



NATIONAL TRANSPORTATION SAFETY BOARD

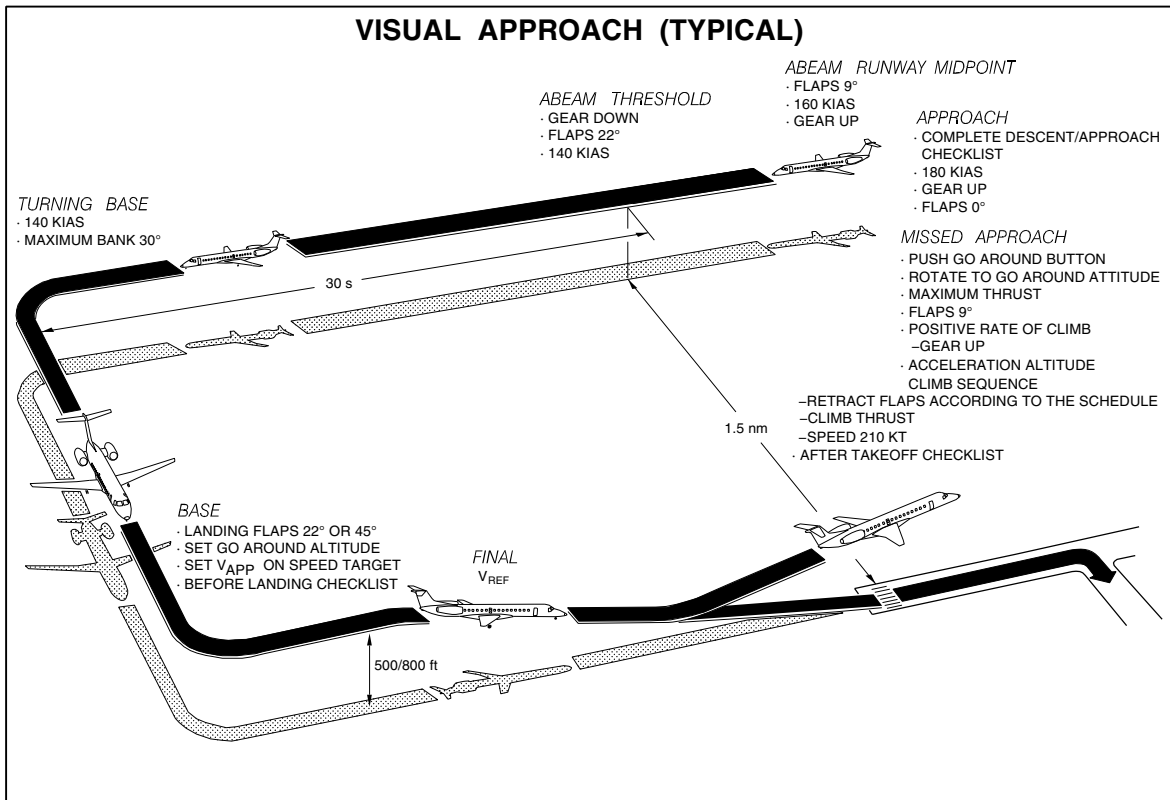
Office of Aviation Safety
Washington, D.C. 20594

March 26, 2020

Attachment 9 – Trans States Airplane Operations Manual [Excerpts]

OPERATIONAL FACTORS

DCA16LA100



TAILWIND

Maximum Takeoff and Landing Tailwind Component..... 10 kt

DIRECT VISION WINDOW (AFM PROCEDURES)

Maximum recommended speed to remove direct vision windows is 140 KIAS.

UNPRESSURIZED FLIGHT (NON-AFM)

Maximum altitude for operation after an in-flight depressurization, is 10000 ft MSL unless MEA or otherwise required.

Maximum altitude for dispatch for an unpresurized flight is 10000 ft.

TURBULENT AIR PENETRATION SPEED (AFM PROCEDURES)

At or below 10000 ft..... 200 KIAS
 Above 10000 ft..... 250 KIAS/0.63M,
 WHICHEVER
 IS LOWER

MAXIMUM RECOMMENDED CROSSWIND (NON-AFM)

Embraer aerodynamics analysis have resulted in the following maximum recommended crosswinds for takeoff and landing:

- Dry runway 30 kt
- Wet runway..... 30 kt
- Runway with Compacted Snow..... 25 kt
- Runway with Standing Water/Slush/Loose Snow ... 20 kt
- Runway with Ice (no melting) 10 kt

AFTER TAKEOFF

NOTE: Keep the airplane trimmed to avoid excessive loads on the Horizontal Stabilizer Actuator (HSA). The airplane should be trimmed before 160 KIAS. Failure to accomplish the above procedure may lead to an inoperative trim condition not associated with any EICAS message.

