

DCA25LA163

OPERATIONAL FACTORS/HUMAN PERFORMANCE

Attachment 9

Southwest Airlines Aircraft Operations Manual [Excerpts]

May 23, 2025

DCA25LA163 Manual References / Briefing

AOM Revision 24-05 Revision Date: 12/19/2024

- **FOM Revision 24-05** Revision Date: 12/19/2024

AOM 8.1

8.1 Managing Intensive Tasks During Taxi

Revised: 09/28/2023

The Captain manages taxi situations by controlling when and where head-down tasks are performed. The intent is to allow the First Officer to divert the First Officer's attention to the flight deck when conditions permit to accommodate operational changes. While the First Officer is occupied with flight deck tasks, the Captain must balance workload and be prepared to stop the aircraft if it becomes necessary.

(FO) If unexpected changes require significant flight deck tasks, inform the Captain and receive verbal acknowledgment. Accomplish PWB and FMC programing (e.g., runway, performance, routing) and make aircraft configuration changes as necessary.

(CA) Stop the aircraft, ensure the Pilot Flying briefs the changes, and complete the Departure Plan checklist, if required.

If the reported visibility is less than 4000 RVR or $\frac{3}{4}$ mile, perform any flight deck intensive tasks (either Pilot) with the aircraft stopped and the parking brake set.

AOM 8.4

8.4 Approaching the Departure Runway

Revised: 10/14/2024

(CA) Do not stop at the approach hold short or ILS hold short lines/signs unless instructed to do so by ATC.

(CA) If necessary to amend, revise, or emphasize any briefing items, complete these briefings prior to takeoff.

Verify FOB is more than MINIMUM TAKEOFF fuel.

Complete the following Configuration Check flow:

(CA) Approximately one minute before departure, check the aircraft configuration.

The aircraft is approximately one minute from departure when about 2,000 ft of taxi distance remains or the aircraft is second in the departure sequence.

Visually verify the flaps and stabilizer trim are set as intended for takeoff. Verify the speedbrake lever is properly seated in the forward and down detent.

(CA) Push the ATTEND button.

Monitor PA audio to ensure that the Flight Attendants begin the "Cleared for Departure" PA.

(CA) Perform the Thrust Lever Check.

The Thrust Lever Check should be performed immediately after pushing the ATTEND button. This enables the Captain to perform the check and the First Officer to monitor the completion of the check.

With the parking brake released, momentarily advance one thrust lever past midrange and back. Check that the takeoff configuration warning horn and configuration warning lights do not activate.

If the takeoff warning horn activates, the Captain must stop the aircraft and set the parking brake. Refer to the *QRH* NNC 15 Warning Systems. Release the parking brake, and reaccomplish the Thrust Lever Check.

- If the takeoff configuration warning horn does not re-activate (e.g., speedbrake handle rigging), the Captain must ensure an Info Only entry is made in the Aircraft Logbook.
- If the takeoff configuration warning horn continues to activate, a fault entry and Maintenance notification is required.

Refer to *FOM* 19.2.6 Flight Deck Crew Responsibilities for additional information.

Complete the Before Takeoff flow.

(FO) Air Conditioning/Pressurization Panel Configure for Takeoff

Ensure that the ISOLATION VALVE switch is placed in AUTO or CLOSE, as required. Ensure RECIRC FAN switch(es) is (are) set to AUTO.

Refer to [16.2.1 Engine Bleeds Off Takeoff](#) for additional information.

Weather Radar or Terrain Display Set for Departure

Set tilt at 4° for departure.

Coordinate weather radar on one display and terrain display on the other, if desired.

(MAX) The Pilot Monitoring should select VSD on the EFIS control panel.

APU As Required

(CA) MCP Verify/Set

- A/T ARM Switch—ARM (as appropriate). If armed, verify that ARM is displayed in white on the FMA.

