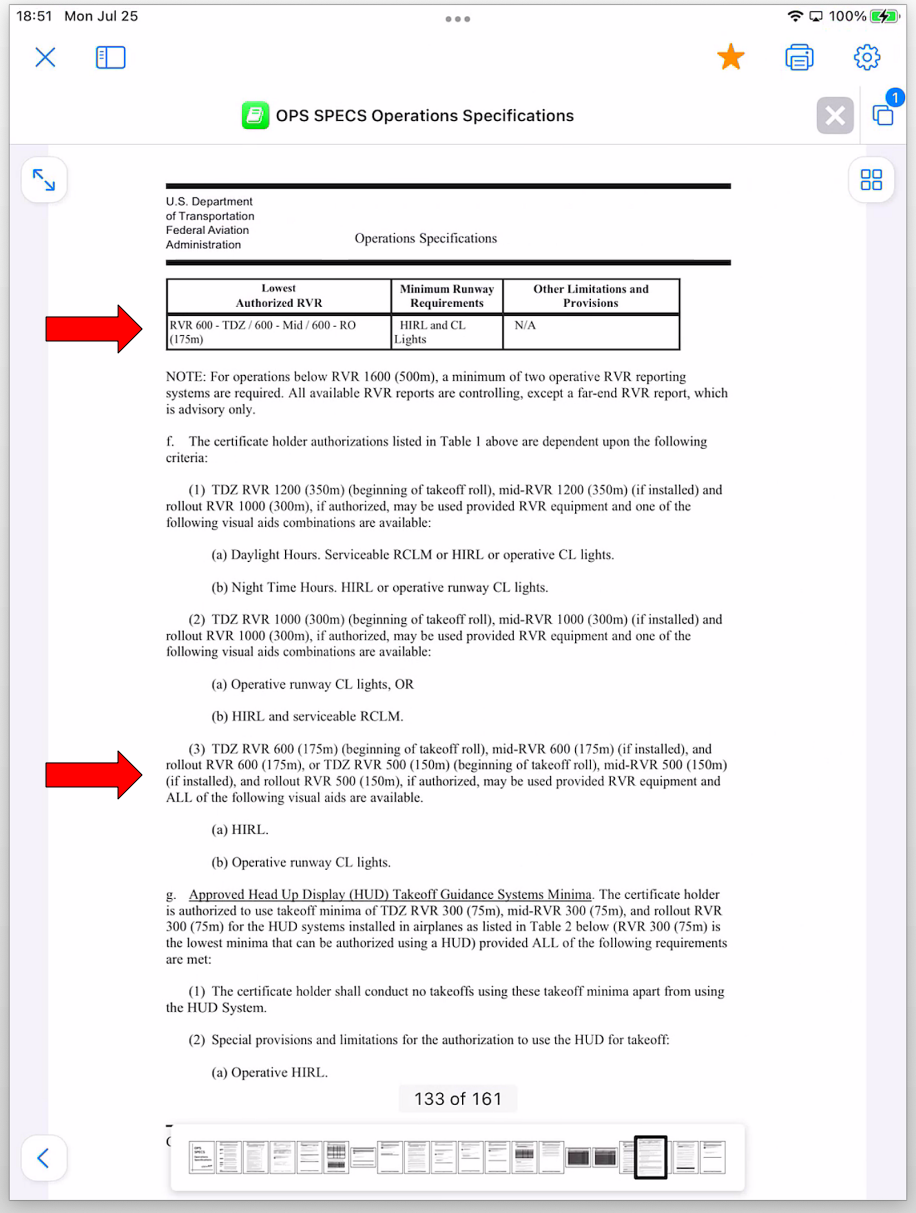
SOP 1-4.19

Prior to advancing the thrust levers on takeoff, the CA will visually verify with outside references that the aircraft is lined up on the proper runway heading. The visual references to be used may include but are not limited to:

- Operative high intensity runway lights
- Operative runway centerline lights
- Runway centerline markings
- Adequate visual reference with outside references

Note: Consult Operations Specifications for applicable references to be used at specific RVR values.

On the takeoff roll, the CA will maintain outside visual reference until VR . The F/O will monitor the PFD, MFD and CAS throughout the takeoff and initial climb, and will announce any sign of instrument or system failure or heading deviation during the takeoff roll.



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

Rejected Takeoffs

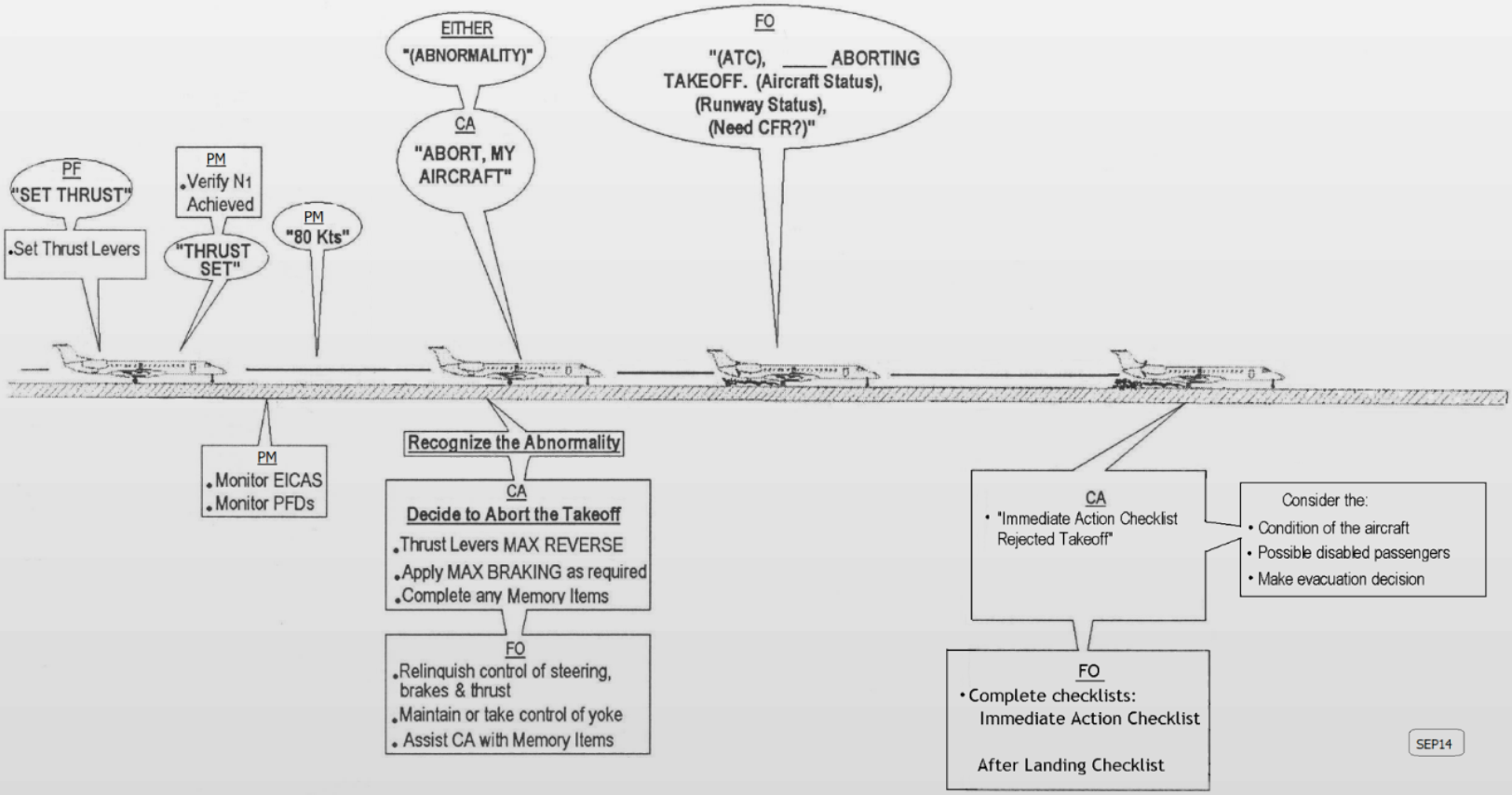
- A rejected takeoff is a maneuver performed during the takeoff roll to expeditiously stop the aircraft on the runway.
- The decision to reject a takeoff be made so that brake application can be made by V_1 , not after.
- As the aircraft accelerates, energy increases rapidly. At low speeds, up to approximately 80 KIAS, the energy developed is not sufficient to cause difficulty in stopping the aircraft. **Below 80 KIAS, any Master Caution (amber), Master Warning (red), or abnormality will be cause for a rejected takeoff.** Above 80 KIAS, the aircraft is increasingly difficult to stop. GoJet uses 80 KIAS to mark the beginning of the high speed regime, and only a Master Warning (red) or the aircraft unable/unsafe to fly shall be cause for a rejected takeoff.
- As airspeed approaches V_1 , on a balanced field (FLEX Takeoffs), the effort required to stop the aircraft in the event of a rejected takeoff approaches maximum. The decision to reject the takeoff must therefore be made so that the maneuver can be initiated no later than V_1 .
- CAUTION: On a balanced field, making a decision to reject a takeoff after V_1 may result in the aircraft NOT being able to stop on the runway remaining.