Landing Gear UP
 PNF commands landing gear up after PF has requested and confirms the three white UP indications on the EICAS.

FLAPS 0
 PNF retracts FLAPS at acceleration altitude according Normal takeoff for Flaps 9, 18 or 22° schedule.

Thrust Rating CLIMB
 Select CLB mode on the THRUST RATING panel and confirm on the EICAS the CLB indication.

Internal and External Lights AS REQUIRED

Windshield Heating AS REQUIRED
 Turn Windshield Heating ON if icing conditions or windshield fogging is encountered or anticipated.
 For airplanes equipped with PPG windshield, the windshield heating system may be selected ON during all flight phases.

Air Conditioning..... SET

Once CLB thrust is set the air conditioning should be set as follows:

- If the takeoff was performed on APU BLEED then both engine BLEEDS must be selected to OPEN, the CROSS BLEED must be set to AUTO and the APU bleed must be CLOSED.
- If the takeoff was performed on ENGINE BLEED, depending on the takeoff mode and on the temperature an ECS OFF signal may be generated. In this case, both PACKS must be reset, preferably one at a time, one shortly after the other for the sake of passenger comfort.

**Altimeters SET &
XCHECKED**

Upon passing the transition altitude, the altimeters are set to QNE by the respective pilots if it is an operation in ICAO airspace.

Pressurization CHECKED

Once the air conditioning system is set, verify that the pressurization is functioning properly. Verify the cabin altitude, the differential pressure and the cabin rate of climb on the EICAS.

APU..... AS REQUIRED

Shut down the APU IMMEDIATELY after the engine bleed valves are open, that is, without any cool down period.

ABOVE 10000 FT

External Lights OFF

Upon passing 10000 ft switch the external lights OFF except strobe and red beacon. The logo light must also be switched OFF.

Fasten Belts AS REQUIRED

Switch the FSTN BELTS OFF if conditions permit.

PC Power System (if installed) AS REQUIRED

If PC Power supply is desired release the PC Power button on IFE overhead panel to turn on the system for passengers use.

DESCENT

Windshield Heating..... ON

The system must be switched ON to prevent fog and ice formation on the windshield inner layer.

Approach Briefing COMPLETED

The crew must review the descent, approach and landing procedures.

HGS Combiner (if installed)..... SET

If the combiner has been installed, position the combiner in the operating position.

HGS Control Panel (if installed)..... SET

Enter on HCP, the touchdown zone elevation for the landing runway.

Enter on the HCP the glideslope angle for the landing runway.

Select the desired mode.

Speed Bugs SET

Check on the FMS the expected landing weight and set V_{REF} , V_{APP} , $V_{APP\ CLB}$, V_{FS} on the MFD:

$V_{APP} = V_{REF} + \text{wind correction.}$

Wind correction = $\frac{1}{2}$ steady headwind component + gust increment above steady wind.

For Flaps 45° landing, the minimum wind correction is 5 KIAS and the maximum is 15 KIAS.

For Flaps 22° landing, the minimum wind correction is 5 KIAS and the maximum is 20 KIAS.

For $V_{APP\ CLB}$, set the $V_{APP\ CLB}$ or the V_{APP} , the greatest.

For V_{FS} , set V_{FS} or the V_{APP} , the greatest.

EXAMPLE:

- $V_{REF} = 118 \text{ kt}$
- Reported wind = 16 kt, gusting to 25 kt
- The wind correction would be $\frac{1}{2} (16) + (25 - 16) = 17 \text{ kt}$
However the maximum wind correction is 15 kt (Flaps 45°), thus:
- $V_{APP} = 118 \text{ kt} + 15 \text{ kt} = 133 \text{ kt}$



Pressurization CHECKED

Verify that the digital controller was set to the destination airport elevation.

BELOW 10000 FT

External Lights ON

The following lights must be turned ON upon crossing 10000 ft:

- LDG1, NOSE AND LDG2.