CAUTION: Pressing TO/GA with the autothrottle armed advances the thrust levers to takeoff power. Do not select TO/GA until aligned with the runway for takeoff and engines stabilized momentarily at approximately 40 percent N_1 .

The A/T ARM switch may be selected OFF (as appropriate) based on RRM principles.

- VNAV—ARM (as appropriate). If armed, verify that VNAV is displayed in white on the FMA.
- LNAV—ARM (as appropriate). If armed, verify that LNAV is displayed in white on the FMA.

Before crossing the hold short line, properly secure EFBs, then complete the Before Takeoff checklist.

Plan to have all preparation items completed before receiving the "Line up and wait" or "Cleared for takeoff" clearance from tower. This way, both Pilots can devote their full attention to clearing final, clearing the takeoff path, and transitioning to takeoff. On some occasions, this procedure may result in a significant time difference between pressing the ATTEND button and beginning the takeoff. This is acceptable and does not require any further Flight Attendant notification.

Prior to accepting the line up and wait or cleared for takeoff clearance, ensure the engine stabilization limitation will be met before takeoff thrust is applied. Refer to [3.8.2 Engine Stabilization and Cooldown](#) for additional information regarding engine stabilization limitations.

9 Takeoff and Initial Climb

Revised: 04/11/2022

This chapter covers the regulations and policies pertaining to the takeoff and initial climb to 3,000 ft AAE.

9.1 Taxiing Onto the Departure Runway Procedures

Revised: 04/11/2022

[Advisory Circular 120-74B]

The Pilot(s) with an unobstructed view of the approach path will clear final and call, "Final is clear."

Final is considered "clear" even with known aircraft on extended final as long as they are not a conflict for the takeoff. Verbally acknowledge the presence of these aircraft. The intention is to increase awareness of landing aircraft that might pose a conflict while taking the runway.

Treat the runway environment as a critical zone. When entering the departure runway, direct your attention outside. Do not perform flight deck tasks, except for momentary items such as turning on exterior lighting.

Monitor the movement of aircraft and vehicles in the runway environment. Ensure the departure runway, intersecting runways and taxiways, and departure flight path remain clear for takeoff. Be vigilant for aircraft and vehicles crossing without clearance.

Mentally rehearse rejected takeoff procedures and considerations. Refer to the *QRH*; also refer to *FOM* 5.2 Takeoff Warning and Reject Considerations.

When entering the departure runway either for takeoff or to "Line Up and Wait," turn on all exterior lights except landing lights.

Ensure the WING ANTI-ICE switch is OFF prior to beginning the takeoff roll.

Both Pilots crosscheck all available references and confirm that the aircraft's location is in agreement with the assigned departure runway.

Use all available references to confirm that the aircraft is at the assigned departure runway. The references may include:

- Aircraft heading indicators (including HGS)
- Navigation display
- Runway signage
- Painted runway designation (may not be visible for displaced thresholds or intersection takeoffs)
- Jeppesen -9 page
- Runway lighting (expected lighting versus actual lighting)

Verify that the aircraft is on the assigned runway for takeoff using all available references.

(CA) Verbally verify the aircraft is on the assigned runway.

Verify that the aircraft is on the assigned runway and state, "Runway ____, Verified."

WARNING: If there is any doubt that the aircraft is on the correct runway, do not takeoff and notify ATC immediately.

(CA) Align the aircraft on the runway centerline.

(CA) If it is the First Officer's takeoff, transfer aircraft control.

As the aircraft taxis onto the runway, the Captain may wish to transfer control of the thrust levers to the First Officer while retaining directional control with the tiller. Verbally transfer control, and receive acknowledgement (e.g., 'You have the thrust levers;' the First Officer answers, 'I have the thrust levers'). Before takeoff, the Captain must still affect a positive transfer of aircraft control according to the following directive.