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

Rejected Takeoffs



Rejected Takeoffs

Rejected Takeoff	
Either pilot state the emergency	
Captain	First Officer
"**ABORT, MY AIRCRAFT**"	Take control of the yoke Advise tower of intentions and requirements
Simultaneously: • thrust levers idle/max reverse as required (RESPECT SPEED RESTRICTIONS) • apply maximum brakes • apply maximum reverse thrust	For a high speed Rejected Takeoff, during deceleration, calls: **"80 KNOTS"**
Bring the aircraft to a complete stop on the runway (or exit the runway if feasible) and set the Parking Brake. Advise passengers to remain in their seats if an evacuation is NOT required.	
Call **"IMMEDIATE ACTION CHECKLIST REJECTED TAKEOFF"**	Read Immediate Action Checklist Rejected Takeoff
	After Landing Checklist

If an Emergency Evacuation is required, See SOP 1-10.11

Rejected Takeoffs
Emergency Evacuation

An emergency evacuation is initiated for a condition potentially endangering the life or physical well-being of passengers and crew.

In the majority of cases, this procedure will follow another Immediate Action Checklist or QRH procedure. This requires a great deal of coordination on the part of the crew members.

Time permitting, brief flight attendant(s):

- nature of emergency
- evacuation signals
- specific directions regarding exits to be used

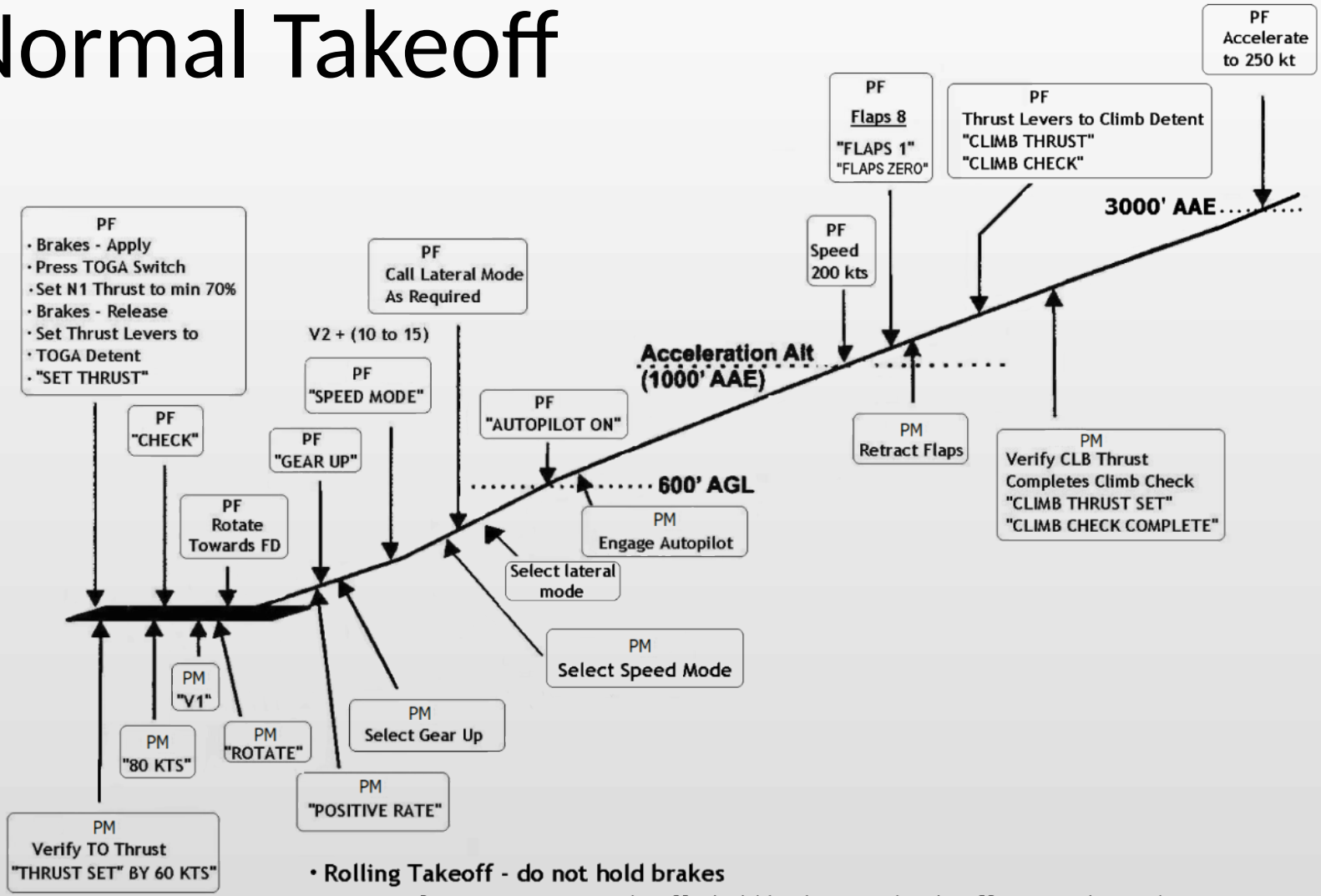
When the decision to evacuate the passengers has been made, the captain shall call for the Immediate Action Checklist Passenger Evacuation. The Passenger Evacuation Checklist includes eight (8) items for the CA and 3 items for the FO to complete. These items are required to be completed concurrently. The Immediate Action Checklist and the QRH must be consulted; however, the next slide illustrates the actions and callouts required.

Rejected Takeoffs
Emergency Evacuation

Captain	First Officer
Stop aircraft, set PARKING BRAKE and verify the problem.	
Command: "Immediate Action Checklist Passenger Evacuation"	Notify ATC: The condition and intention to evacuate.
GND LIFT DUMPING switch: Select MAN DISARM.	EMER DEPRESS switchlight: Select ON.
Both thrust levers: Select SHUT OFF.	
PA announcement: "Easy Victor" "Easy Victor" "Easy Victor".✸	EMER LTS switch: Select ON. (should coincide with PA announcement)
APU FIRE PUSH & LH & RH ENG FIRE PUSH switchlights: Select and PUSH.	Proceed to cabin to assist in evacuation. Evaluate if safe to open Type I Forward Service Door (if not already open)
BATTERY MASTER switch: Select OFF.	
Assist in evacuation.	

✸ If an evacuation is to be made through a particular exit, the captain should state the exit first, followed by the evacuate command.