During night time, the LOGO light must also be turned ON.

Fasten Belts ON

Switch the FASTEN BELTS light upon crossing 10000 ft, if it is not ON yet.

PC Power System (if Installed) OFF

Below 10000 ft the PC Power System must be turned off by pressing the PC Power button on IFE overhead panel.

Curtains..... STOWED

Any curtain used during flight must be stowed for landing.

APPROACH

- XFEED OFF
- PASS SIGNS Panel..... SET
- AIR COND/PNEUMATIC Panel..... SET
- Altimeters SET &
XCHECKED

When the altimeters are set to QNH (passing the Transition Level) the Approach Checklist should be called for, if it is a flight in ICAO airspace. If the flight is in other than ICAO airspace, checklist must be called for at an altitude established as operational standard.

Verify that both altimeters and the standby altimeter are set to QNH.

- Approach Aids SET &
XCHECKED

NOTE: The VAPP mode should be selected only on final approach segment, below 2500 ft AGL. Therefore, the outbound segment should be flown using any other mode.

Both pilots must verify that the frequencies and courses that were selected are correct for the intended approach. Ensure that both PFD's are displaying appropriate information.

They must also verify that the radio altimeter alert (DH) and the FMS are properly selected for the type of approach in mind.

CAUTION: RADIO ALTIMETER-BASED DECISION HEIGHTS ARE NOT RECOMMENDED ON CAT I APPROACHES. THE DECISION ON A CAT I APPROACH HAS TO BE BASED ON THE ALTIMETER RATHER THAN ON THE RADIO ALTIMETER. THE DH ALERT IN THESE CASES IS A REFERENCE ONLY THAT MUST BE USED WITH CARE AND ITS VALIDITY DEPENDS ON THE PILOTS' KNOWLEDGE OF THE TERRAIN BEFORE THE RUNWAY. ALTIMETER-BASED DECISIONS ARE NOT ALLOWED ON CAT II APPROACHES. THE DECISION ON THESE APPROACHES HAS TO BE BASED ON THE RADIO ALTIMETER.



The tables below shows the flap maneuvering speeds during a visual approach or during an instrument approach:

ALL ENGINES EXCEPT EMB-145XR MODEL

| | | FLAP MANEUVERING SPEED (KIAS) | | | |
|---------|-------|-------------------------------|-----------------------|---------------------|-----------------------|
| | | BELOW MSLW* | | ABOVE MSLW* | |
| FLAPS | GEAR | NO ICING CONDITIONS | WITH ICING CONDITIONS | NO ICING CONDITIONS | WITH ICING CONDITIONS |
| 0° | Up | 180 | 200 | 180 | 200 |
| 9° | Up/Dn | 160 | | | |
| 18°/22° | Up/Dn | 140 | 150 | | |
| 45° | Dn | 140 | | | |

*Maximum Structural Landing Weight as specified on Limitations Section.

ONLY APPLICABLE TO EMB-145XR MODEL

| | | FLAP MANEUVERING SPEED (KIAS) | | | |
|---------|-------|-------------------------------|-----------------------|---------------------|-----------------------|
| | | BELOW MSLW* | | ABOVE MSLW* | |
| FLAPS | GEAR | NO ICING CONDITIONS | WITH ICING CONDITIONS | NO ICING CONDITIONS | WITH ICING CONDITIONS |
| 0° | Up | 180 | 200 | 180 | 200 |
| 9° | Up/Dn | 160 | | | 170 |
| 18°/22° | Up/Dn | 150 | 160 | | |
| 45° | Dn | 140 | 150 | | |

*Maximum Structural Landing Weight as specified on Limitations Section.

Thrust Rating..... T/O

If fuel consumption is a consideration, consult the In-flight performance software for maximum endurance speeds.

NOTE: - The maximum flap 45° extended speed (V_{FE}) of 145 KIAS must not be exceeded in any condition. However, if momentary deviations happen to speeds up to 160 KIAS during transition to or flight with flaps 45°, no maintenance action is required. This information does not constitute authorization to operate above V_{FE} .

For the EMB-145 XR model, any exceedance of the flap 45° extended speed (V_{FE}) – 160 KIAS – requires maintenance action.