- **(CA) For a First Officer's takeoff, announce the transfer of control, "You have the aircraft." If necessary, announce the status of the brakes (e.g., 'Parking brake is set,' or 'Parking brake is released').**
- **(FO) Announce, "I have the aircraft."**

When cleared for takeoff or commencing takeoff roll, turn on the landing lights and strobe/high intensity lights (if not already on). Refer to *FOM* 3.7 Aircraft External Lighting Policy for additional information.

9.2 Takeoff Procedures

Revised: 04/11/2022

This section contains information on takeoff procedures.

9.2.1 Normal Takeoff

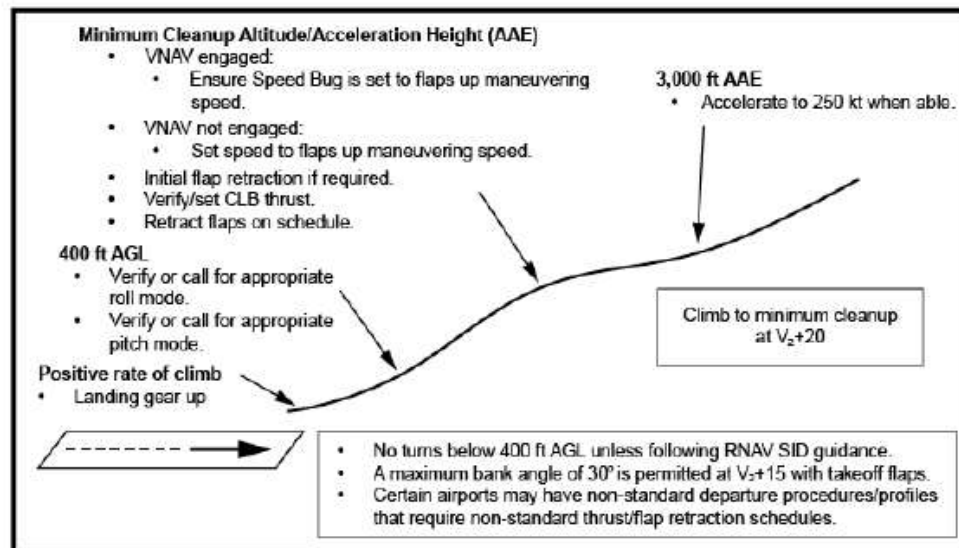
Revised: 09/28/2023

Takeoff profiles and procedures are required for several reasons. The first is to ensure obstacle clearance. The second is to allow a timely clean up, which improves performance, saves fuel, and reduces noise. The third is to comply with regulatory requirements (i.e., limiting speed in controlled airspace).

A rolling takeoff is preferred because it expedites departure and reduces the risk of foreign object damage and engine surge/stall due to tailwind or crosswind. A rolling takeoff is defined as releasing brakes before advancing takeoff thrust.

Note: For takeoff warning and reject considerations, refer to *FOM 5.2 Takeoff Warning and Reject Considerations*.

Figure 9.1 Normal Takeoff Profile



(PF) During takeoff, position feet and hands on the aircraft controls.

(PF) Advance thrust for takeoff.

CAUTION: Do not select TO/GA until on the takeoff runway and after the initial thrust application. If TO/GA is selected and the autothrottle switch is in ARM, the autothrottle system advances the power to takeoff thrust.

Apply takeoff thrust by advancing the thrust levers to approximately 40 percent N_1 .

Allow the engines to stabilize momentarily, then promptly advance the thrust levers toward takeoff thrust while simultaneously selecting TO/GA, and then monitor thrust lever advancement to takeoff thrust.

The objective is to achieve symmetric engine acceleration to minimize directional control problems.

CAUTION: Takeoff into headwind of 20 kt or greater may result in THR HLD before the autothrottle can make final thrust adjustments.

If the autothrottle is not used, advance the thrust levers to takeoff thrust while simultaneously selecting TO/GA.

(PF) Hold light forward pressure on the control column.