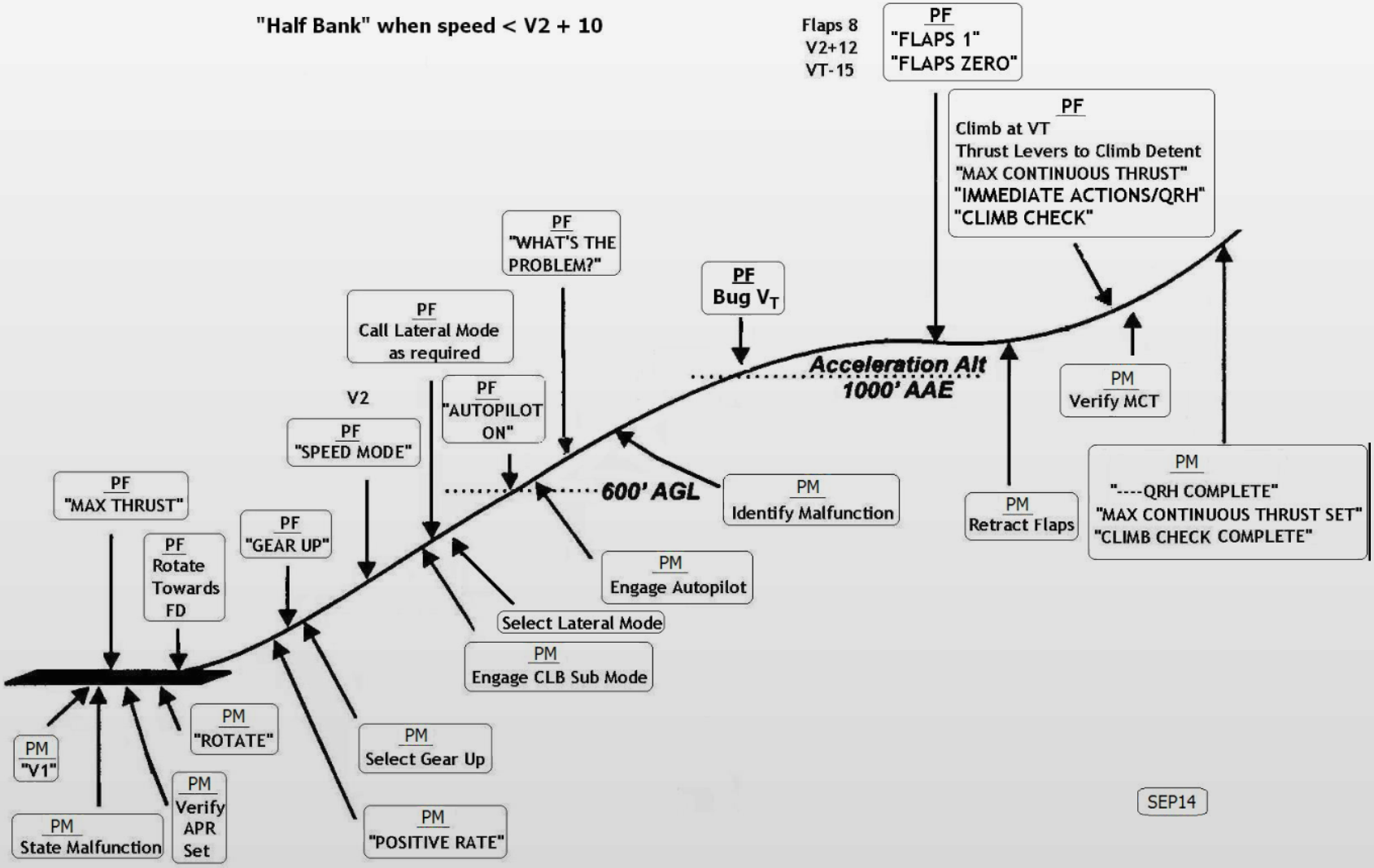
Normal Takeoff



- 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

V1 Cut


"Half Bank" when speed < V2 + 10
Flaps 8
V2+12
VT-15
PF
"FLAPS 1"
"FLAPS ZERO"
PF
Climb at VT
Thrust Levers to Climb Detent
"MAX CONTINUOUS THRUST"
"IMMEDIATE ACTIONS/QRH"
"CLIMB CHECK"
PF
"WHAT'S THE PROBLEM?"
PF
Bug V_T
PF
Call Lateral Mode as required
Acceleration Alt
1000' AAE
V2
PF
"AUTOPILOT ON"
PF
"SPEED MODE"
PM
Verify MCT
600' AGL
PM
Identify Malfunction
PF
"MAX THRUST"
PF
"GEAR UP"
PM
Retract Flaps
PM
"----QRH COMPLETE"
"MAX CONTINUOUS THRUST SET"
"CLIMB CHECK COMPLETE"
PF
Rotate Towards FD
PM
Engage Autopilot
Select Lateral Mode
PM
Engage CLB Sub Mode
PM
"V1"
PM
"ROTATE"
PM
Select Gear Up
PM
Verify APR Set
PM
State Malfunction
PM
"POSITIVE RATE"
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

Checklists
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

Checklists
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 drift down speed, whichever is higher.
- The drift down 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

Checklists
Cruise Checks

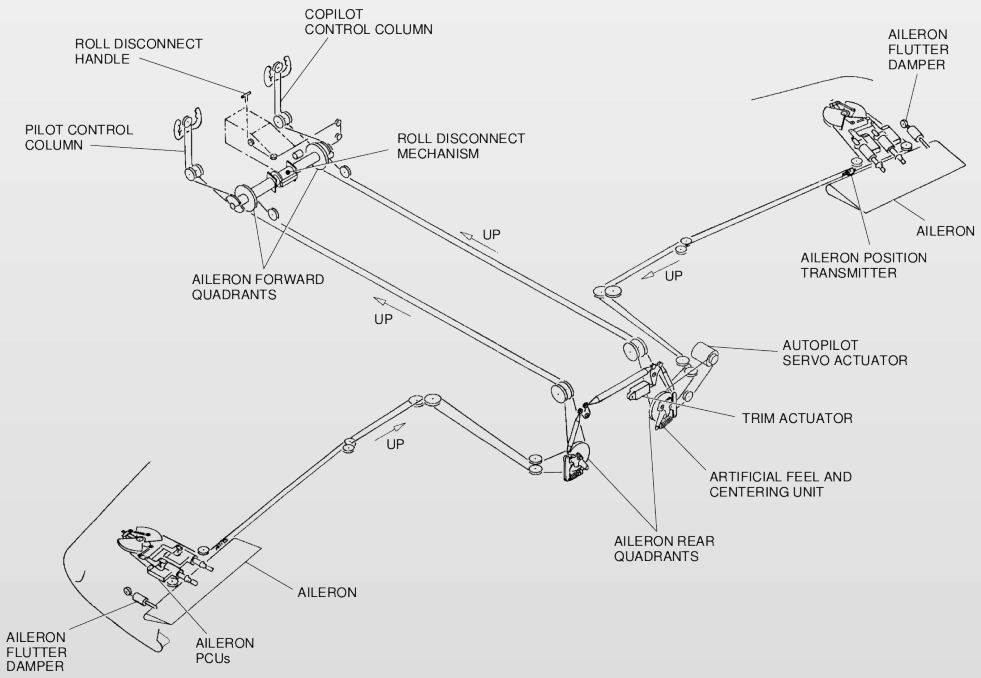
- Cruise Fuel Check: As stated in GOM 3-2.2.17, Captains on flights scheduled for flight times of one (1) hour or more must record the actual fuel burn and actual time from brake release on the flight plan at the first fix beyond the top of climb (ToC)
- Cruise Altimeter Check: When operating in RVSM 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,

Flight Control Malfunctions
PCU Runaway - ABNORM 8-8

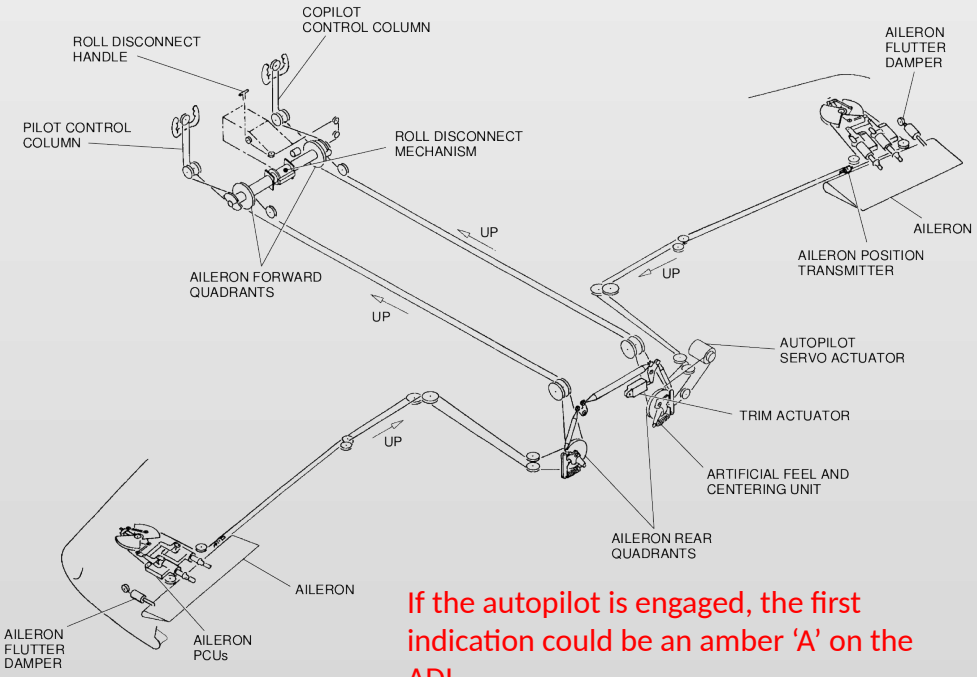
Each aileron is hydraulically powered by two Power Control Units (PCUs) and mechanically-controlled by rotation of either control wheel. The left aileron PCUs are powered by hydraulic systems 1 and 3 and the right aileron PCUs are powered by hydraulic systems 2 and 3.

Spoileron control transfer is automatic in the event of a PCU runaway. The green PLT ROLL or CPLT ROLL light on the glare shield indicates the side with the operative aileron. Disconnecting the roll torque tube isolates the faulty aileron and prevents further mechanical damage.

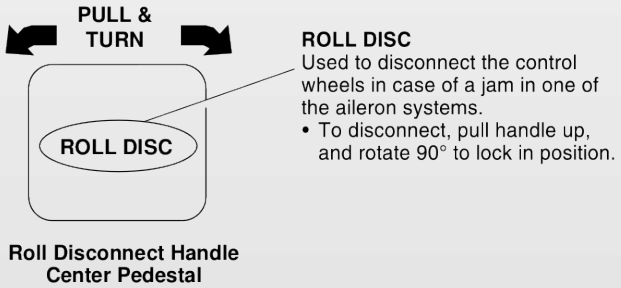


Flight Control Malfunctions
Aileron System Jam - IAC

In the event of an aileron control jam, the left and right systems can be mechanically separated by pulling a roll disconnect handle. The roll disconnect allows limited lateral control using the unaffected aileron control system and the opposite side spoilerons.



If the autopilot is engaged, the first indication could be an amber 'A' on the ADI.



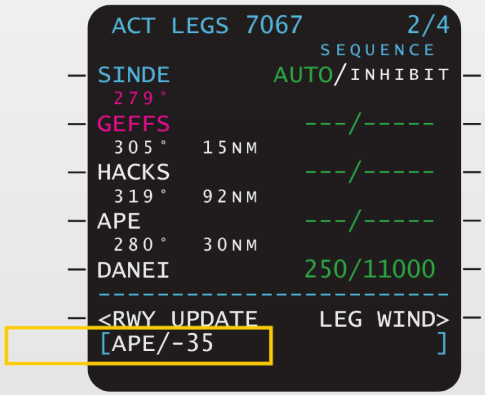
Roll Disconnect Handle Center Pedestal

Twenty seconds after pulling the roll disconnect handle, two roll select lights illuminate on the glare shield. The flight crew must then select the roll priority on the operable side to obtain control of all spoilerons.