- The maximum flap 22° and 18° extended speed (V_{FE}) of 200 KIAS must not be exceeded in any condition. However, if momentary deviations happen to speeds up to 210 KIAS during transition to or flight with flaps 22° or 18°, no maintenance action is required. This information does not constitute authorization to operate above V_{FE} .
- The maximum flap 9° extended speed (V_{FE}) of 250 KIAS must not be exceeded in any condition. However, if momentary deviations happen to speeds up to 260 KIAS during transition to or flight with flaps 9°, no maintenance action is required. This information does not constitute authorization to operate above V_{FE} .

MISSED APPROACH

Go Around Button PRESS

Press the Go Around buttons at the thrust levers and check if Flight Director goes to pitch 10° nose up. Rotate or verify that autopilot rotates the airplane following the Flight Director.

Thrust Levers MAX

Advance the thrust levers to MAX position and verify the engines parameter.

Flaps 9°

Select the flaps control to 9° position.

With positive rate of climb:

Landing Gear UP

Select the landing gear lever to the up position.

Minimum Airspeed APPROACH
CLIMB SPEED

Maintain the pitch as commanded by the Flight Director or pitch 10° if Go Around is being performed on raw data to maintain the airplane airspeed above the minimum airspeed (approach climb speed selected on the MFD).

Once the acceleration height is reached check that the speed is consistent with the flap retraction speed, reduces the thrust levers to Thrust Set position. Select flap controls to zero position and select Climb Mode at the Thrust Rating panel.

- NOTE:** - For coupled Go-Around the altitude loss may be 75 ft.
 - During the GO-AROUND procedure, the DON'T SINK aural warning may sound. In this case monitor the sink rate and follow the GO-AROUND guidance.

BEFORE LANDING

Landing Gear DOWN

Command gear down and check whether the speed is within limits for landing gear extension. Also check the three green lights before this item is confirmed.

Speed Brake CLOSE

Flaps °SET

Check that the flap position is the intended one for landing.

Landing Lights AS REQUIRED

Auto Pilot & Yaw Damper OFF

CAUTION: YAW DAMPER ON DURING LANDING MAKES THE DIRECTIONAL CONTROLLABILITY OF THE AIRPLANE ON THE RUNWAY MORE DIFFICULT ESPECIALLY WITH GUSTS AND CROSS WINDS.

SPD Button (Flight Guidance Controller)..... SET
 APPROACH
 CLIMB SPEED



INTENTIONALLY BLANK

| | | |
|---------|-----------|------------|
| 1-02-61 | Page 2 | Code 01 |
|---------|-----------|------------|

REVISION 37

AOM-145/114

AFTER LANDING

Thrust Levers..... AS REQUIRED

If taxi is not required, thrust levers should be set to idle.

Brakes..... AS REQUIRED

Windshield Heating..... AS REQUIRED

Turn windshield heating OFF if it is not required to defog or de-ice the windshield.

For airplanes equipped with PPG windshield, the windshield heating system may be selected ON during all flight phases.

Air Conditioning and

Pneumatic System..... AS REQUIRED

Pressurization CHECK

External Lights SET

Turn ON the taxi light, that must remain ON throughout the taxi regardless of the time of the day. The strobe lights must be turned OFF as soon as the airplane leaves the runway.

Radar STBY

Verify that both radar selectors are set to Standby.

Flaps 0°

The flaps must be retracted to a zero-degree position.

NOTE: Flap retraction from 22° to 0° following landing on a contaminated runway or after operation in icing condition should be delayed until flap gaps and actuators have been checked to be free of contamination and ice.



Pitch Trim..... SET

Reset the PITCH TRIM back in the green range (approx. 7.0 UP).

APU..... AS REQUIRED

If the intention is to start the APU, do it now. Do not use the APU BLEED until the airplane is parked and with blocks on (wait at least 3 minutes for use APU bleed). This will maximize the APU life.

NOTE: To prevent spurious overcurrents in the electrical system, engines must not be shut down concurrently with the starting of the APU. A minimum one-minute interval between those two procedures is recommended.

Transponder..... STBY

Set the Transponder and the TCAS to Standby.

Gust Lock..... LOCKED

The GUST LOCK must be applied immediately after the airplane leaves the runway.