Table 9.1 Takeoff Procedures

Pilot Flying	Pilot Monitoring
The Captain aligns the aircraft with the runway centerline. Using the map display, airport signs, and runway markings, verify the aircraft is on the correct runway.	
Advance the thrust levers to approximately 40 percent N_1 .	Verify engine indications are stable and normal.
Allow the engines to stabilize momentarily, then promptly advance the thrust levers toward takeoff thrust while simultaneously selecting TO/GA. Ensure the thrust levers advance to takeoff thrust (if the autothrottle is not used, advance the thrust levers to takeoff thrust while simultaneously selecting TO/GA). Call, 'Set takeoff thrust, XX.X' For example, when the takeoff N_1 is 93.3, the call is "Set takeoff thrust, 93.3."	Ensure thrust levers advance to takeoff N_1. If the autothrottle is used for takeoff, verify that the autothrottle annunciation indicates N_1. Make final adjustments by 60 kt. Call, 'XX.X, set.' For example, when the takeoff N_1 is 93.3, the call is "93.3, set."
After takeoff thrust is set, the Captain's hand remains on the thrust levers until V_1 .	
Hold light forward pressure on the control wheel. Keep the runway centerline between the two main gear assemblies during the takeoff roll.	Monitor engine instruments and call out abnormal indications.
Verify airspeed indication is 80 kt.	Call, "80 kt." If the 80-kt call is missed, call the actual speed. If the autothrottle is used for takeoff, verify the A/T annunciation changes to THR HLD at or after 84 kt.
Verify V_1 is called.	At 5 kt prior to V_1 , call, " V_1 ."
After V_1 , the Captain removes their hand from the thrust levers.	
Maintain a smooth, continuous rotation using 2-3° per second rotation rate to 15° of pitch attitude. After liftoff, follow the flight director.	At the computed V_R speed, call, "Rotate." When the V_1 and V_R are the same, call, "V_1, rotate."

Note: The oil pressure in the amber caution range is only valid when on the ground with takeoff thrust set.

Note: If autothrottle is used for takeoff, a momentary autothrottle overshoot of 4 percent N_1 may occur, but thrust should stabilize at ± 2 percent N_1 after THR HLD. Thrust should be adjusted by the PM, if required, to -0 percent + 1 percent target N_1 .

Note: After takeoff thrust is set, the Captain's hand remains on the thrust levers until V_1 in order to respond quickly to a rejected takeoff. After V_1 , the Captain removes their hand from the thrust levers.

Note: If reduced thrust is used for takeoff, both Pilots should be aware that additional thrust is available and may be used if adverse conditions are encountered. If emergency thrust is subsequently needed during takeoff, advance the thrust levers full forward. The EECs protect the engines against an overspeed condition.

Note: If reduced thrust is used for takeoff, slightly more back pressure may be needed during rotation and initial climb.

CAUTION: If an engine exceedance occurs after thrust is set and the decision is made to continue the takeoff, do not retard the thrust levers in an attempt to control the exceedance because this action will affect takeoff performance. When the Captain determines that altitude (minimum 400 ft AGL) and airspeed are acceptable, retard the thrust lever until the exceedance is within limits and accomplish the Engine Limit or Surge or Stall checklist on the Quick Reference Card.

CAUTION: Do not use the flight director pitch reference for rotation rate.

CAUTION: Rotation rates vary from 2-3° per second with rates being lower on longer models. Liftoff attitude is achieved in approximately 3-4 seconds depending on aircraft weight and thrust setting.

WARNING: Rotation rates in excess of the recommended 2-3° per second can cause a tail strike.

