

Airbus A300B4-203 Procedures

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NORMAL OPERATION, BEFORE TAKEOFF

PRESTART

Set outer airspeed bugs to V1, F, S, and Vfto.

Set amber inner airspeed bug to V2. (To avoid obscuring the V2 bug, no bug is set on Vr.)

Set pressure altimeter bugs to field elevation and 600 feet AFE or appropriate obstruction clearance altitude.

Press the setting knobs in on both N1 indicators for automatic setting of N1 bugs.

Set Mmo in accordance with TOGW:

- 337,300 lbs or below, set 0.86
- Above 337,300 lbs, set 0.82

STARTING ENGINES

The normal engine start sequence is 2, 1; however, this may be varied at the captain's discretion. An engine start is complete only when the engine has stabilized at idle (approximately 25% N1 and 65% N2).

When available, the APU should be used to start the first engine. Use the cross bleed procedure to start the second engine.

A start should be aborted for any of the following conditions:

- No EGT rise after 25 seconds.
- No indication of N1 within 30 seconds after N2 has stabilized at idle.
- No positive oil pressure indication by the time N2 has stabilized at idle.

Do not initiate start on the second engine until the first engine has stabilized at idle with its generator on line. This will preclude a power interruption which will cause starter cutout during second engine start.

ONE-ENGINE TAXI

Significant fuel savings are possible by using one-engine for taxi-out and taxi-in. In some operational environments, such as an uphill slope, heat-softened asphalt, very high gross weight, or congested ramp areas, it may be advisable to taxi on both engines.

Any engine with a history of starting difficulties should be started prior to leaving the ramp. To initiate taxi, breakaway thrust is obviously higher with only one engine running.

Both engines must be started at least 3 minutes prior to takeoff to permit:

- Engine normalization.
- Completion of the taxi and takeoff checklists.

TAXI

After receiving "all clear" from the ground crew, release the brakes, increase thrust slightly, then wait momentarily for roll to start. Once roll has begun, some thrust can usually be reduced to maintain desired taxi speed.

Tire temperatures must be considered when taxiing long distances. At heavy gross weight, limit taxi speed to approximately 20 knots. If speed tends to build up at idle thrust, allow an increase to approx 25 knots, then brake to approximately 15 kt.

Do not use reverse thrust to back up the airplane.

STEERING

Make all turns with as large a radius as possible. Minimum-radius turns result in tire scrubbing and heavy side loads on the landing gear. Do not allow the airplane to stop while turning.

180° TURN ON RUNWAY

The following recommended technique may be used for making a 180° turn on a standard 150 ft wide runway.

- Taxi on the right hand side of the runway up to about 500 ft from the end of the runway.
- Turn left to about a 25° angle to the runway heading.
- When the captain is physically over the edge of the runway, quickly apply full right nosewheel steering hand deflection and set approximately 55% N1.

NORMAL OPERATION, TAKEOFF

TAKEOFF CONSIDERATIONS

Before every takeoff, mentally review the engine-failure and rejected-takeoff procedures. Consider the factors relevant to the takeoff, such as:

- **The QNH.** TOGW limits in the Route and Airport Manual are based on field elevation, but airplane performance is based on pressure altitude. No corrections are made until QNH falls below 29.81. Above 29.81, the higher the pressure, the better the airplane's performance.
- **The temperature lapse rate.** Low-altitude inversions can result in significant increase in EGT with the rising temperature as the airplane climbs.
- **The wind that may be encountered after liftoff.** If significant wind shear is suspected, consider the alternatives of taking off in a different direction or delaying the takeoff until conditions are more favorable. If shear is suspected, use full takeoff thrust; do not use reduced thrust. If the takeoff is not obstacle-limited, a speed in excess of V2+10 may be used for the initial climb to provide additional protection from shear.
- **The thrust.** TOGW limits are based on full takeoff thrust. Set exact N1.

STANDARD TAKEOFF PROCEDURES

Standard takeoff procedures include the following:

- The pilot not making the takeoff will call out "Airspeed, 80 knots, V1, Vr, V2, positive climb, 600 feet" (or appropriate obstruction clearance altitude).
- If essential power is lost, the engineer will select essential power to an operating source. Only one such selection should be made during the takeoff in an attempt to regain essential power.

- The pilot making the takeoff will advance the throttles to approx 65% N1 and check for balanced N1. The pilot will then press either go lever, call for takeoff thrust, and guard the throttles as they advance to takeoff thrust. Check that Speed Reference System (SRS) and N1 are annunciated on the failure and performance indicator. The engineer will trim the engines if necessary to the desired takeoff thrust by 70-80 knots.
- If the autothrottle system or N1 computer is inoperative, after checking for balanced N1 at 65%, the pilot will manually advance the throttles to near takeoff thrust and call for takeoff thrust. The engineer will trim the engines to takeoff thrust by 70-80 knots.
- The flight engineer will monitor thrust throughout the takeoff.
- The captain will position his hand on the throttles until V1.
- The captain will make any decision to discontinue the takeoff and will execute the RTO procedures.
- The captain will remove his hand from the throttles at V1.

TAKEOFF POSITIONING

Takeoff performance calculations presume the use of all available runway. Good judgment dictates that a minimum amount of runway be used in positioning for a takeoff, especially when TOGW is runway-limited.

At light gross weights, when the runway length is not limiting, a continuous roll into takeoff is permissible.

GROUND ROLL THROUGH INITIAL CLIMB

Hold the yoke forward with enough pressure to keep the nosewheel on the ground, but not so hard as to cause bottoming of the nosewheel strut. Too much pressure gives a rough ride; too little reduces nosewheel steering effectiveness and increases drag. Maximum acceleration is obtained by leaving the nosewheel on the runway until Vr.

Delaying rotation will increase the liftoff distance considerably. Premature rotation may result in the airplane becoming airborne before the normal liftoff point and at a speed slower than normal. As this speed will be below the best angle of climb speed, the initial climb profile (and net climb gradient) may be greatly reduced.