NOTE: In case of an overcurrent protection is actuated, and the EICAS message DC BUS 2 OFF (PF D 2 and MFD 1 blank and MFD 2 displaying a red X) is displayed after a commanded engine 2 shutdown during taxi, the following actions must be carried out:

- Stop the airplane.
- Restart the engine 2.
- Taxi the airplane normally to the appropriate area.
- To shut the airplane down and reset the overcurrent protection, refer to Shutdown Procedures.

CAUTION: DURING TAXI, THE ENGINE 2 MUST NOT BE SHUT DOWN JUST BEFORE OR DURING A TURN, AS THIS MAY CAUSE STEERING COMMAND LOSS (STEERING IS SUPPLIED BY DC BUS 2).

SHUTDOWN

Thrust Levers IDLE
 Emergency/Parking Brake ON

Typically when approaching the parking position and turning towards the marshal, turn OFF the taxi light. This is especially important during nighttime.

Pull the Emergency/Parking Brake and twist it to the set position after airplane has stopped. Make sure that the airplane is static before pulling the Emergency/Parking Brake.

The crew should verify the brake temperatures. If the brakes are hot, release the Emergency/Parking Brake as soon as the chocks are ON.

NOTE: To avoid hydraulic fluid transference from system 1 to system 2 first apply brakes using the pedals and after pull the emergency/parking brake handle. To release the emergency/parking brake, do the same procedure.

GPU/APU AS REQUIRED

If the APU is not running yet, then start it up before the engines are shut down. If the APU (or the APU generator) is unserviceable and there is a GPU available, select the GPU before shutting down the engine. Check the GPU voltage on the MFD ELEC page before selecting it.

Shed Buses AS REQUIRED

If the electrical system is being powered by the APU after the shut down of both engines and galley power is necessary, switch the shed buses to OVRD.

If the electrical system is being powered by a GPU after shutdown, the shed buses can be left in AUTO.

Start/Stop Selectors STOP

Once the Emergency/Parking Brake is applied, shut down the engines by selecting the engine start knobs to STOP.

- NOTE:** - Associated engine BLEED must be CLOSED before selecting the engine START/STOP Selectors to STOP;
- The engines will not shut down with START/STOP Selectors unless Thrust Levers are first moved to IDLE. If STOP is selected before Thrust Lever is retarded to IDLE, momentarily cycle START/STOP Selector to RUN and back to STOP;
 - It is recommended to keep the engine running at idle during 1 minute to permit engine thermal stabilization prior to shutdown. Time of operation at or near idle, such as taxiing, is included in this 1-minute period.
 - To prevent spurious overcurrents in the electrical system, engines must not be shut down concurrently with the starting of the APU. A minimum one-minute interval between those two procedures is recommended.

NOTE: If the overcurrent protection is actuated, the airplane will enter in electrical emergency when both engines are shut down (both PFDs and MFDs deenergized, but EICAS display energized). In this case, the following steps must be accomplished:

- Batteries 1 and 2.....OFF
- Bus TiesOFF
- Properly trained personnel must reset the electrical system through ELEC SW switch on the Maintenance Panel behind the pilot's seat.
- If the failure persists, the related fault isolation task (FIM TASK 24-60-00-810-820-A) should be accomplished.

Red Beacon OFF

The red beacon should be switched OFF after the engines are shut down. The use of the Red Beacon should be associated with engine(s) running or airplane in movement.

Fasten Belts OFF

The FSTN BELTS lights should be switched OFF by crew as soon as the airplane is static and the engines are shut down. This will be a signal to cabin crew to initiate the procedures for deplaning of the passengers.

| | | |
|---------|-----------|------------|
| 1-02-73 | Page 2 | Code 01 |
|---------|-----------|------------|

PUMP PWR AS REQUIRED

If the APU is running, keep the right fuel pump ON (or the left pump ON and CROSSFEED open).

If the APU is not running, turn both fuel pumps OFF.

Elec. Hydraulic Pumps.....OFF

Once the airplane is parked and the parking brake is applied, the copilot must switch both electric hydraulic pumps to OFF.

Ice Protection System.....OFF

Air ConditioningSET

If passengers are to be disembarked through means other than a jetway, the crew must switch APU BLEED to ON, CROSSBLEED to OPEN, and switch PACK 1 to OFF, thus reducing the external noise in the vicinity of the main passenger door, for better passenger comfort.

If better cooling is required after disembarkation is finished, PACK 1 can be switched ON again.