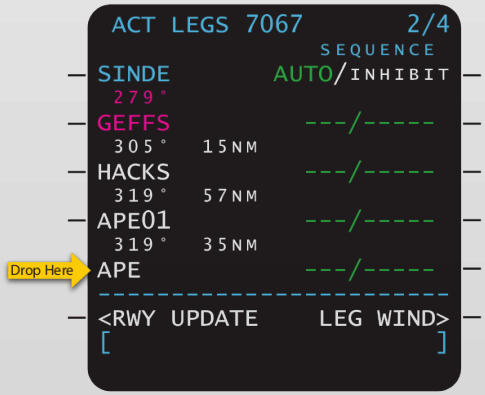
FMS – Waypoints

Along Course Waypoints

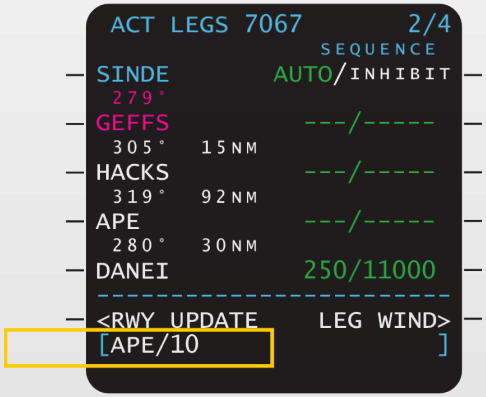
1. Create the waypoint, 35 nm this side of APE in the scratchpad:
   APE/-35



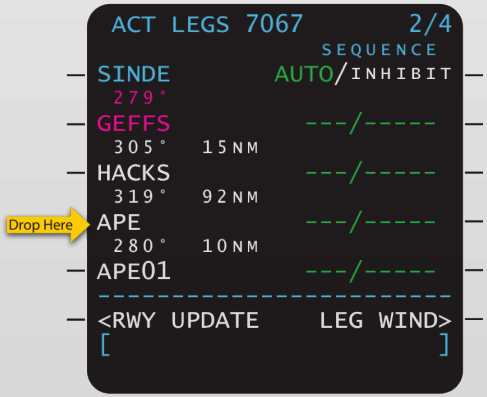
2. Drop on top of the waypoint on which it was based:
   The FMS will "auto-place" the waypoint where it belongs.



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



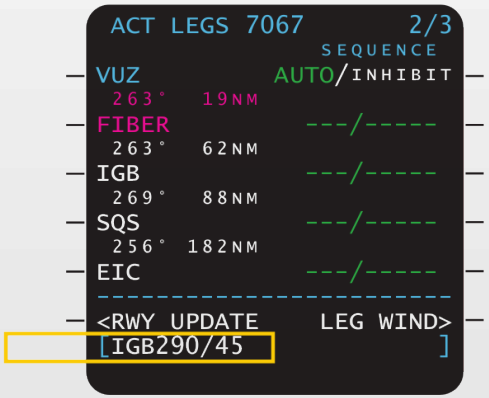
4. Drop on top of the waypoint on which it was based:
   The FMS will "auto-place" the waypoint where it belongs.



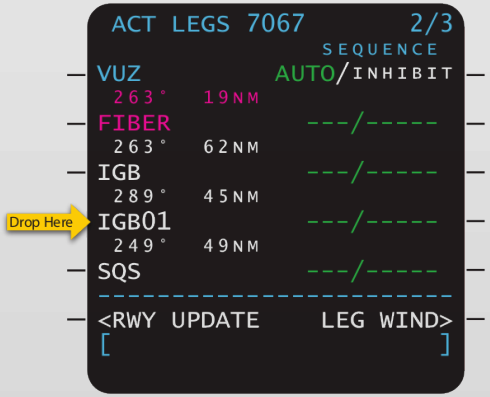
FMS – Waypoints

Place/Bearing/Distance

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

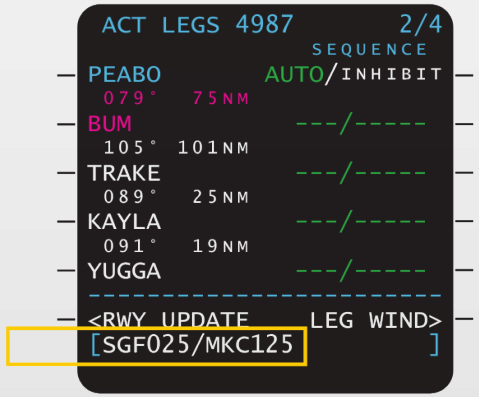


2. Drop the waypoint where it belongs:
   The FMS will **not** "auto-place" the waypoint.

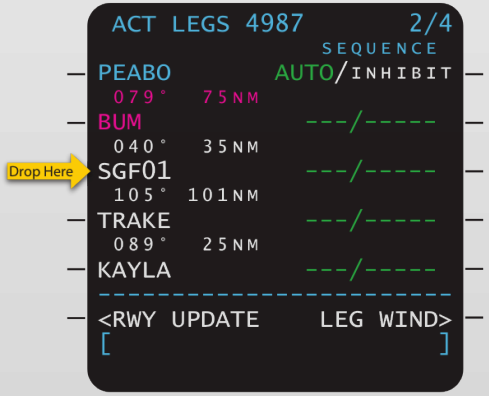


Place Bearing/Place Bearing

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

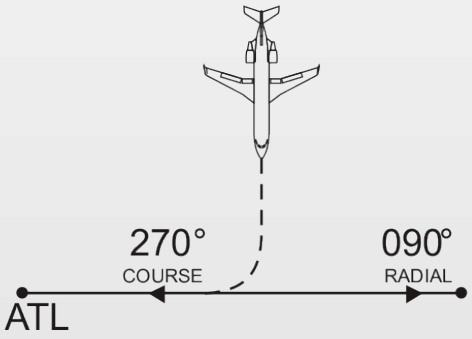


2. Drop the waypoint where it belongs:
   The FMS will not "auto-place" the waypoint.



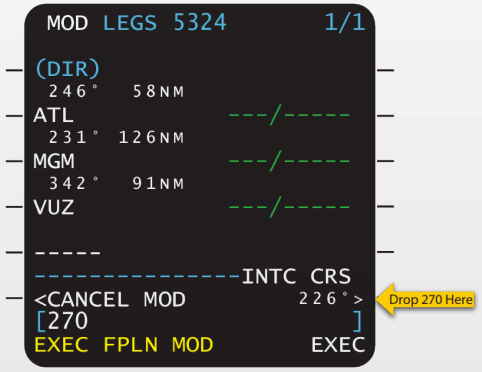
FMS – Tracking

Track a Radial Inbound

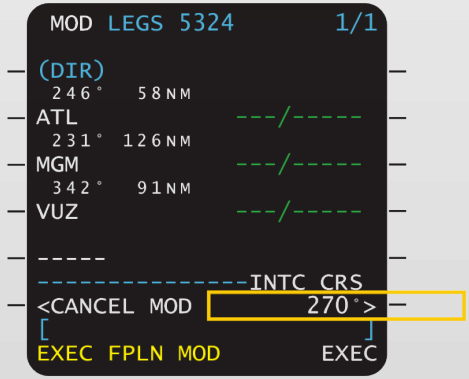


Example: "Fly heading 180. Intercept and track inbound on the ATL 090 degree radial."

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).

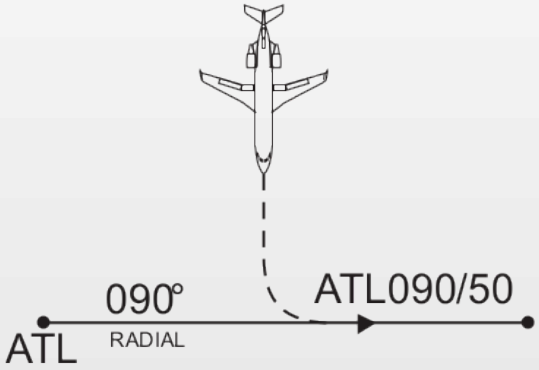


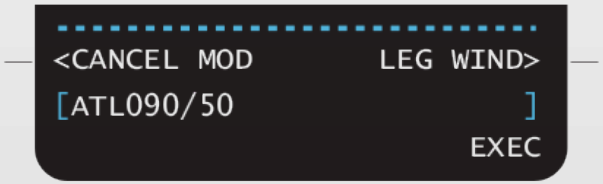
Tracking the 090 degree radial inbound results in a 270 degree course.

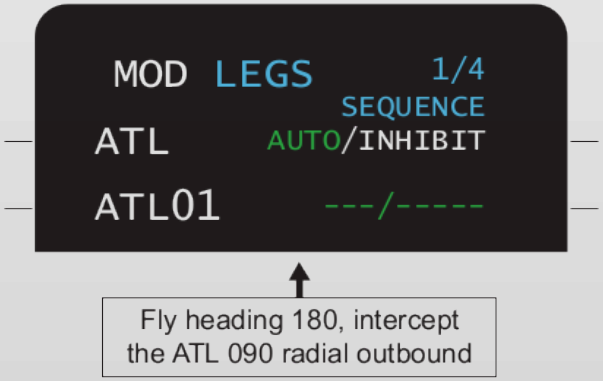
When you first put something in the TO line (line select 2L), the FMS assumes you want to fly direct to that fix. If you do not want to fly direct, you must define how you want to arrive at that fix.

FMS – Tracking

Track a Radial Outbound



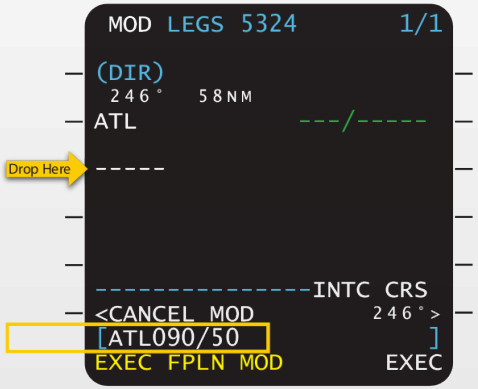




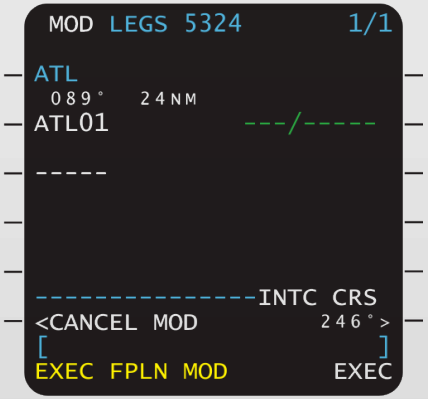
Example: "Fly heading 180. Intercept and track outbound on the ATL 090 degree radial."

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.

Holding (SAFE Check)

SOP 1–8: Holding pattern entry should be accomplished in accordance with the procedures described in the Aeronautical Information Manual (AIM).

Upon receiving a holding clearance, the pilot flying should verify:

S – speed for holding determined, (< 15,000’ MSL, Flaps 0 speed + 30 KIAS)

A – altitude for holding

F – fuel sufficient for holding and minimum diversion fuel

E – expected further clearance time

Speed reduction to the holding airspeed should be initiated three (3) minutes before the estimated arrival at the holding fix.

Make all turns during entry and while holding at 25 degrees, unless otherwise authorized by ATC.

Most RNAV arrivals and approaches utilize fixed distance holding pattern leg lengths, which should be verified against the holding pattern leg length in the FMS database prior to executing the hold.

FMS – Holding

Holding at a Waypoint on the Flight Plan

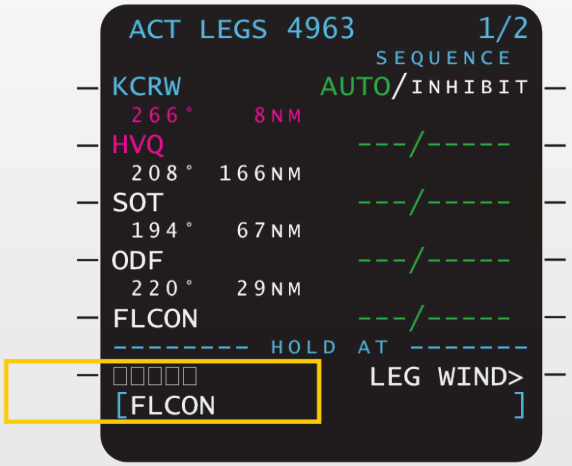
The only holds pre-programmed into the FMS are those that are part of Instrument or Missed Approach Procedures. When a hold waypoint is selected, the FMS defaults to hold on the inbound or current heading, right-hand turns, and 1.0 or 1.5 minutes legs, depending on altitude. These defaults could appear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

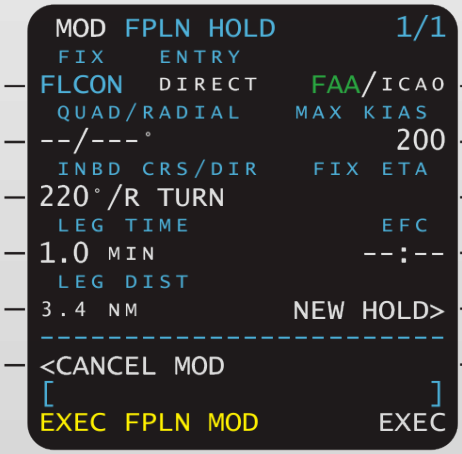
From the LEGS page:

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.

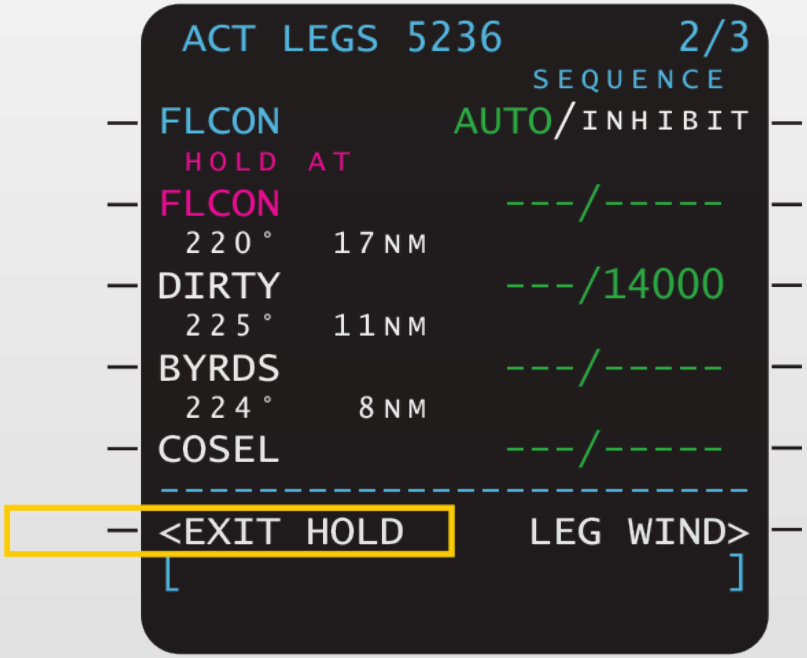
4. Change the defaults to match your clearance as required.

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).



Engine Failures in Flight

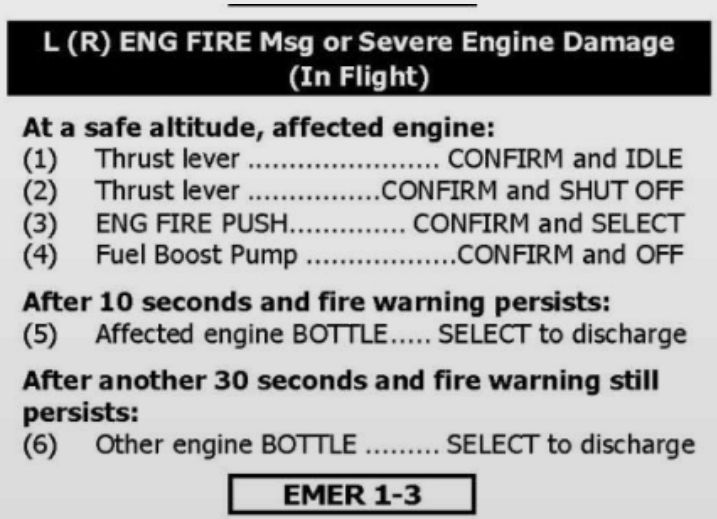
Engine Flameout (L ENG FLAMEOUT or R ENG FLAMEOUT)

- 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

Double Engine Failure

Please open your QRH 2 to EMER 1-4

Double Engine Failure

(1) IGNITION, CONT ..... ON
(2) Airspeed ..... Not less than 240 KIAS

(3) Turn toward nearest suitable airport.

(4) Engines instruments ..... MONITOR for automatic relight.

NOTE
L ENG FLAMEOUT and **R ENG FLAMEOUT** caution messages are displayed.