The rotation maneuver should be a smooth, continuous pitch change to the V2 + 10 climb attitude. Approaching Vr, gradually remove any forward yoke pressure. At Vr, rotate smoothly to the target climb attitude. The airplane should reach the target climb attitude and V2 + 10 simultaneously. Early rotation, or an excessive rate of rotation can cause the tail to strike the runway. Tail strike will occur at approximately 13° of pitch with the main gear on the ground.

Retract the landing gear after the airplane is definitely airborne and a positive rate of climb is established, as indicated by the pressure altimeter.

After establishing the initial climb attitude by reference to the ADI, monitor the airspeed and adjust the pitch attitude to maintain V2 + 10, to a maximum of 18° nose up. The V2 + 10 speed is very close to the maximum-angle-of-climb speed and also provides normal maneuvering capability. Do not exceed 30° of bank.

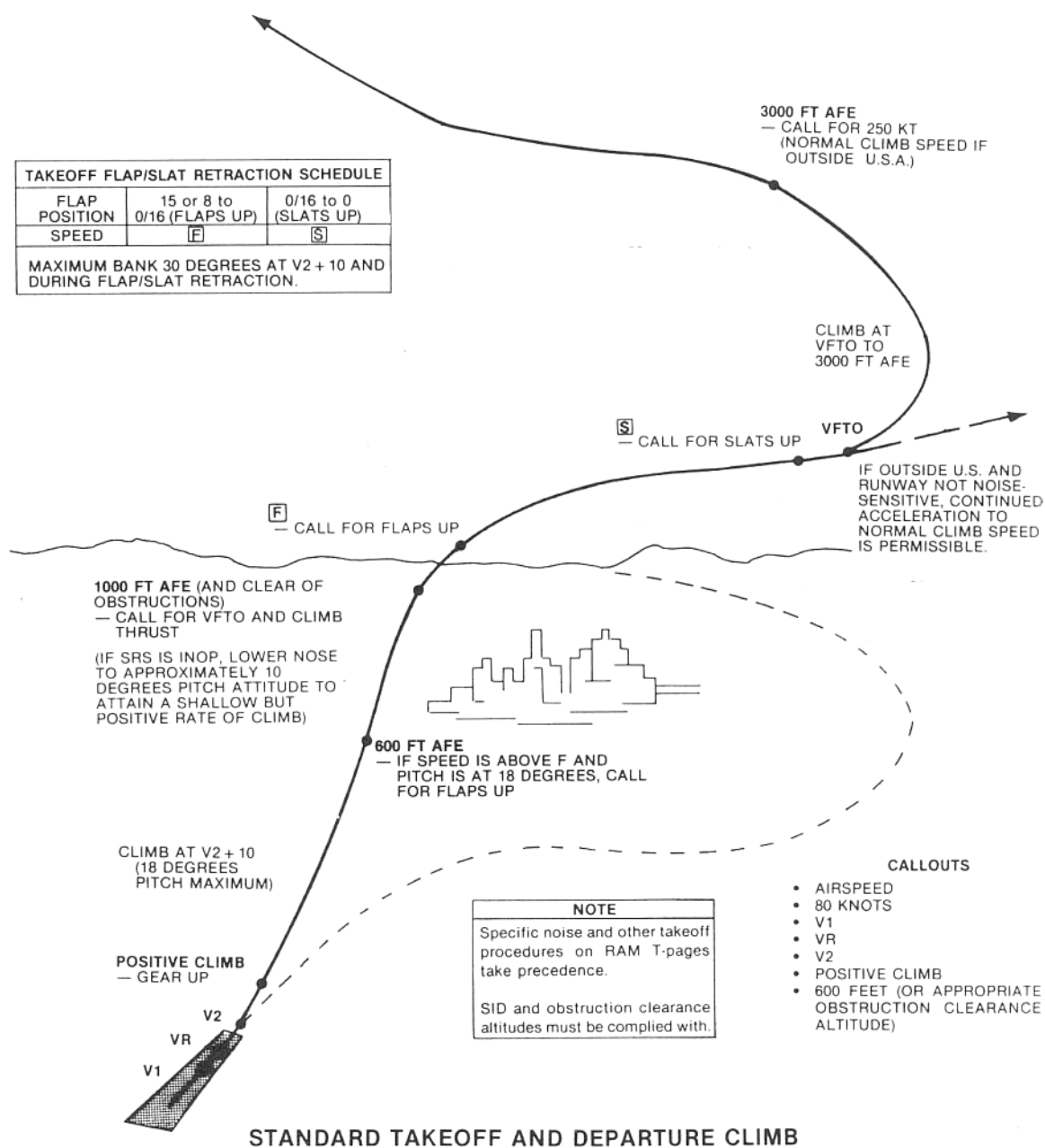
STANDARD TAKEOFF AND DEPARTURE CLIMB

Use the Standard Takeoff and Departure Climb at all airports, unless otherwise indicated on RAM T- or R- pages.