20.1 Normal Checklists

Revised: 10/14/2024

Figure 20.1 B737 Normal Checklist (Front)

B737 NORMAL CHECKLIST

BEFORE START—ORIGINATING

Logbook Aboard
 Landing Gear Pins 3 Aboard
 Fire Warning and Overheat Checked
 Start Levers CUTOFF
 Stab Trim Cutout Switches NORMAL
 Lights Test Checked

BEFORE START

FMC Programmed
 Briefings Complete
 Oxygen Masks and Quantity Checked
 EECs ON
 Navigation Switches NORMAL
 Displays Switches AUTO and NORMAL
 Fuel Cleared with _____
 Center Pumps ON/OFF

Passenger Signs ON
 Window Heat ON
 Hydraulic Pumps A's OFF, B's ON
 Pressurization Set, AUTO
 Flight Instruments _____ Set
 Auto Brake RTO
 Takeoff Warning Horn Checked
 Parking Brake Set
 Transponder TA/RA
 Aileron and Rudder Trim Centered
 O/P/Fit For Duty Accepted/Signed

BEFORE PUSH

Zero Fuel Weight _____ Set
 Gross Weight _____ Crosschecked
 PWB Remarks Reviewed
 N₁s _____/_____, Reduced Set
 or _____, MAX Set
 Runway _____/_____, Set
 Flaps PWB _____, CDU _____
 V Speeds _____, _____, _____ Set
 Stab Trim _____ Set
 Min Cleanup Altitude _____ Set
 or _____, _____ Set
 Flight Deck Door Lights Out

BEFORE TAXI

Electrical Generators ON
 Probe Heat ON
 Anti-Ice As Required
 Flight Controls Free
 Flight Deck Windows Closed and Locked
 Flaps CDU _____, Indicates _____, Green Light

DEPARTURE PLAN

FMC Programmed
 Briefings Complete
 PWB Remarks Reviewed
 N₁s _____/_____, Reduced Set
 or _____, MAX Set
 Runway _____/_____, Set
 Flaps PWB _____, CDU _____, Indicates _____
 Green Light
 V Speeds _____, _____, _____ Set
 Stab Trim _____ Set
 Min Cleanup Altitude _____ Set
 or _____, _____ Set

BEFORE TAKEOFF

Min Takeoff Fuel Verified
 Departure Plan Not Req'd/Complete
 Attendant Notification Complete
 Electrical Generators ON
 Anti-Ice As Required
 Packs As Required
 Bleeds As Required
 Start Switches Left, CONT
 APU As Required
 Flaps CDU _____, Indicates _____, Green Light
 Start Levers IDLE
 Recall Checked

CLIMB

Pressurization Checked
 Start Switches As Required
 APU As Required

DESCENT

Minimums Set
 V_{REF} and V_{TARGET} _____, _____ Set
 Auto Brake As Required
 Recall Checked

APPROACH

Altimeters _____, _____ Set
 Packs AUTO
 Start Switches As Required

BEFORE LANDING

Speedbrake ARMED, Green Light
 Landing Gear DN, 3 Green
 Flaps _____, Green Light

FAA Approved
 Rev 24-01, 08/01/2024
 CPD_FO_Norm_24-01

B737 AIRCRAFT OPERATING MANUAL

Flight Deck Cards

Figure 20.2 B737 Normal Checklist (Back)