(5) ADG manual deploy ..... PULL

When ADG power is established:

(6) STAB TRIM, CH 2 ..... SELECT

(7) Oxygen masks (if required) ..... DON

(8) Crew communications ..... ESTABLISH

(9) PASS SIGNS (both) ..... ON

(10) APU (if available, at 37000 feet and below) ..... START

(11) APU GEN ..... CHECK AUTO

If engines continue to run–down and L ENG FLAMEOUT and R ENG FLAMEOUT caution messages are not displayed:

(12) Thrust levers (both) ..... SHUT OFF

- **If relight of either engine is not considered feasible, proceed to step (13).**
- **If windmilling relight is considered feasible, proceed to step (16).**
- **If APU bleed air relight is considered feasible, proceed to step (38).**

(13) **RELIGHT OF EITHER ENGINE IS NOT CONSIDERED FEASIBLE**

▼

Single Engine Drift Down

SOP 1-5.9.7

When the aircraft must be allowed to drift down, do as follows:

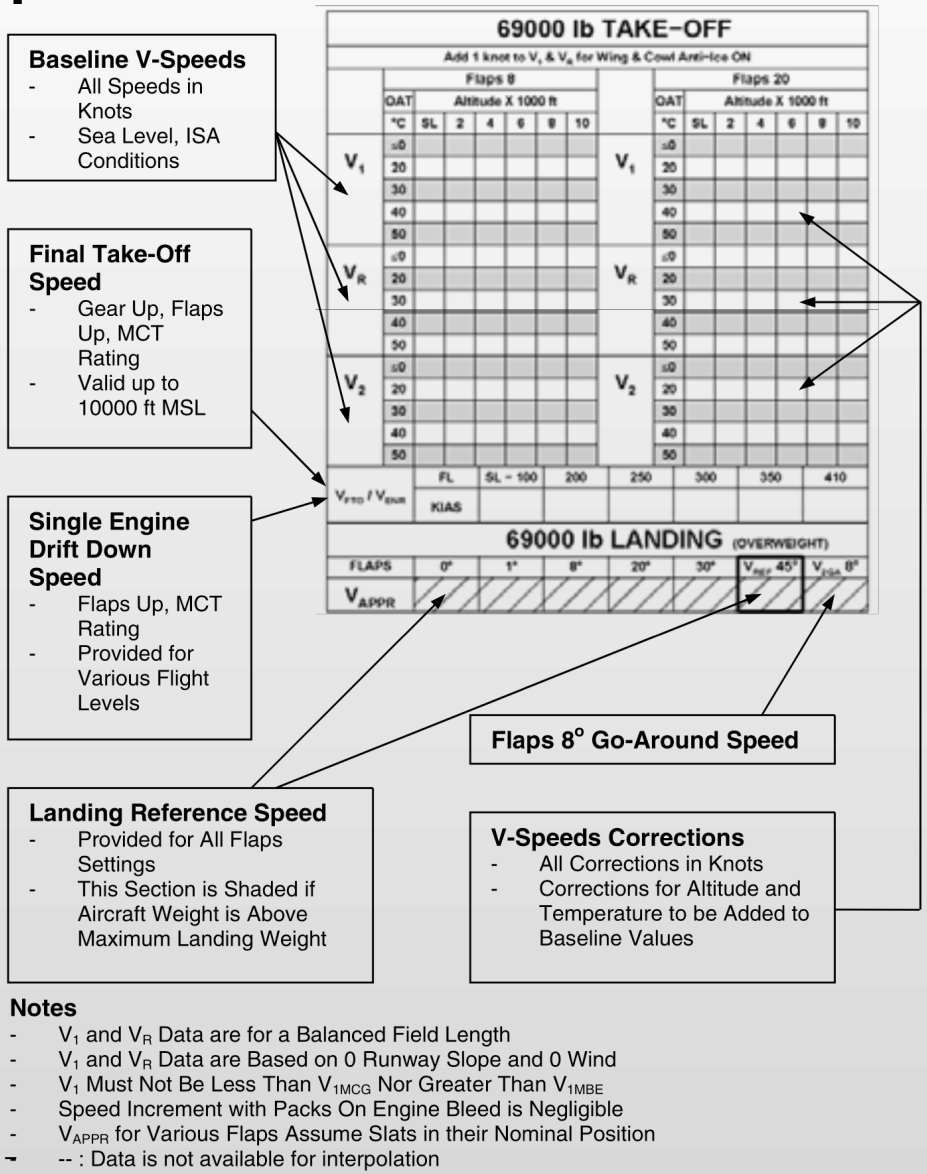
1. Set Maximum Continuous Thrust (MCT) on the operating engine.

2. Comply with QRH Procedures.

3. Determine the single engine drift down speed using the applicable speed card in QRH Volume 1. We use the cards with “<1098> and <Imperial>” at the top. Adjust your pitch to maintain this speed.

WARNING: If turns are required while descending at the single engine drift down speed, make ALL turns at 1⁄2 BNK, to ensure adequate stall margins are maintained.

Speedcard – Legend <Imperial>



Notes

- V_1 and V_R Data are for a Balanced Field Length
- V_1 and V_R Data are Based on 0 Runway Slope and 0 Wind
- V_1 Must Not Be Less Than V_{1MCG} Nor Greater Than V_{1MBE}
- Speed Increment with Packs On Engine Bleed is Negligible
- V_{APPR} for Various Flaps Assume Slats in their Nominal Position
- -- : Data is not available for interpolation

Single Engine Drift Down
SOP 1-5.9.7

4. Continue the DD until the aircraft is able to maintain altitude and the single engine drift down speed. Coordinate with ATC to maintain this altitude, or a lower altitude, if desired.

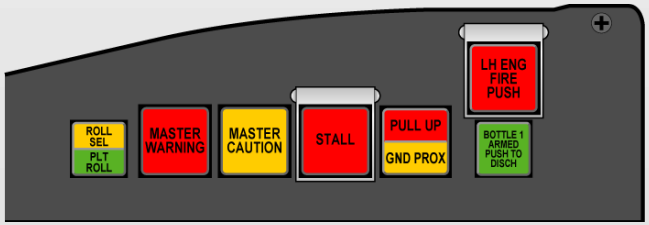
5. When the flight is planned with DD escape guidance, comply with the filed routing. If the aircraft is not on the originally planned route (ATC re-route, ATC assigned shortcut, etc.) coordinate an escape route with ATC respecting the maximum single engine altitude. When the flight is not planned with DD escape guidance, work with ATC and Dispatch, to determine the nearest suitable airport, considering the terrain along the route.

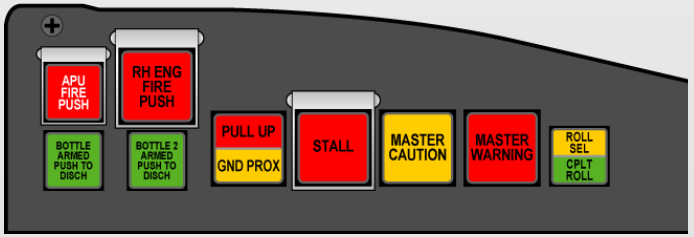
6. If fuel burn is a consideration, determine the LRC using the applicable speed card in QRH Volume 1. Time and workload permitting, re-compute the LRC every thirty (30) minutes to ensure maximum fuel conservation.

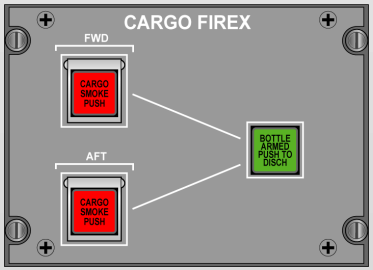
7. After reaching the LRC, engine thrust may be reduced from MCT to maintain the LRC.

8. Upon arriving at the diversion airport, descend and land in compliance with QRH Single- Engine Procedures.

Fire Detection and Protection



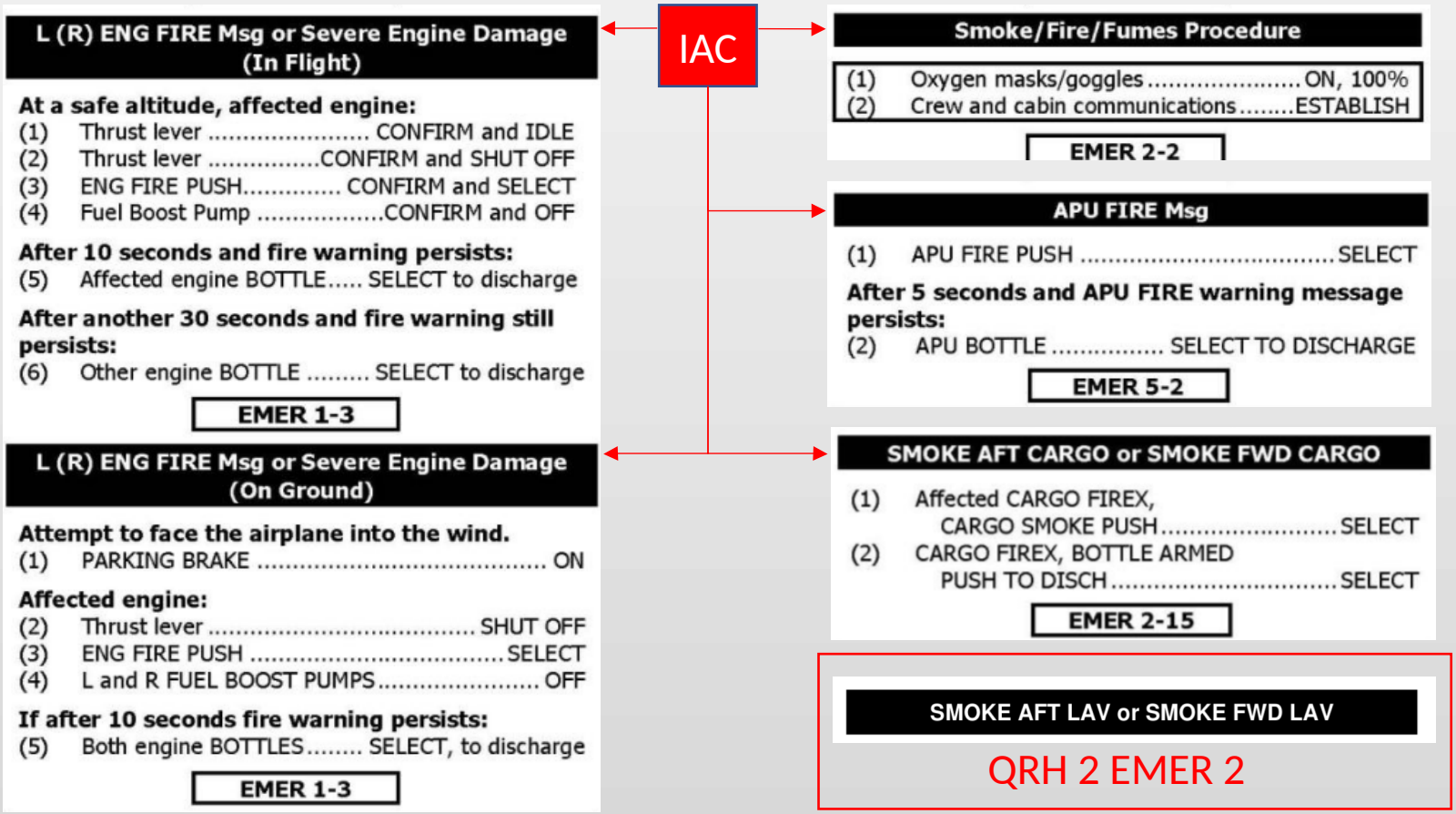




Fire Checklists

Time is critical during smoke/fire/fumes emergencies. The flight crew should consider an immediate landing anytime the situation cannot be controlled. (QRH2 EMER 2-2)

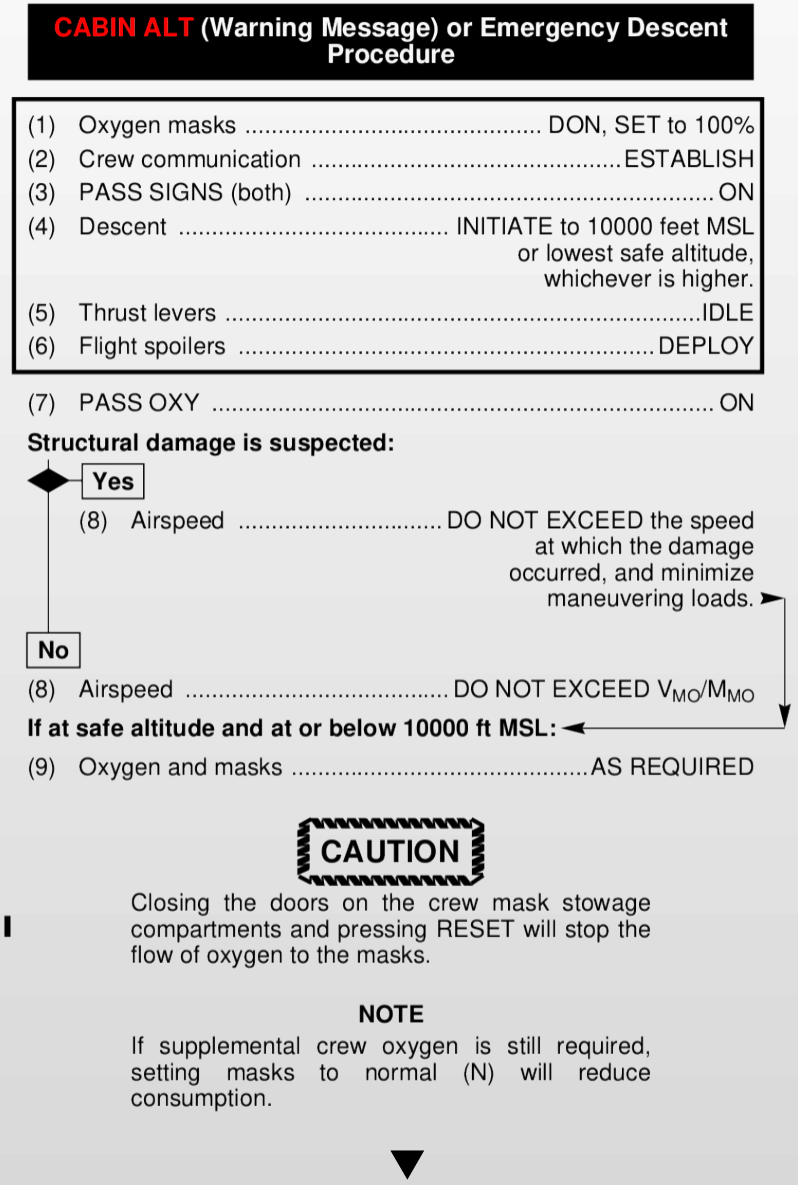
Passenger masks should not be deployed when performing smoke or fire procedures



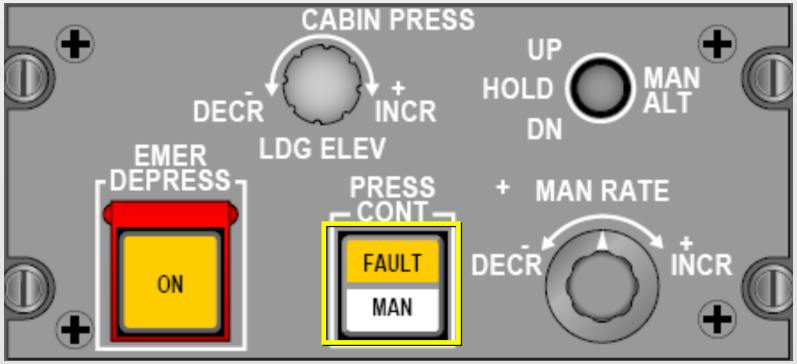
Rapid Decompression Emergency Descent

This maneuver affords evaluation of the pilot's use of recommended procedures for their duty position while the aircraft is established in the highest practical rate of descent during emergency conditions or any other situation demanding an immediate and rapid descent.

The primary purpose of this maneuver is to descend the aircraft as rapidly as practical to a safe altitude. In order to maintain positive "G" forces, and for the purpose of clearing altitudes below, a 30 to a 45-degree bank should be established in the initial descent for at least a 90-degree heading change.



Rapid Decompression Emergency Descent



Door/hatch message(s) displayed/unsafe condition:

Yes

(10) Do not attempt to repressurize the airplane.

(11) Applicable door procedure ..... ACCOMPLISH when at a safe cabin altitude.

Refer to EMER 14–2

Refer to ABNORM 5–1

– END –

No

(10) PRESS CONT .....MAN

(11) MAN ALT ..... DN

(12) MAN RATE ..... MAXIMUM INCR

Control of cabin pressurization is regained:

Yes

(13) Manual Pressurization Control Procedure .....CONTINUE

Refer to ABNORM 2–16

– END –

No

(13) Unpressurized Flight Procedure (PACKs on) .....ACCOMPLISH

Refer to ABNORM 2–18

——— END ———

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

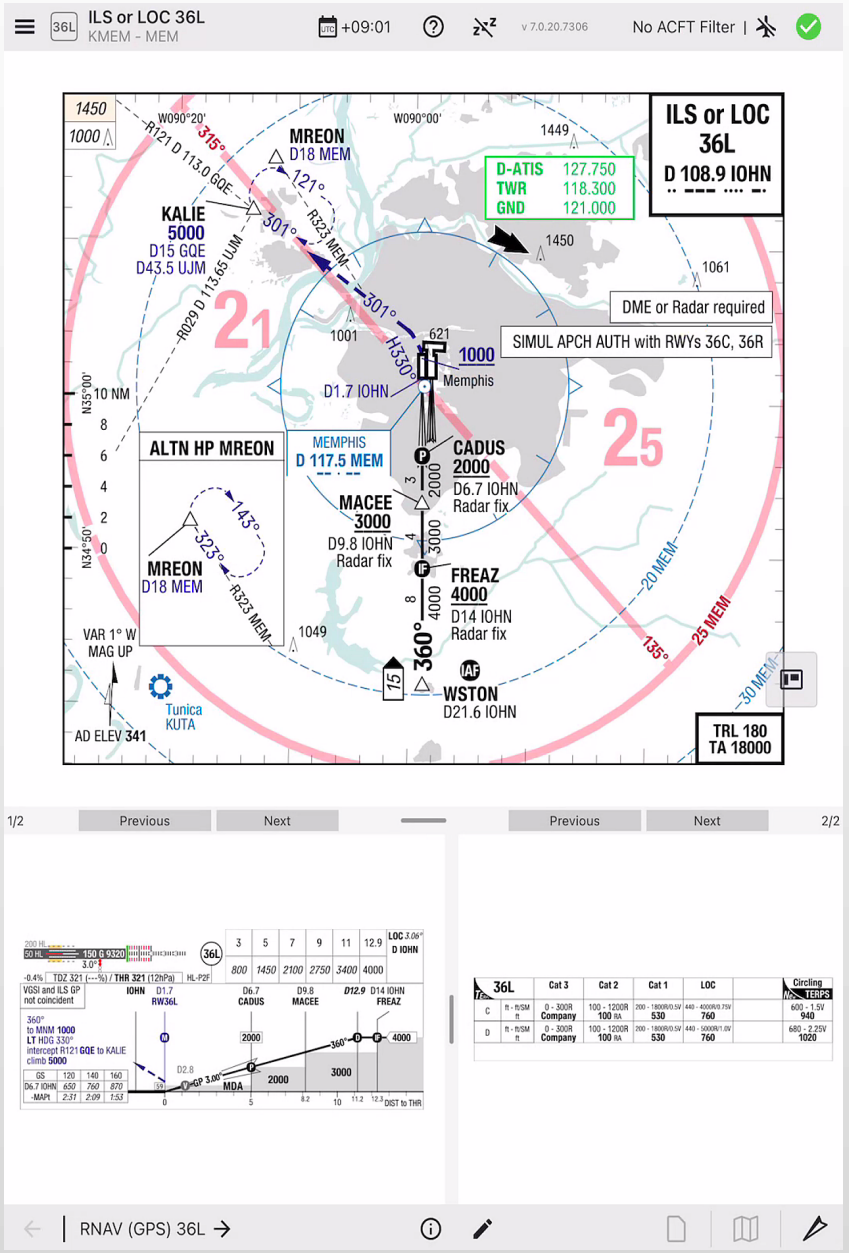
- Normally performed after descending below 18,000’.
- Challenge and Response

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

Approach Briefing

Please brief this approach:

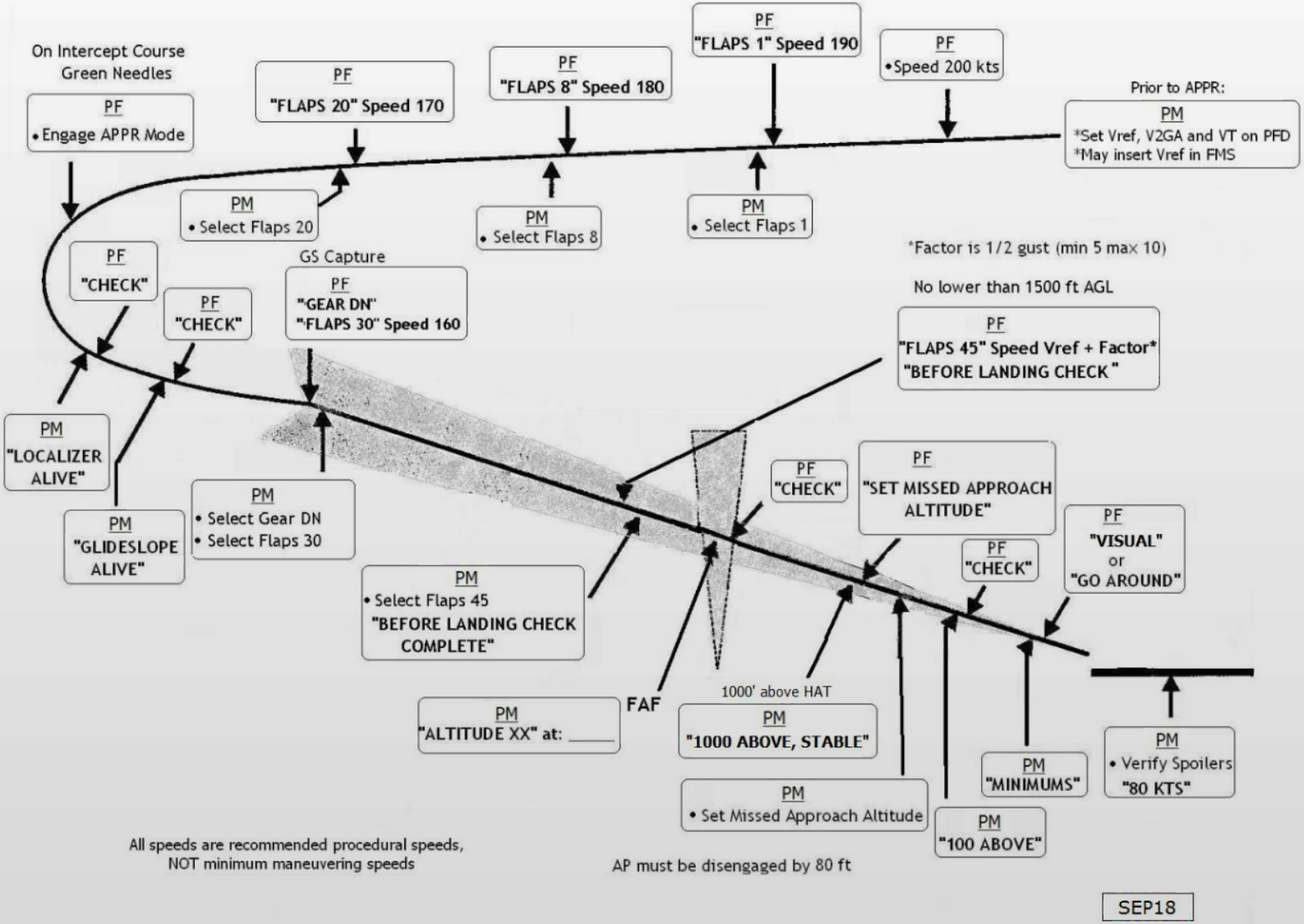


Checklists
In Range Practice

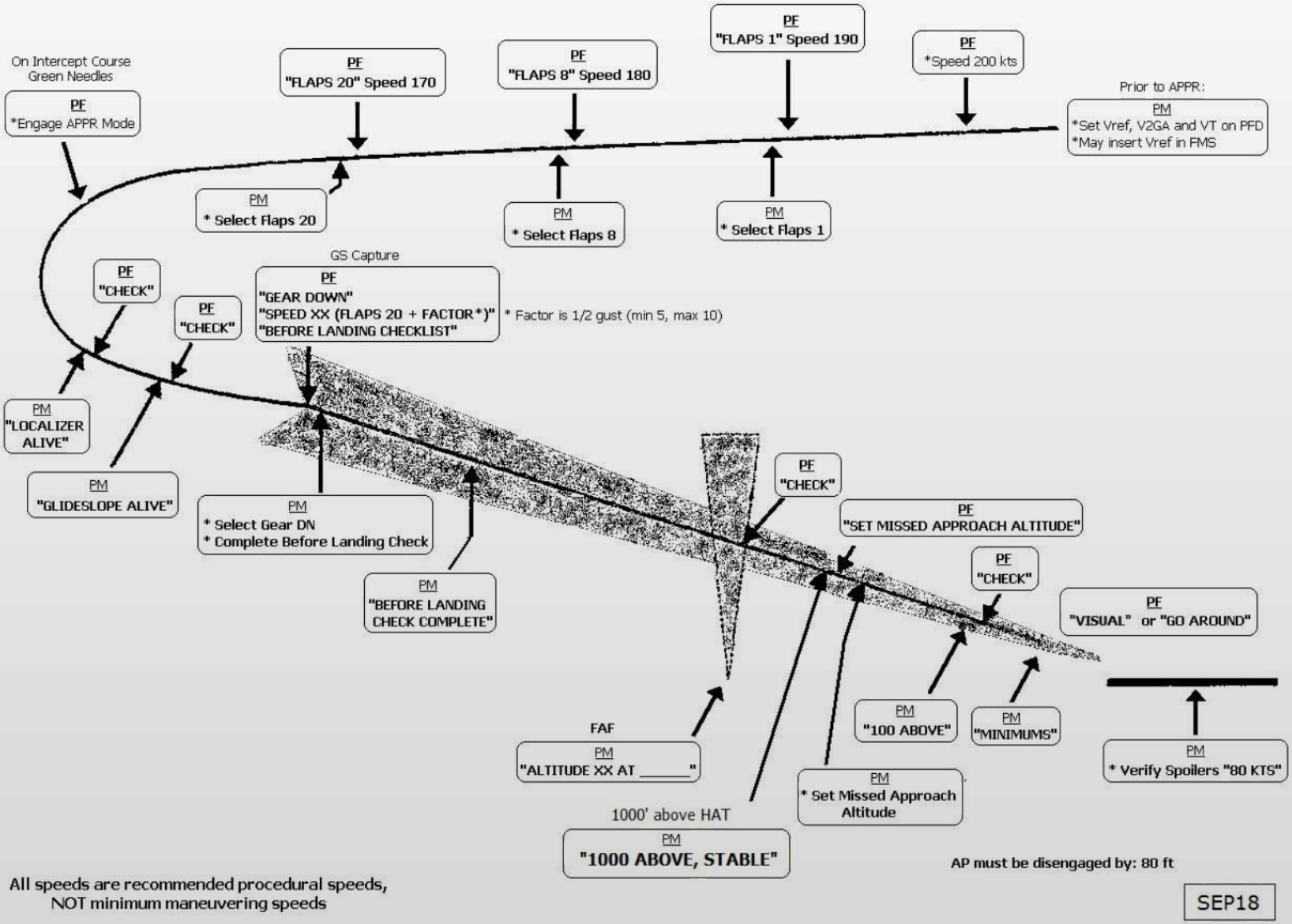
IN RANGE CHECK	
Sterile Light ..... ON	PF/PM
LDG ELEV ..... Set	PM
Fuel ..... Checked	PF
Altimeters ..... (----) Set/Cross Checked	BOTH
Radar/Terrain ..... As Required	PM
CAS ..... Checked/Clear	BOTH
Landing Data ..... Set/Checked	BOTH
Approach Briefing ..... Complete	PF

SOP 2-13

ILS Approaches



Single Engine Precision Approach



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

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.

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 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

Debrief

- ✓ How can you best prepare for simulator training?
- ✓ What do you need to succeed?
- ✓ Instructor Feedback
- ✓ Training Completion Form
- ✓ Attendance Form