A300 Standard Takeoff and Departure Climb

Oct 4, 1985

Normal Operation, Takeoff



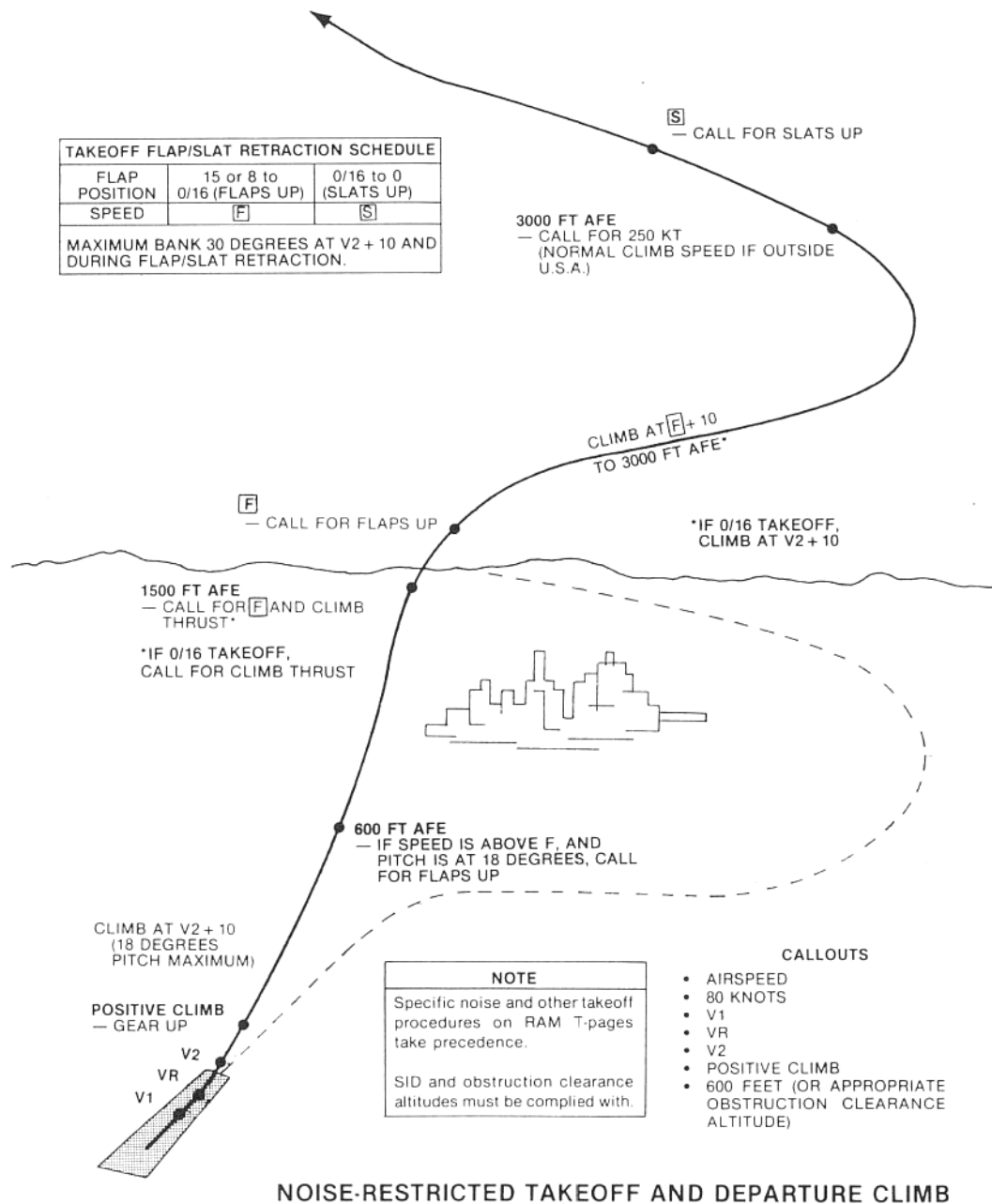
NOISE-RESTRICTED TAKEOFF AND DEPARTURE CLIMB

Use the Noise-Restricted Takeoff and Departure Climb at those airports when noted on the RAM T- or R- pages.

A300 Noise-Restricted Takeoff and Departure Climb

Normal Operation, Takeoff

Oct 4, 1985



FLIGHT DIRECTOR/AUTOTHROTTLE

Normally, the flight director SRS mode and the autothrottle N1 mode are to be used for all takeoffs. HDG SEL and ALT ACQ should also be selected.

PACK OPERATION FOR TAKEOFF

Takeoffs are normally made with both engine bleeds on, both packs on, and the APU off.

If necessary for performance reasons, takeoff may be made with engine bleeds off. Use the bleeds-off correction when computing N1 for the bug sheet. The N1 limit computer will automatically compensate for the bleeds-off condition. Both packs may be operated from the APU.

REDUCED-THRUST TAKEOFF

The majority of takeoffs are not restricted by FAR performance limits; therefore reduced thrust should be used whenever possible to achieve increased life of engine hot section parts and improve engine reliability.

In some circumstances it may be necessary to provide a performance cushion through use of an N1 between normal and fully reduced N1. However, when the actual TOGW is less than the TOGW for the maximum temperature, a performance cushion already exists.

When making a reduced-thrust takeoff, N1 may be increased to the go-around thrust value at any point in the takeoff profile should it be desirable to do so; however, the reduced-thrust procedure provides at least the normal FAR performance protection without resetting N1 to go-around thrust.

NORMAL OPERATION, CLIMB

NORMAL CLIMB SPEED

The published climb speed for flight planning is 300 knots or .78 Mach. This schedule is close to the best rate of climb speed and provides a reasonable compromise considering passenger comfort, fuel consumed, and elapsed time at climb thrust.

A300 Climb Speeds

GW	363	300	250
IAS	320	310	300
MACH	.78	.78	.78

SETTING CLIMB THRUST

The N1 limit computer should be used whenever possible to set climb thrust. If thrust is being set manually, during acceleration, the main engine control does not compensate for the increase in TAT. While accelerating, particularly from takeoff to climb speed, recheck the N1 every 1000 ft or .01 Mach increase, until stabilized on speed. Thereafter, recheck the N1 approximately every 2000 ft.

FUEL USAGE

With center tank fuel:

- Use tank-to-engine fuel feed until 5000 feet AGL.
- At 5000 feet AGL, set center tanks pumps to AUTO and center tank shutoff valves to AUTO.

INTERMEDIATE LEVEL OFF

The proper cruise Mach to be flown during intermediate level off is long range cruise Mach (LRC).

OPERATIONAL VARIATIONS

High Angle Climbs

Do not exceed an 18° pitch attitude.

Takeoff Flaps Climb

The best angle of climb speed with takeoff flaps is $V_2 + 10\text{kt}$. The angle of climb with takeoff flaps is less than with flaps up. However, because of the distance required to accelerate to the flaps-up best angle of climb speed, use the takeoff flap climb configuration to meet close-in angle of climb requirements.

Maximum Angle Climb

To climb to an altitude in the minimum distance over the ground, maintain the 1 engine climb speed on the A300 Speed Placard. Above 20,000 feet add 4 knots for each 1000 feet. Do not use a climb speed faster than .78M. When beyond the critical point or above the critical altitude, resume the normal climb speed.

NORMAL OPERATION, CRUISE

ALTITUDE SELECTION

Buffet boundaries, optimum cruising levels, and performance ceilings are all directly dependent upon gross weight. Before accepting an altitude for cruising, determine optimum altitude, considering the top-of-climb gross weight and anticipated temperature. Optimum altitude is the altitude that gives the best nautical miles per thousand pounds of fuel for a given gross weight. It provides a 1.30g or better buffer protection.

BUFFET BOUNDARY

The minimum recommended moderate turbulence buffet boundary protection is 1.30g. The minimum sever turbulence buffet boundary protection is 2.0g.

CRUISE THRUST

Use of autothrottles is recommended. Trim the throttles to maintain balanced thrust. There is a large drag penalty with unbalanced thrust.

CRUISE PERFORMANCE AND ECONOMY

The flight plan analysis (FPA) estimates of fuel remaining at top-of-descent (TOD) remain constant when:

- All conditions, including altitude and route of flight, cruising speed, wind data, and takeoff gross weight, are as assumed by the FPA.
- The airplane is aerodynamically clean and properly trimmed.

The FPA estimates of fuel remaining at TOD trend downward under any of the following conditions:

- The altitude is lower than planned.
- The speed is faster than planned.
- The along-track wind component results in a lower groundspeed than planned.
- Fuel is not balanced.
- The airplane is not aerodynamically clean or is improperly trimmed.
- Excessive throttle adjustments are made.

The FPA estimates of fuel remaining at TOD trend upward when:

- Takeoff gross weight is significantly less than FPA TOGW.
- The along-track wind component results in a higher groundspeed than planned.
- A more direct route of flight is flown than was planned.

Cruising Fuel Penalties

The following cruising conditions result in the indicated fuel burn increases:

- Altitude 4000 feet low, 2%.
- Speed .02 Mach fast, 2 to 3%.
- Headwind increase or tailwind decrease, 150 to 250 pounds for each minute late.

STEP-CLIMB

Step-climbs as high as the optimum altitude should be considered throughout the cruise phase of flight. The smallest altitude increment allowed by ATC should be used. If making a step-climb of 2000 ft or less, climb at cruise Mach. For step-climbs of more than 2000 feet, climb at normal climb speed.

Step-climbs will result in less fuel being consumed for the trip under the following conditions:

- The new altitude is not above optimum.
- The winds at the new altitude are nearly as favorable as the winds at the old altitude.
- The new altitude is reached prior to the top of descent point. No specific amount of time at the new altitude is required to recover climb fuel.

NORMAL OPERATION, DESCENT

LANDING SPEEDS

Shortly after TOD, the engineer should announce the landing gross weight used to determine landing speeds.

Threshold Speed, V_{th}

V-threshold (V_{th}) is the minimum maneuvering speed in the landing configuration. It is also the airspeed used to establish the landing field length requirement.

Programmed Speed, V_{prog}

V-programmed (V_{prog}) is the target airspeed in the landing configuration. Depending on conditions, determine V_{prog} by adding only one of the following adjustments to V_{th} :

- 5 kt.
- Wind adjustment.
- Possible wind shear adjustment.

To determine which adjustment is to be made, consider the applicable conditions, as follows:

- **5 kt.** For steady winds up to 10 knots, obtain V_{prog} by adding 5 knots to V_{th} .

- **Wind Adjustment.** For steady winds over 10 knots and gusting winds, the effects of high inertia and the lack of direct lift production form increase thrust require a more significant adjustment to V_{th} . The maximum total wind adjustment is 20 knots.
 - $V_{prog} = V_{th} + \text{reported gust value} + \frac{1}{2} \text{ runway headwind component},$
 - $V_{prog} = V_{th} + 20 \text{ knot maximum}.$
- **Possible Wind Shear Adjustment.** Several conditions may indicate the possibility of wind shear being present for an approach. Some of these are:
 - Frontal passage.
 - Extreme temperature inversions at low altitude.
 - Thunderstorms.
 - Heavy rain during the approach.
 - Virga.
 - Wind reported at the surface significantly different from that observed at altitude.
 - Pilot reports of wind shear on the approach path.

In these cases, an adjustment to V_{th} of up to 20 knots may be made.

After a single value for V_{prog} is determined, proceed as follows:

- Set one outer bug to V_{prog} on each airspeed indicator.
- Crosscheck bug settings.

When landing flaps are selected, the amber bug must be set to V_{prog} . (There will now be two bugs on V_{prog} .)

NORMAL DESCENT

The normal descent is with idle thrust at cruise Mach or 280 knots, whichever is slower. Lower the nose simultaneously with thrust reduction to maintain normal descent speed schedule.

DESCENT VARIATIONS

Clean configuration is preferred. Descents with flaps or gear down are airspeed-limited, noisy, and expensive. Also, at limit speed, flaps cause buffeting. Speed brakes should only be used when they are needed to maintain the desired descent profile. They may be used for speed reduction or increasing the angle of descent. Do not use speedbrakes with airspeed below 180 knots.

HIGH-SPEED DESCENT

A high-speed descent can save a few minutes trip time, but it should only be used after a consideration of the effect on passenger comfort and the reduced descent profile flexibility. The speed in a high-speed descent should not exceed V_{mo-15} .

FUEL SYSTEM

The fuel system should be placed in the tank-to-engine configuration before landing.

OPERATIONAL VARIATIONS

Holding, Speed and Configuration

If the holding airspeed is above ATC maximum, request a higher speed from ATC. If ATC cannot approve a higher speed, use the slats as necessary to comply with ATC speed limitations. The holding airspeeds provide buffet margins for holding in smooth air. If turbulence is encountered, maintain the recommended turbulence airspeed and advise ATC of that speed.

Holding, Altitude

If there is a choice, a holding altitude of about FL200 is a reasonable compromise between low and high altitude holding. This is low enough for an approach in a reasonable amount of time, but high enough to decrease climb fuel requirements in event of diversion.

NORMAL OPERATIONS, APPROACH

AIRPLANE CONTROL

The normal approach is an ILS approach. The approved methods of airplane control during approaches are:

- Coupled (dual autopilot)
- Coupled (single autopilot)
- Manual (hand flown)

SPEED CONTROL

Minimum maneuvering speeds are noted on the profile diagrams, and are referenced to V_{th} . Normal maneuvering speeds, however, are also noted on the diagrams and are referenced to V_{prog} .

After landing flaps have been selected, the fast-slow indicator on the ADI may be used as the primary speed reference.

Note: If autothrottles are armed, the alpha floor function may not permit speed reduction to $V_{th} + 70$ when clean. In this case, a slightly higher speed should be maintained or slats should be extended.

RATE OF DESCENT CONTROL

Below 500 feet AGL, for any sink rate of more than 1000 fpm, take immediate corrective action or abandon the approach.

Sink rates at 100 feet AGL should not exceed 800 fpm regardless of conditions.

FLAP EXTENSION

As the speed is reduced for landing, the flaps should normally be extended at or near the minimum maneuvering speed for the existing flap setting. Regardless of weather conditions, for all straight-in approaches, the airplane must be in the landing configuration, with the landing checklist complete, not lower than 1000 feet AFE (500 feet AFE in VMC). At this point the airplane must be stabilized on the glidepath, stabilized on V_{prog} , with the proper sink rate, and trimmed for zero control forces.

FLIGHT DIRECTOR MANAGEMENT

Although it is used in other phases of flight, the primary purpose of the flight director is to provide

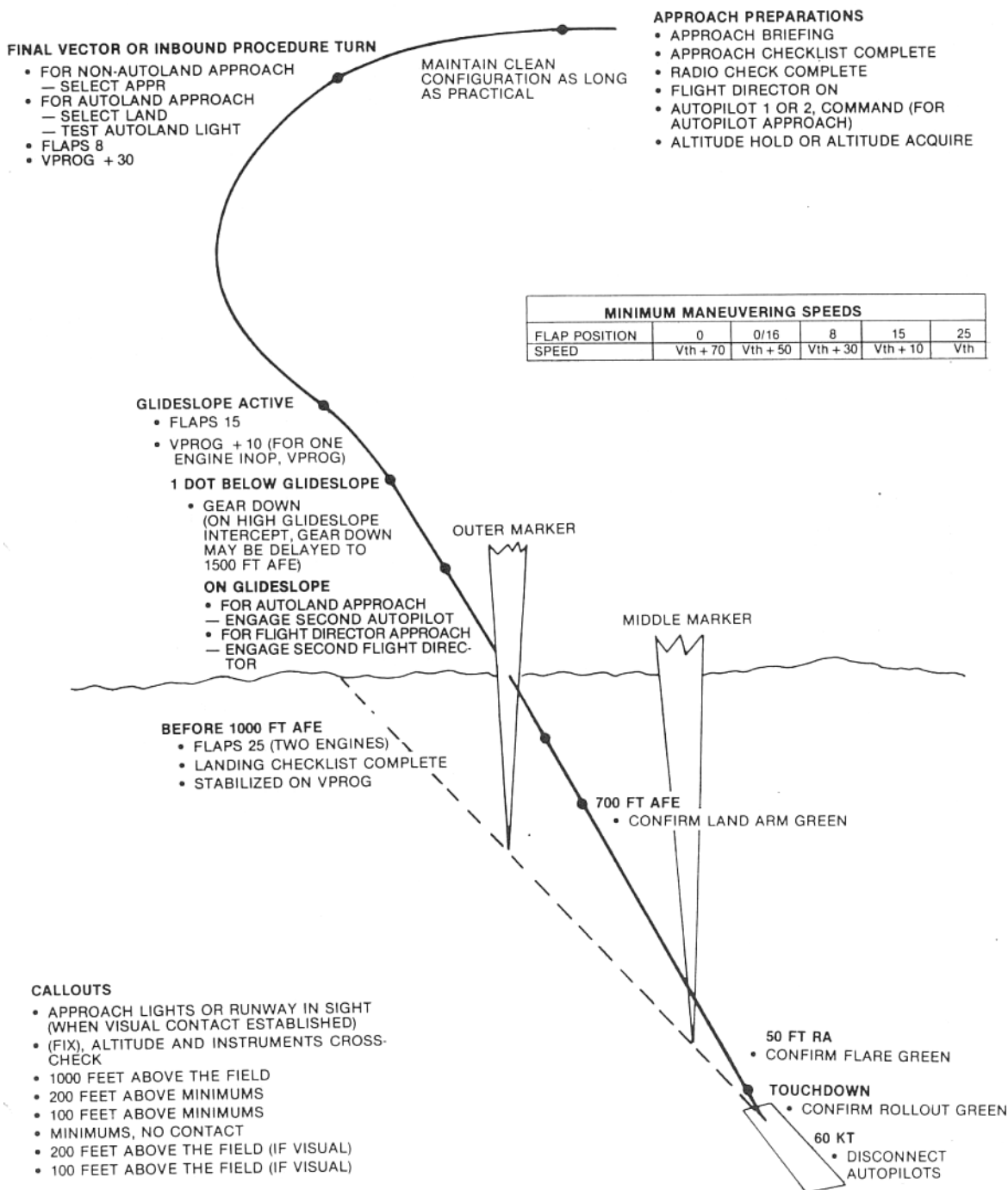
roll and pitch commands during the final stages of an instrument approach. In the approach area the flight director should be used to aid in heading control.

APPROACH DIAGRAMS

A300 Precision Approach Flight Director and Autopilot Management

Jun 14, 1985

Normal Operation, Approach



PRECISION APPROACH FLIGHT DIRECTOR AND AUTOPILOT MANAGEMENT 406.115 p 7

A300 Non-Precision Approach

Oct 12, 1984

Normal Operation, Approach

MINIMUM MANEUVERING SPEEDS					
FLAP POSITION	0	0/16	8	15	25
SPEED	$V_{th} + 70$	$V_{th} + 50$	$V_{th} + 30$	$V_{th} + 10$	V_{th}

APPROACH PREPARATION

- APPROACH BRIEFING
- APPROACH CHECKLIST COMPLETE
- RADIO CHECK COMPLETE

FINAL VECTOR OR INBOUND PROCEDURE TURN

- FLAPS 8
- $V_{PROG} + 30$

ESTABLISHED ON INBOUND COURSE

- FLAPS 15
- $V_{PROG} + 10$
(FOR ONE-ENGINE INOP, V_{PROG})
- GEAR DOWN

FINAL APPROACH FIX

- START TIMING TO MISSED APPROACH POINT

BEFORE 1000 FT AFE

- LANDING FLAPS
- LANDING CHECKLIST COMPLETE
- STABILIZED ON V_{PROG}

NOTE

Landing flaps may be lowered before, at, or after the final approach fix as long as the "Before 1000 Ft AFE" requirements are met.

MINIMUM DESCENT ALTITUDE

CALLOUTS

- APPROACH LIGHTS OR RUNWAY IN SIGHT (WHEN VISUAL CONTACT ESTABLISHED)
- (FIX), ALTITUDE AND INSTRUMENTS CROSSCHECK
- 1000 FEET ABOVE THE FIELD
- 200 FEET ABOVE MINIMUMS
- 100 FEET ABOVE MINIMUMS
- MINIMUMS
- MISSED APPROACH POINT, NO CONTACT
- 200 FEET ABOVE THE FIELD
- 100 FEET ABOVE THE FIELD

MISSED APPROACH POINT

NONPRECISION APPROACH, STRAIGHT IN

A300 Circling Approach

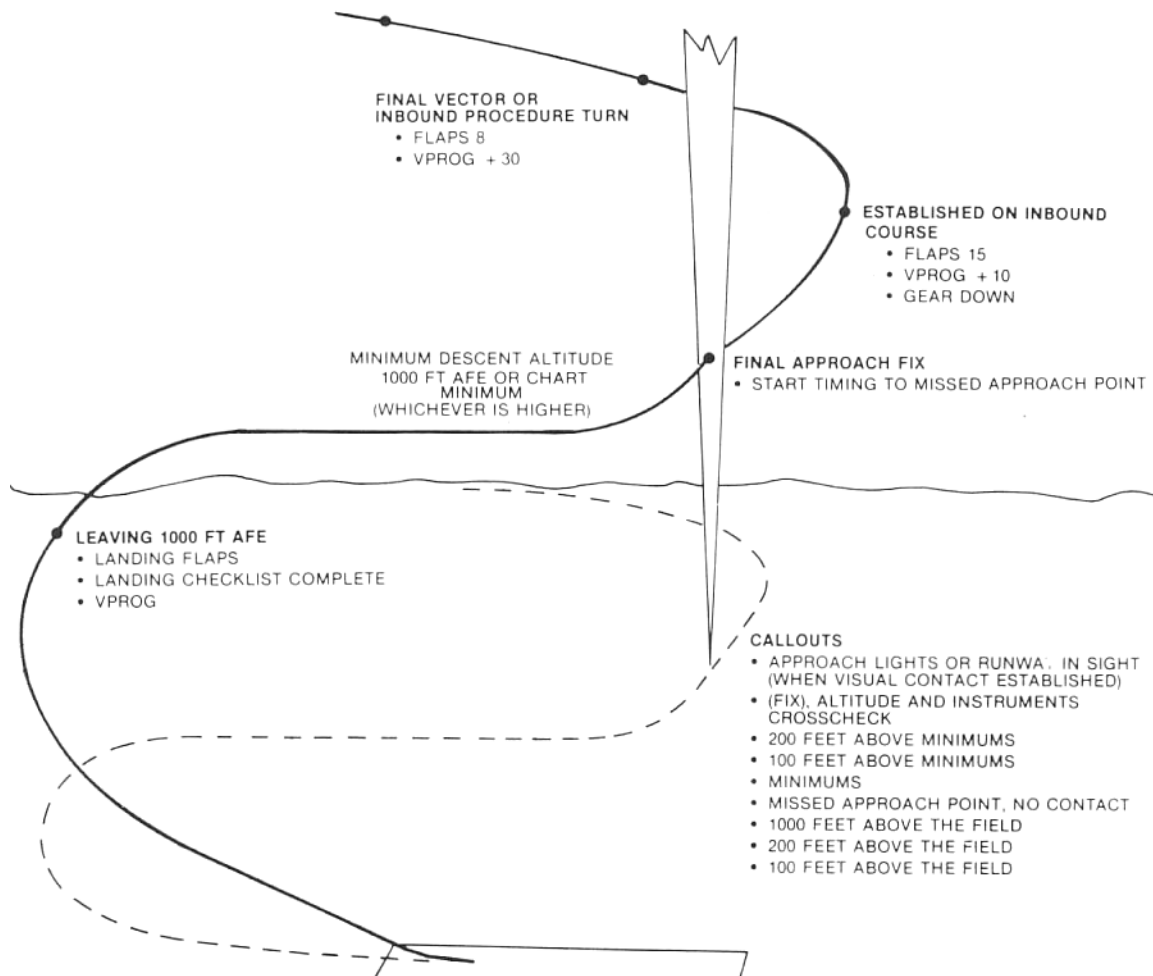
Normal Operation, Approach

Sep 17, 1984

MINIMUM MANEUVERING SPEEDS					
FLAP POSITION	0	0/16	8	15	25
SPEED	$V_{th} + 70$	$V_{th} + 50$	$V_{th} + 30$	$V_{th} + 10$	V_{th}

APPROACH PREPARATION

- APPROACH BRIEFING
- APPROACH CHECKLIST COMPLETE
- RADIO CHECK COMPLETE



CIRCLING APPROACH

A300 Visual Approach

Feb 7, 1986

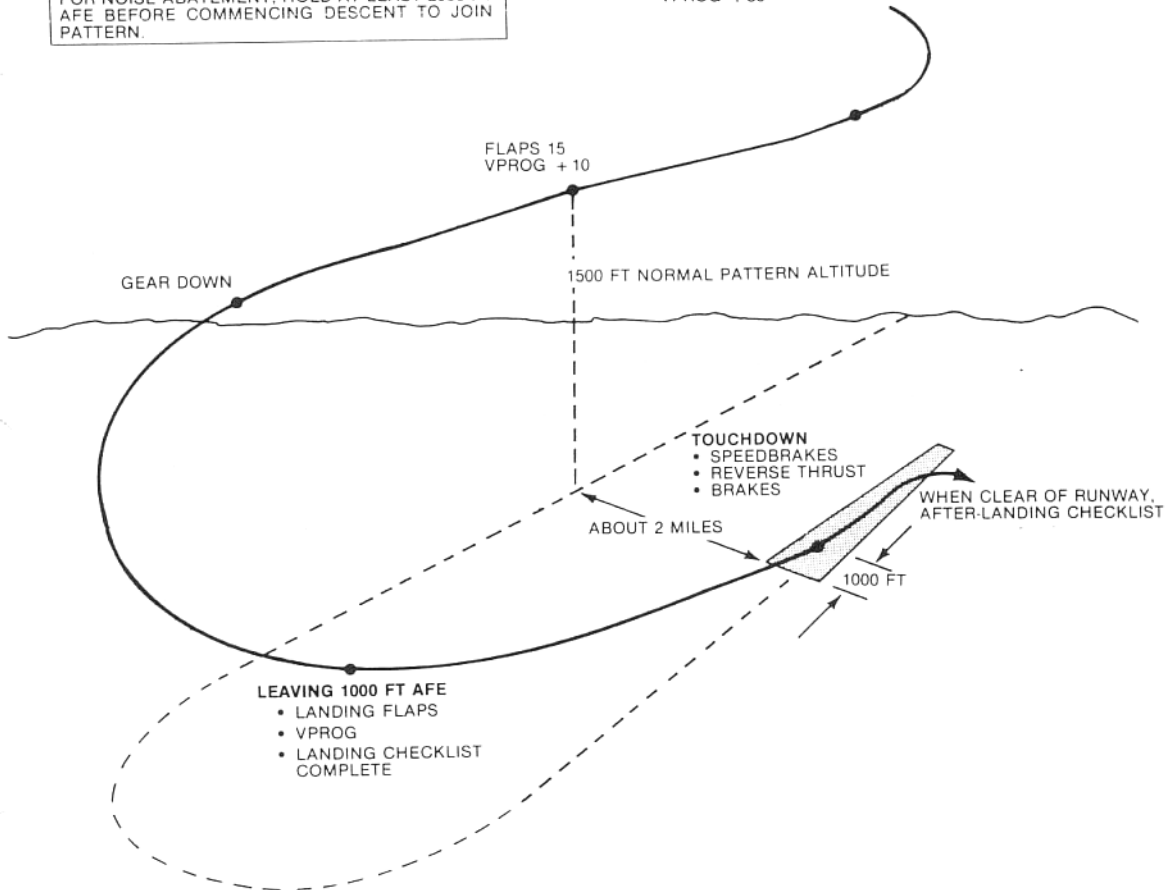
Normal Operation, Approach

MINIMUM MANEUVERING SPEEDS					
FLAP POSITION	0	0/16	8	15	25
SPEED	$V_{th} + 70$	$V_{th} + 50$	$V_{th} + 30$	$V_{th} + 10$	V_{th}

NOTE	
FOR NOISE ABATEMENT, HOLD AT LEAST 2000 FT AFE BEFORE COMMENCING DESCENT TO JOIN PATTERN.	

APPROACH PREPARATION

- APPROACH BRIEFING
- APPROACH CHECKLIST COMPLETE
- RADIO CHECK
- FLAPS 8
- $V_{PROG} + 30$



CALLOUTS

- 1000 FEET ABOVE THE FIELD
- 200 FEET ABOVE THE FIELD
- 100 FEET ABOVE THE FIELD

VISUAL APPROACH

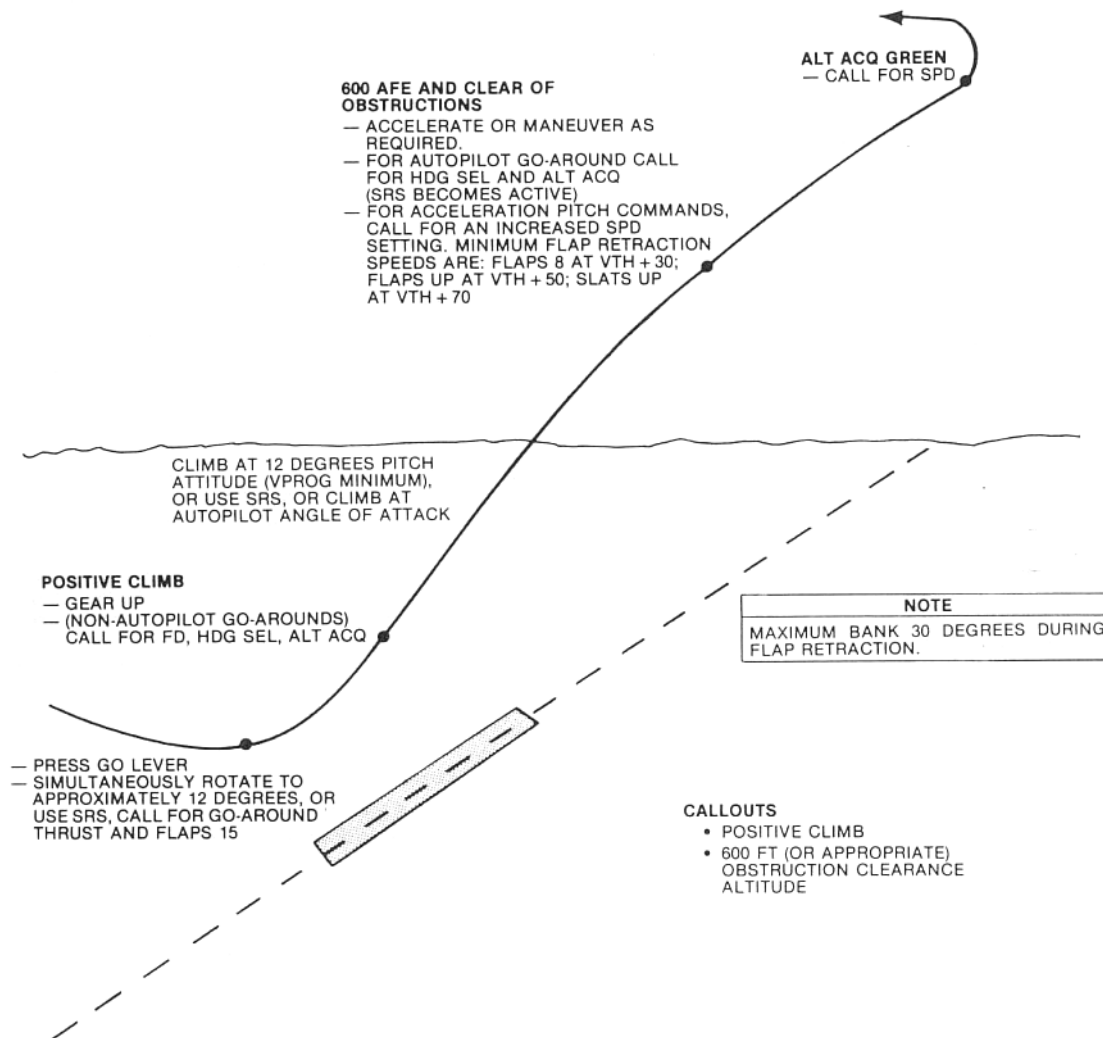
MISSED APPROACH

In the event of a missed approach, press either go-lever. Simultaneously apply go-around thrust and retract flaps to 15. If autothrottles are armed, thrust will advance automatically.

A300 Missed Approach

Jun 14, 1985

Normal Operation, Approach



NORMAL OPERATION, LANDING

AIRPLANE CONTROL

The runway aiming point is 1500 feet beyond the threshold. The main gear touchdown target is 1000 feet. Landing gross weight affects more than just Vth. The greater the momentum, the more time and control force required for flightpath corrections, and with the higher approach speeds, the less time available.

FINAL APPROACH

Use of a 2.75° to 3° slope is recommended for all landings. On a 3° glidepath, the sink rate is approximately 700 fpm no-wind for an average approach speed. Below 500 feet AGL, for any sink

rate of more than 1000 fpm, take immediate corrective action or abandon the approach. Sink rates at 100 feet should not exceed 800 fpm regardless of conditions.

TOUCHDOWN

Continue the approach in a stabilized attitude, maintaining V_{prog} , on a proper glideslope and aligned with the runway centerline. At approximately 50 feet (radio altitude), the pilot should shift his vision from the runway aim point to a point down the runway. At approximately 30 feet (radio altitude), flare the airplane to reduce the rate of descent while continuing to fly onto the runway. Retard the throttles to idle thrust at or just before touchdown. Avoid excessive nose-high attitudes. An attitude in excess of approximately 13° can cause the tail to strike the runway.

Do not permit the airplane to float. If the airspeed over the threshold is above V_{prog} , accept that speed and land the airplane. The rate of deceleration on the runway is approximately three times greater than in the air.

At touchdown, pull all reverse levers into reverse and promptly lower the nosewheel smoothly. Increased reverse thrust may be smoothly applied after the interlock releases while the nose is being lowered. Confirm that auto spoiler extension has occurred.

STOPPING

Use autobrakes on every landing. When MIN or MED is deceleration rate is selected, autobraking begins 10 seconds after the ground spoilers are deployed (which occurs at 50 knots main wheel speed). If HI or MAX is selected, the brakes are applied upon touchdown; anticipate a significant pitch down tendency which can require up to full elevator to control.

Normally select the following:

- MIN for routine braking on runways over 10,000 feet long.
- MED for routine braking on runways less than 10,000 feet long.
- MED or HI for slippery runways.
- HI for very short runways.
- MAX for emergency braking only.

REVERSING

With the spoilers operating automatically, it is possible to apply reverse thrust sooner in the landing roll. Reverse thrust is most effective at higher roll-out speeds and becomes less effective as the speed is reduced.

Normally, 60 to 80% N1 should be used for reverse thrust. If stopping requirements dictate, full reverse thrust should be used. Plan to be at idle reverse by 60 knots.

OPERATIONAL VARIATIONS

Crosswind Landings

On final approach, maintain runway alignment by crabbing. Before flaring, gradually remove the crab by applying downwind rudder. Prevent downwind drift by applying aileron to lower the upwind wing. Land with the upwind wing slightly low. The maximum crosswind recommended for landing on a slippery runway is 15 knots.

NORMAL OPERATION, AFTER LANDING

TAXI-IN

Allow the engines to idle for at least two minutes before shutdown. This idling period permits the engines to cool slowly to prevent possible damage resulting from rapid temperature changes. If high reverse thrust was used (EGT above 750°C) allow the engines to idle for three minutes before shutdown.

After the airplane has cleared the runway, either engine may be shut down to conserve brake life, reduce taxi speed, and save fuel.