PARKING Parking Brake Set Start Levers CUTOFF Anti-Collision Light OFF Fuel Pumps As Required Window Heat OFF Probe Heat AUTO Anti-Ice OFF Hydraulic Pumps Electrics OFF Start Switches OFF Oil Quantity % Hydraulic Quantity %/Refill Radar TEST Transponder STANDBY and Zeros TERMINATING Stab Trim Green Band IRSS OFF Emergency Exit Lights OFF External Lights OFF Ground Power OFF APU OFF Battery OFF DIVERSION INFORMATION - Contact Dispatcher to coordinate diversion and amend Dispatch Release/ODP. - Verify fuel requirements. - Verify approach charts aboard. - Review NOTAMs and weather. - Notify ATC. - Reset pressurization. - Monitor fuel burn and weather. - Inform Flight Attendants and Passengers. Refer to FOM 20 Non-Scheduled Operations for additional guidance. Refer to IFOM 9 Contingencies for international diversions. LEAVING THE AIRCRAFT POWERED ON GATE SERVICES Parking checklist complete. IRSS OFF Emergency Exit Lights ARMED Flight Attendant and/or Operations Agent Notify Required Conditions: Refer to B737 AOM 13 Leaving the Aircraft Powered on Gate Services. For international flights, refer to IFOM 4 Aircraft Unattended with Power Applied.	BRIEFINGS (CA) Captain - Assign PF/PM duties - SIP - Alternates - Special airports - MEL items - NOTAMs - Adverse weather - Taxi routing/hotspots/SMGCS - Runway conditions - RTO considerations (PF) Pilot Flying - Clearance - MCP and VHF NAV radio - FMC route - Engine failure procedure - Automation and navigation - HGS T/O - Required minimum climb gradient - Transition altitude (PF) Arrival - STAR/transition - Altitude/speed restrictions - Approach (type) - Flaps - Braking - Touchdown point/exit plan - Transition level - Adverse weather - NOTAMs - SIP - Special airports - MEL items - LAHSO procedures - Transfer of aircraft control - Taxi routing/hotspots/SMGCS DEBRIEF To improve future performance, consider asking: - Objectively, how was our performance? Note: Discuss good and bad performance. - What worked well? - If we could do it again, what would we change? - Any reports to file (MX discrepancy, IR, ASAP)? FAA Approved Rev 24-01, 08/01/2024 CPD_FO_Norm_24-01
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FOM 2.2.3 Risk and Resource Management

2.2.3 Risk and Resource Management

Revised: 03/27/2025

Risk is an expression of the probability and magnitude of an unwanted outcome. It occurs at many levels (e.g., loss of safety, not reaching business goals, loss of operational effectiveness). Risk is controlled by balancing the factors that increase risk with resources and strategies that decrease the potential for the undesirable outcome and/or increase the likelihood of a positive outcome.

Risk and Resource Management (RRM) is a framework to tie together in-depth and deliberate planning with action-oriented decision making. RRM provides Crew Members with a common language that is easy to use and understand.

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FAA Approved

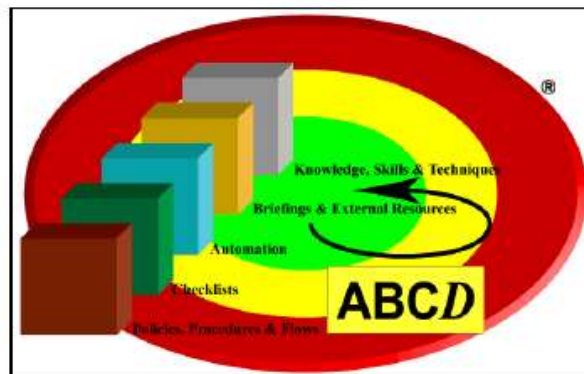
2.2.3 Risk and Resource Management

Revised: 06/23/2022

Risk is an expression of the probability and magnitude of an unwanted outcome. It occurs at many levels (e.g., loss of safety, not reaching business goals, loss of operational effectiveness). Risk is controlled by balancing the factors that increase risk with resources and strategies that decrease the potential for the undesirable outcome and/or increase the likelihood of a positive outcome.

Risk and Resource Management (RRM) is a framework to tie together in-depth and deliberate planning with action-oriented decision making. RRM provides Crew Members with a common language that is easy to use and understand.

Figure 2.4 RRM



Four Principles of RRM

The following four principals improve the odds of reaching goals:

- **Accept no unnecessary risk.** Different levels of risk are inherent when operating in a complex environment. No risk level that requires operating outside of the established policies and procedures should be accepted.
- **Anticipate and manage risk by planning.** Proactive management looks forward and develops strategies and resources that can be deployed during execution to minimize risk.
- **Accept risk when benefits outweigh the cost.** RRM balances risk with the potential gains to be made.
- **Make risk decisions at the right level.** Effective RRM requires good situational awareness.

Factors That Increase Risk and Decrease Performance

Risk factors are anything that increase risk and decrease performance. Risk factors are split into three categories: