COMMERCIAL LEVEL SIMULATIONS

AIRBUS INDUSTRIE

A300-600

TAXI, TAKEOFF, CLIMB, CRUISE, DESCENT & LANDING

Commercial Level Simulations
www.CommercialLevel.com

Disclaimer

This manual is not provided from, or endorsed by Airbus Industrie, or any airline airline in any way.

Any exact similarities between this manual and Commercial Level Simulations aircraft to actually aircraft, procedures, or airline carriers are strictly coincidental.

All copyrights remain the property of their respective owners.

The procedures contained within are the Commercial Level Simulations interpretation of generic flight operations. These procedures are not always accurate in all situations.

All diagrams have been either been recreated to mimic actual procedures or scenarios, or remain the copyrights of the respective owners. The purpose of the manual is not to claim ownership of the procedures or diagrams herein, rather, to show flight operations of the A300-600R based on available information.

This manual is not intended for real world flight.

Commercial Level Simulations aircraft are intended as an add-on for Microsoft Flight Simulator 2004.

The visual model, 2D panel, virtual cockpit, flight model and sounds are based on the most realistic data obtainable for the Airbus A300-600 Basic and A300-600R.

Commercial Level Simulations

PREFACE

This manual serves as a reference for operating procedures and training maneuvers. The flight profiles show the basic recommended configuration during flight.

The maneuvers should normally be accomplished as illustrated. However, due to airport traffic, ATC distance separation requirements, and radar vectoring, modifications may be necessary.

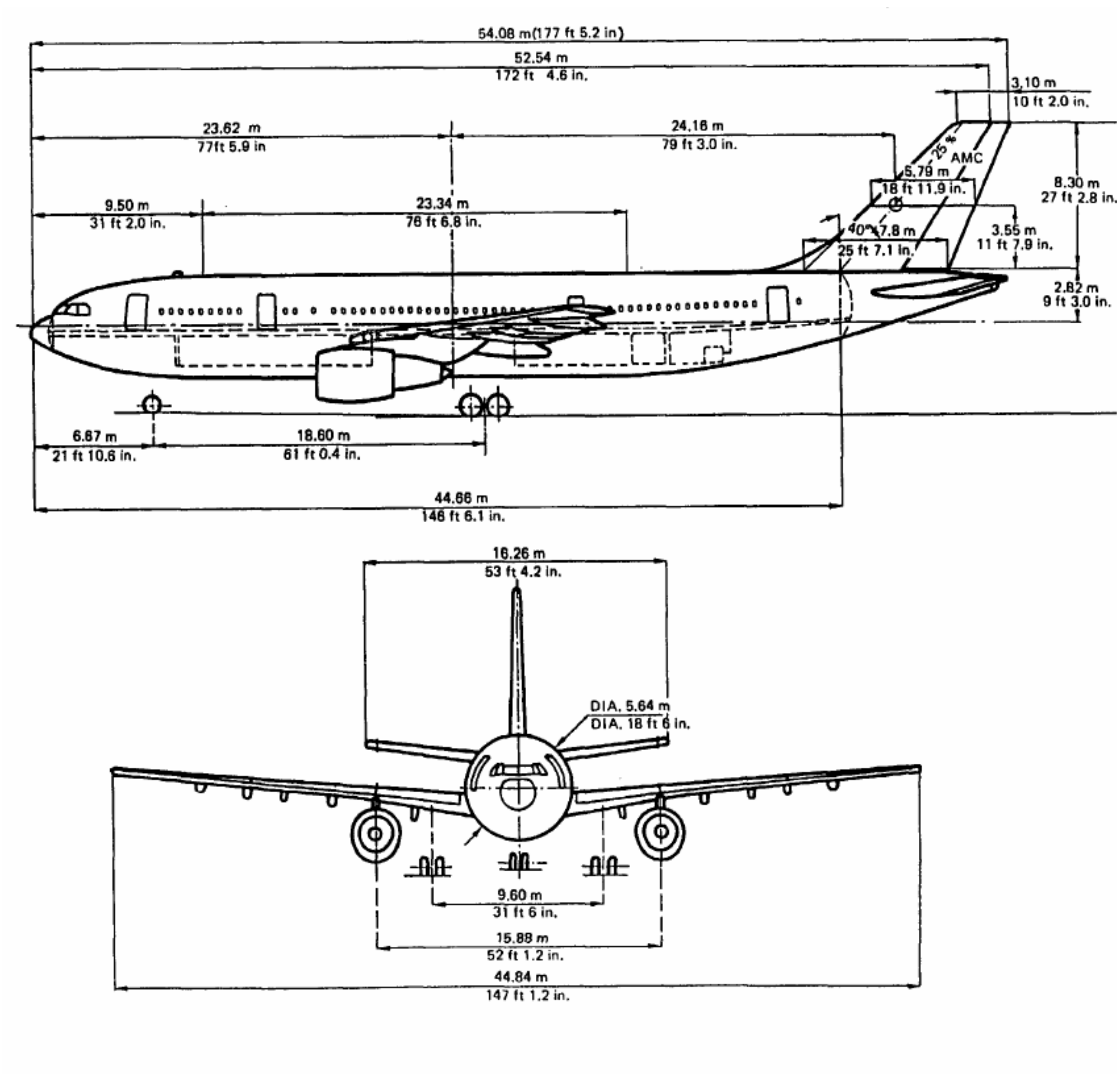
Exercise good judgment.

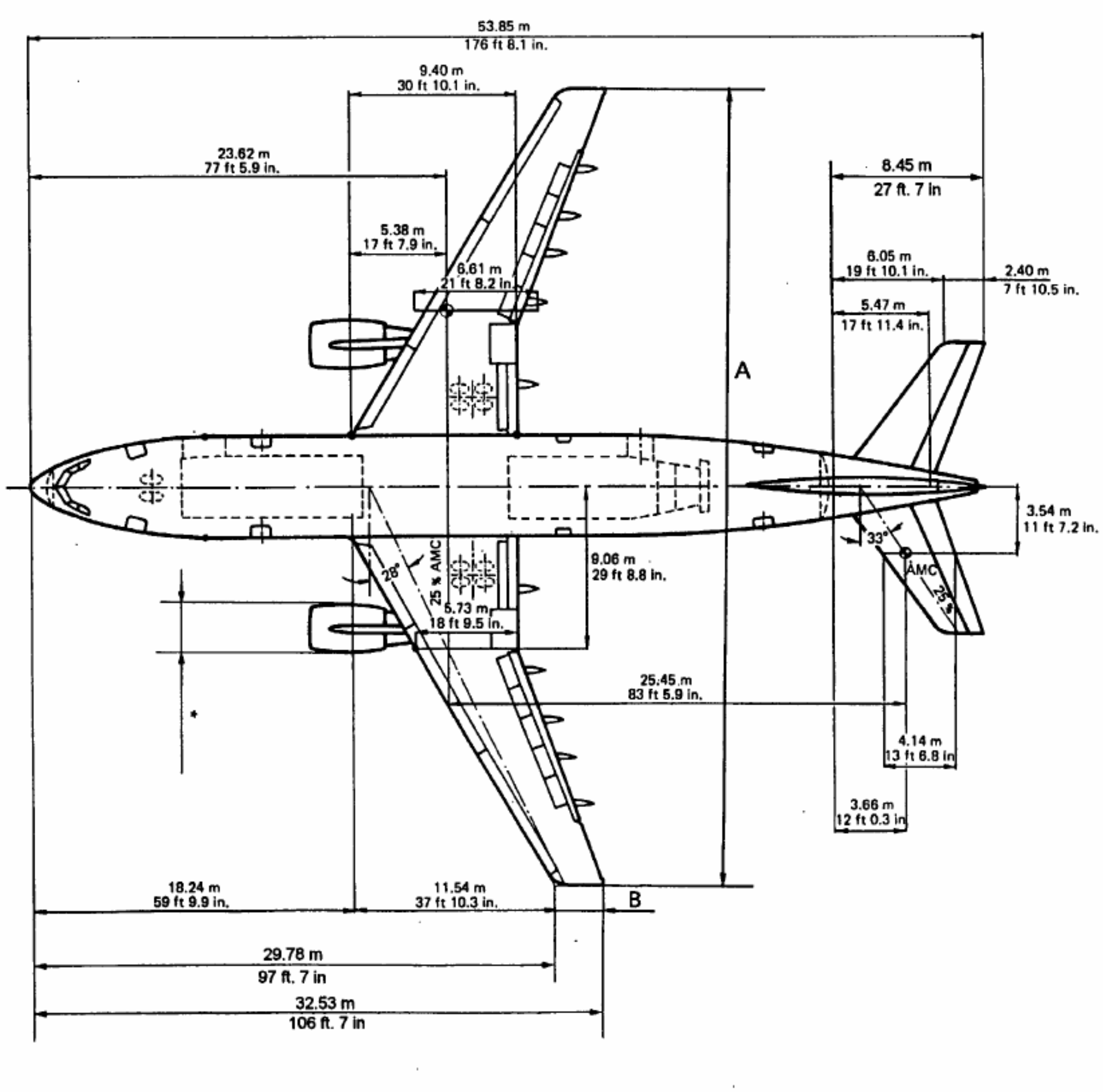
PRINCIPLE DIMENSION AND AREAS

Airbus A300-600R – Aircraft Reference Manual
Flight Simulator 2004

Airbus A300-600R - Specs

Dimensions (-200):
Span 197 ft 10 in
Length 194 ft 11 in
Height 57 ft 20 in





Engines:
GE CF6-80C2A1 x2
TO Thrust Rating: 60,800 lb x 2

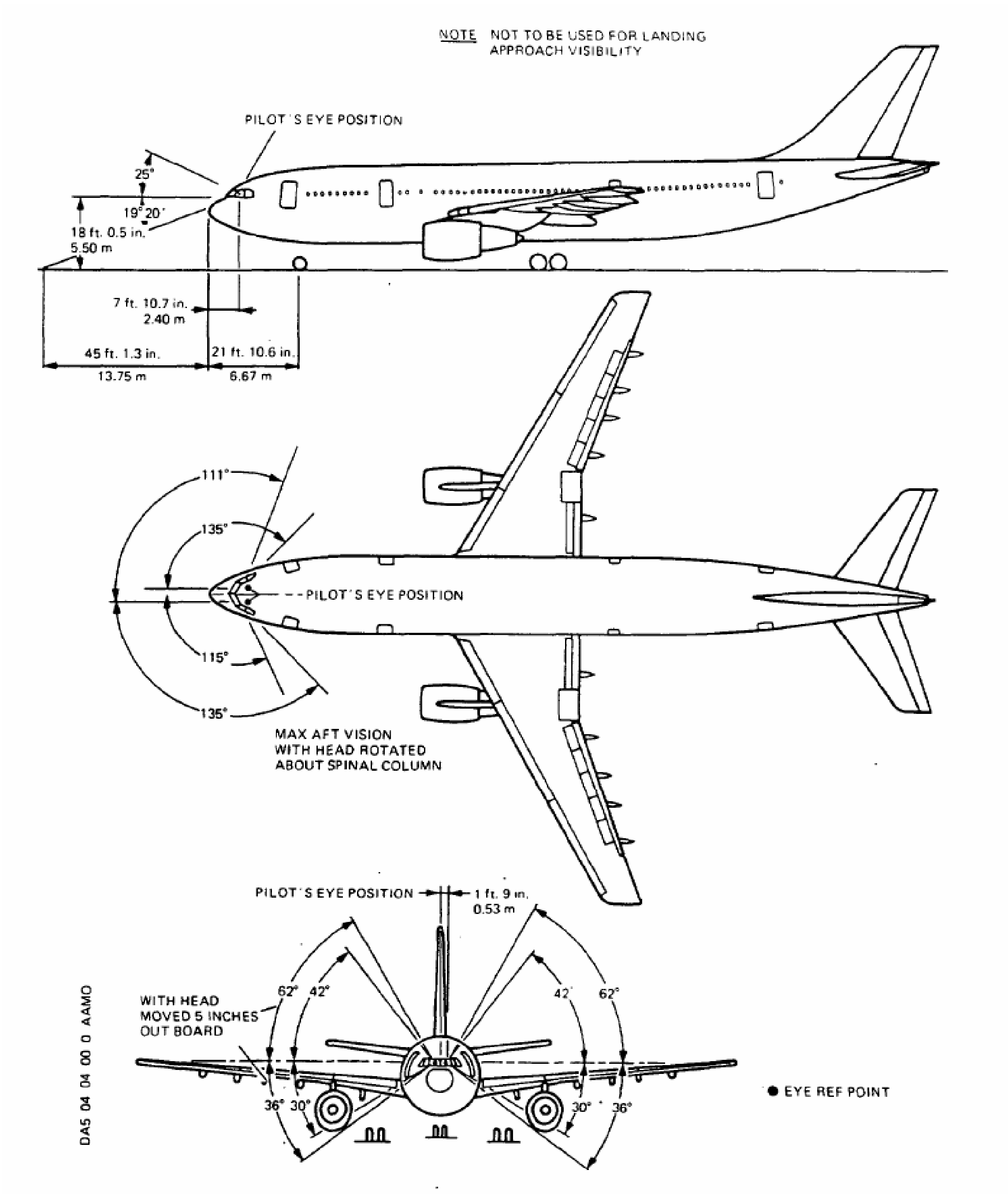
PW4158
TO Thrust Rating: 58,000 lb x2

Weight and Capacities
MaxTOW: 375,890 lb
ZFW: 286,600 lb
Max Fuel Cap.: 18,008 US Gal (116,439 lb)

Performance
Typical Cruise Speed:
M.78 – Long Range Cruise
M.80 – High Speed Cruise
M.82 – Max Speed Cruise
Range: 4,050 nm (GE), 3,800 nm (PW)
Fuel flow: 5300 pph per engine (GE) / 5600 pph per engine (PW) @ cruise FL350 @ M.78

BASIC PILOT INFORMATION

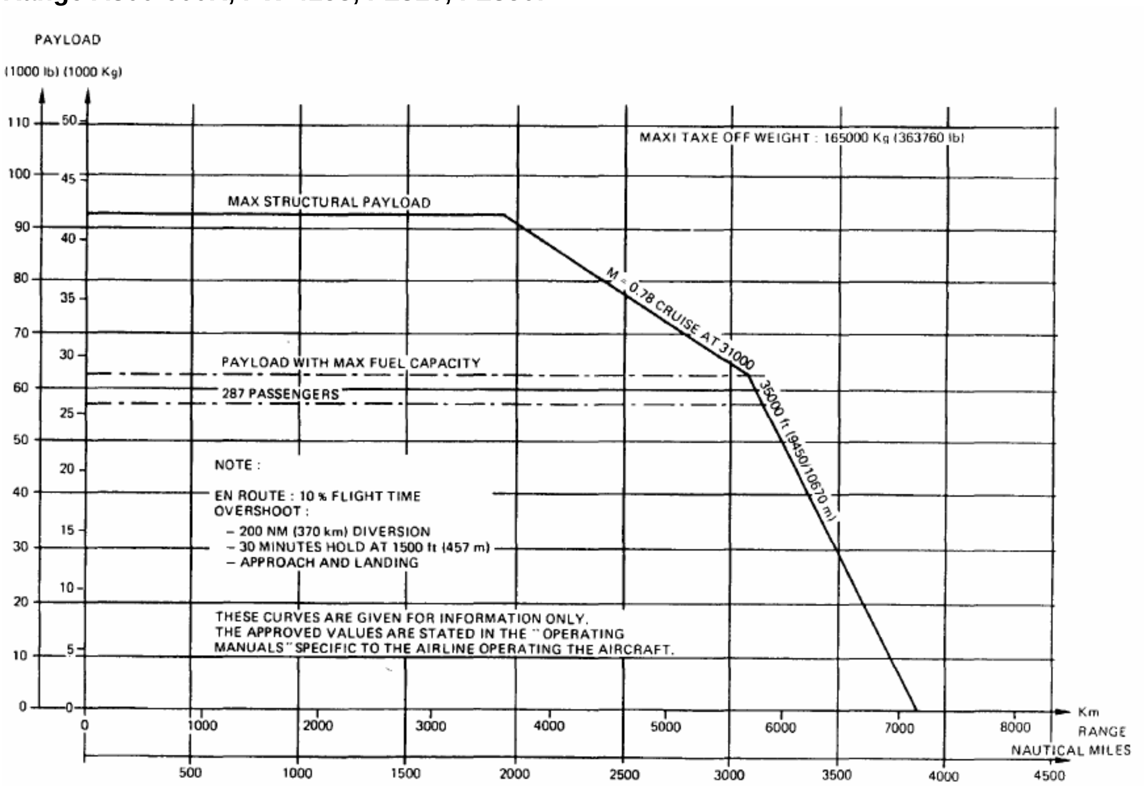
Pilot's view reference point is approximately 18.0 feet from the ground, with ground visibility limited to 45.10 feet looking down at an angle of 19.20 degrees. For proper engine and aircraft operations, the captain must view the EICAS as the engines and wings **are not** visible from the flight deck. Pilot's rearward view is based on the captain's eye reference point with 135 degrees of max travel.



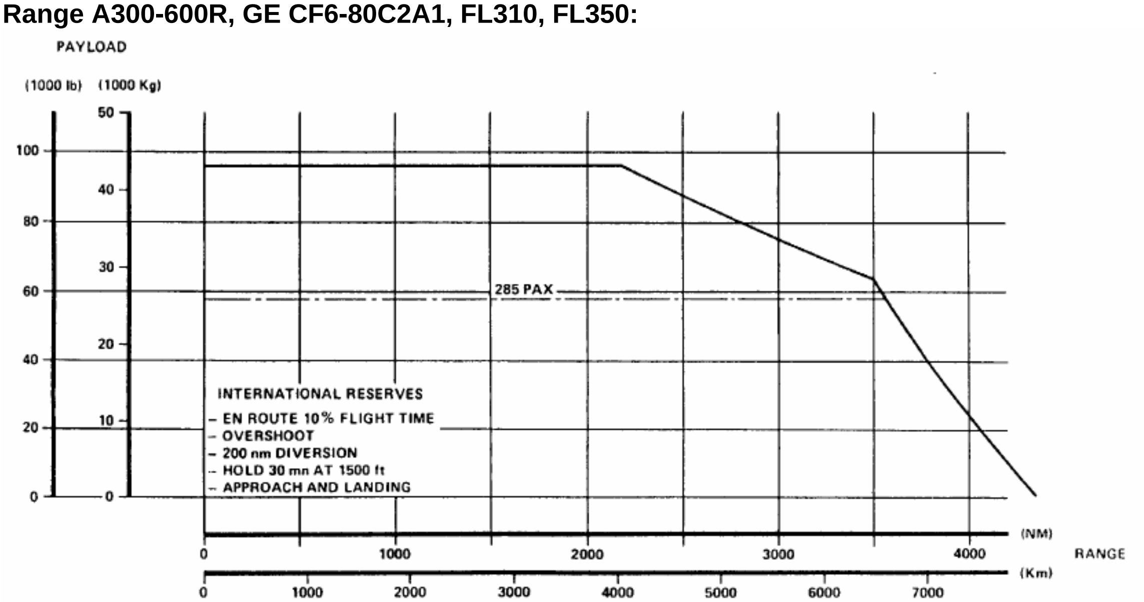
TAXI

1) Prior to taxi, select the flight plan in accordance with the aircraft range.

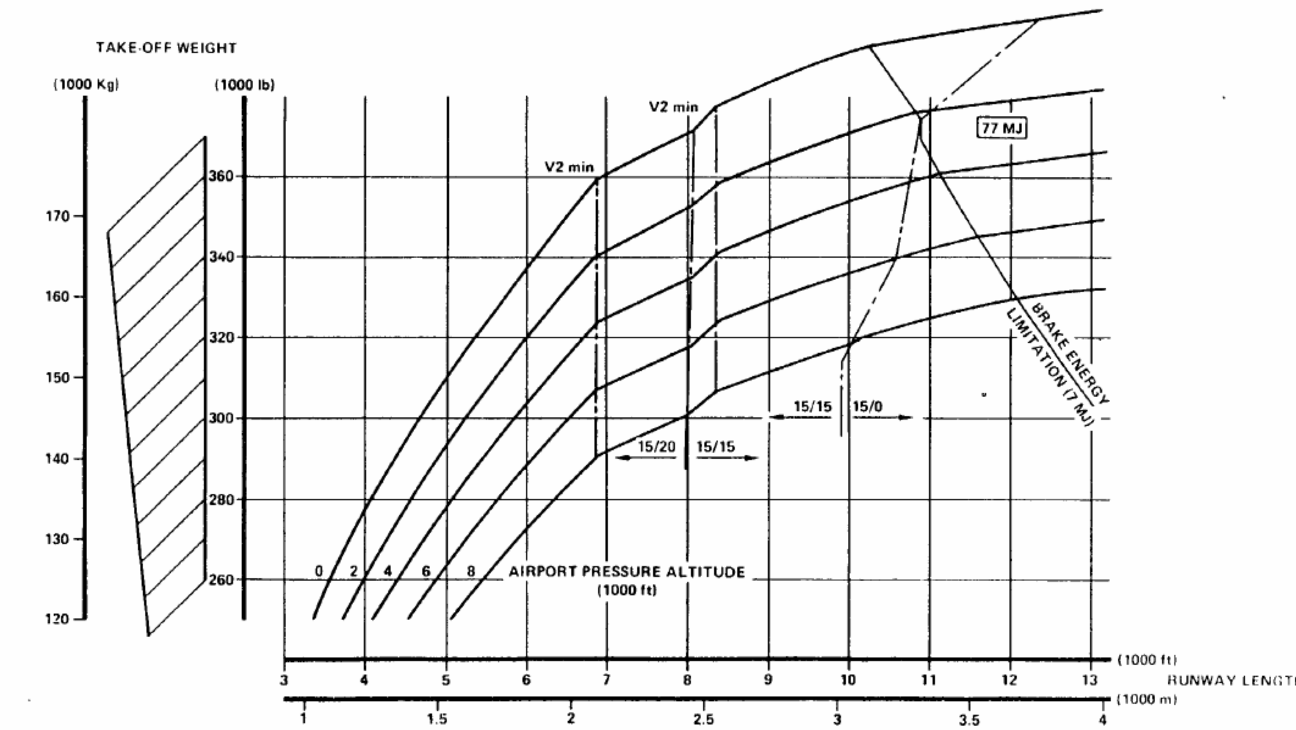
Range A300-600R, PW 4158, FL310, FL350:



Range A300-600R, GE CF6-80C2A1, FL310, FL350:



2) Determine the aircraft required runway takeoff length for the trip gross weight.



3) Determine the aircraft reference speeds. These speeds are based on runway length and aircraft weight. Note: always add the wind component. Add ½ the steady wind component, plus all the gust component. Do not exceed 20 knots. **CLS recommended takeoff flap position is flaps position 1, slat 16 degrees/flaps 8 degrees**:

TAKEOFF WEIGHT LB X 1000	RUNWAY LENGTH								
	5000 Ft Rwy	6000 Ft Rwy	7000 Ft Rwy	8000 Ft Rwy	9000 Ft Rwy	10000 Ft & Longer Rwy			
	V1 Vr V2	V1 Vr V2	V1 Vr V2	V1 Vr V2	V1 Vr V2	V1 Vr V2	F	S	VFTO
364						159 162 167	170	214	249
360				155 158 163	156 159 164	158 151 166	169	213	248
350				147 150 155	152 155 160	157 160 165	167	210	244
340			144 147 152	146 149 154	151 154 159	156 159 164	165	207	240
330			142 145 150	146 149 154	149 152 157	153 156 161	163	204	237
320			139 142 147	143 146 151	147 150 155	152 155 160	160	201	233
310	134 137 142	135 138 143	138 140 145	141 144 149	145 148 153	149 152 157	158	198	230
300	132 135 140	133 136 141	135 138 143	139 142 147	143 146 151	147 150 155	156	195	226
290	131 134 139	132 135 140	134 137 142	138 141 146	141 144 149	145 148 153	153	192	222
280	129 132 137	130 133 138	131 134 139	135 138 143	139 142 147	142 145 150	150	188	218
270	127 130 135	127 130 135	129 132 137	133 136 141	137 140 145	141 144 149	148	185	214
260	124 127 132	124 127 132	126 129 134	131 134 139	134 137 142	139 142 147	146	181	210
250	121 124 129	121 124 129	123 126 131	129 132 137	134 137 142	139 142 147	143	178	206
240	119 122 127	119 122 127	123 126 131	129 132 137	134 137 142	139 142 147	141	174	202
230	117 120 125	119 122 127	123 126 131	129 132 137	134 137 142	139 142 147	139	171	198

4) The nose wheel steering and the engine thrust are used to taxi the airplane.

5) Make sure you have the necessary clearance when you go near a parked airplane or other structures.

6) Set takeoff flaps. CLS recommended setting is Flaps position 1.

7) When the APU in the taxi airplane or the parked airplane is on you must have a minimum clearance of 50 feet between the APU exhaust port and the adjacent airplane's wingtip (fuel vent).

8) The taxi speed must not be more than approximately 30 knots. Speeds more than 30 knots added to long taxi distances would cause heat to collect in the tires. Recommended speed is 20 knots. Beware of changing GS numbers due to tailwinds during taxi.

9) Before making a turn, decrease the speed of the airplane to a speed of approximately 8 to 12 knots. Make all turns at a slow taxi speed to prevent tire skids.

10) Do not try to turn the airplane until it has started to move.

11) Make sure you know the taxi turning radius. **Caution: The A300-600R is an extremely long aircraft. Take particular care of the wheelbase when turning.**

12) Monitor the wingtips and the horizontal stabilizer carefully for clearance with buildings, equipment, and other airplanes.

13) When a left or right engine is used to help make a turn, use only the minimum power possible.

14) Do not let the airplane stop during a turn.

15) Do not use the brakes to help during a turn. When you use the brakes during a turn, they will cause the main and nose landing gear tires to wear.

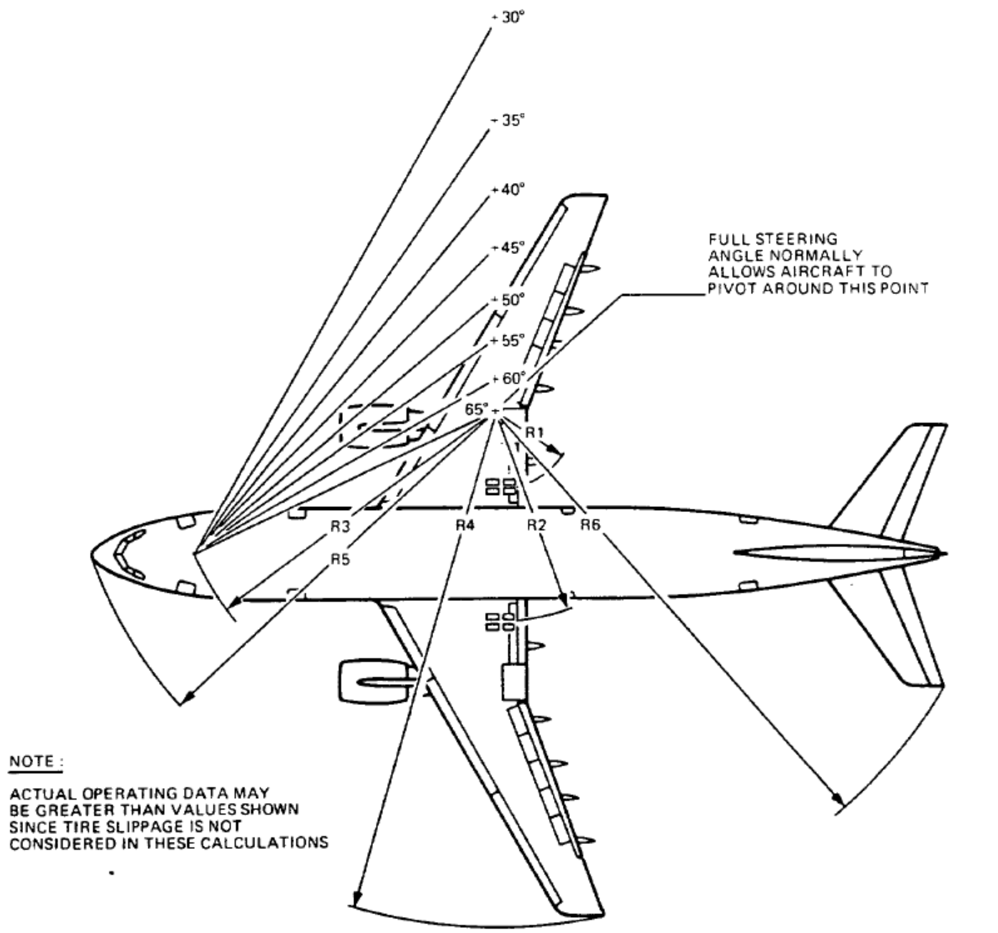
16) When it is possible, complete the taxi in a straight-line roll for a minimum of 10 feet.
NOTE: This will remove the torsional stresses in the landing gear components, and in the tires.

17) Use the Inertial Reference System (IRS) in the ground speed (GS) mode to monitor the taxi speed.

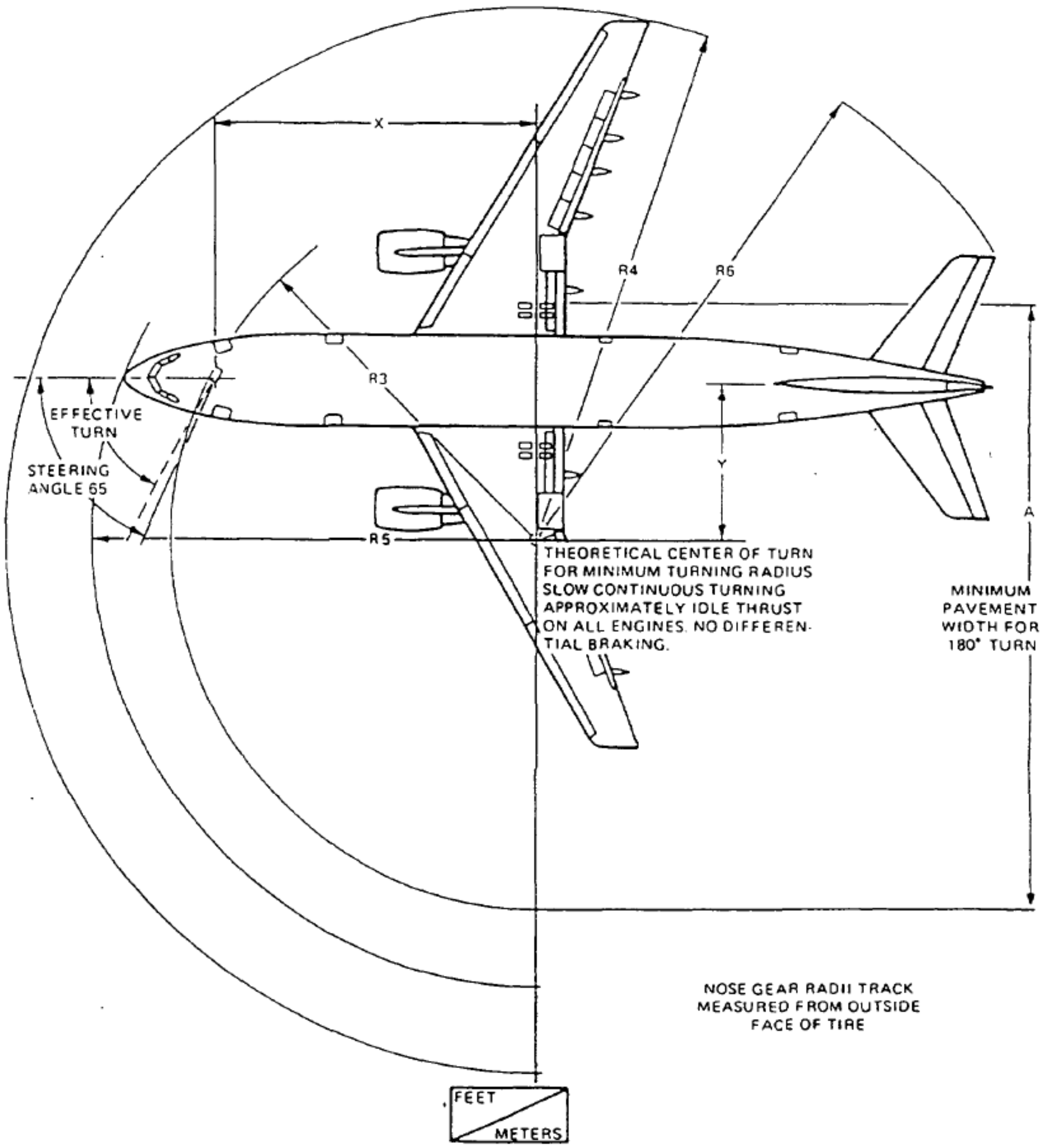
18) If the airplane taxi speed is too fast (with the engines at idle), operate the brakes slowly and smoothly for a short time. NOTE: This will decrease the taxi speed.

19) If the taxi speed increases again, operate the brakes as you did in the step before.

20) Always use the largest radius possible when you turn the airplane. NOTE: This will decrease the side loads on the landing gear, and the tire wear will be decreased.



21) Again, extra care must be given to turn the aircraft due to the fuselage length and wingspan. A minimum distance from the edge of the pavement must be maintained to reverse the aircraft's direction. Minimum distance with 61 degree steering angle is 126 FT:



C.G. AC	EFFECTIVE TURN ANGLE	X	Y	A	R3	R4	R5	R6
FWO 15 %	61°6	61.35 18 70	33.11 10.09	122.26 37.26	69.71 21.25	109.27 33.31	89.29 27.21	111.15 33.88
AFT 34 %	58°3	61.35 18.70	37.89 11.55	125.66 38.30	72.11 21.98	114.01 34.75	91.47 27.88	113.35 34.55

19) Operate the brakes to stop the airplane.

20) Set the parking brake after the airplane has stopped.

TAKEOFF

1) Align aircraft with runway centerline.

2) Increase power to approximately 60% N1, pause briefly to verify that engines have stabilized.

3) Watch EICAS indicator for engine problems or aircraft alarms.

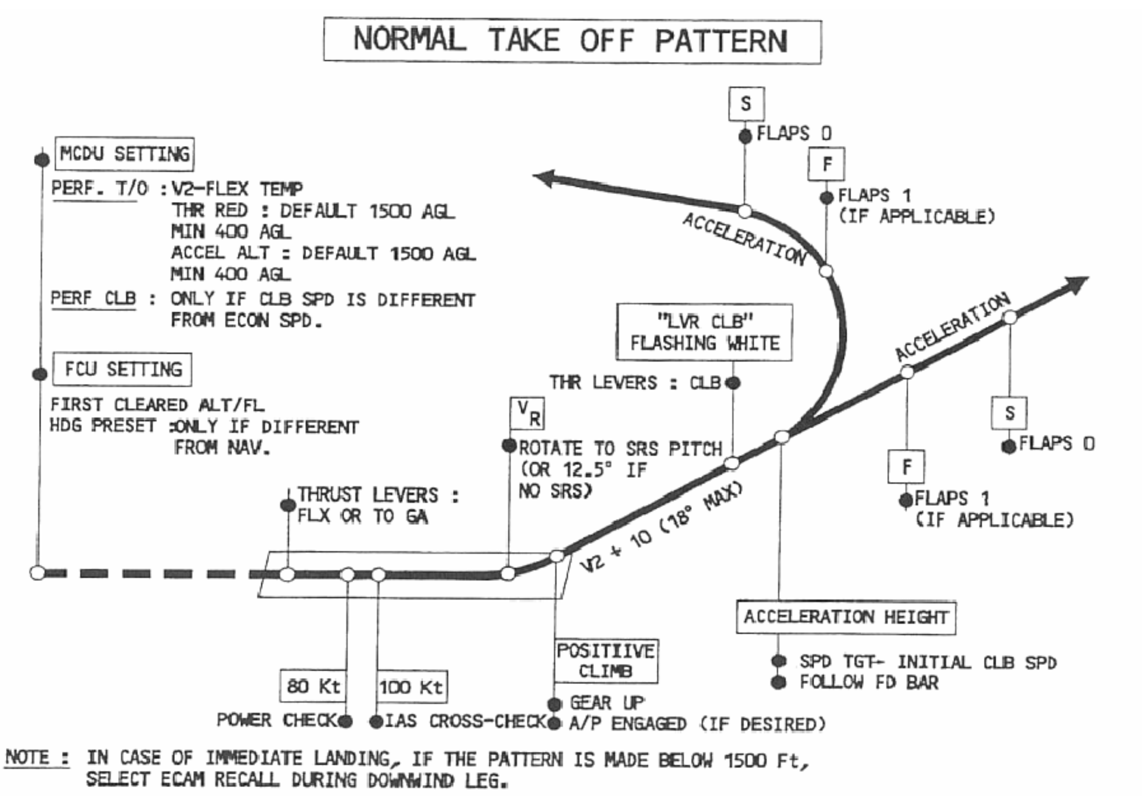
4) Increase power smoothly to 102.0% N1 speeds based on aircraft takeoff weight. This can either be done manually or using the autothrottle with the autopilot engaged.

5) At Vr, smoothly rotate aircraft 10 degrees upwards at a pitch rate of 2 – 3 degrees per second. **<u>Caution:</u> DO NOT rotate more than 10 degrees to avoid tail strike. Tail strike will occur at more than 12.5 degrees rotation.**

6) Hold nose at +10 degrees after positive rate of climb is confirmed, then raise landing gear after V2 (see below).

7) Set initial climbout speed to **V2+15 KTS, 1500 fpm. <u>Caution</u>: do not exceed 15 degrees of bank below 230 knots on initial climbout.**

8) Maintain +10 degrees climb to 1500 FT, or obstacle clearance, whichever is higher. +12-15 degrees climb after 1500 FT. **<u>Caution:</u> on heavy climbout, lower nose as necessary to gain airspeed. Beware of terrain.**



9) At 1500 FT above field elevation, begin slat retraction per retraction table. Maximum slat speed limits are:

0/16	250 KIAS/.55M
8/16	215 KIAS/.47M
15/16	205 KIAS/.46M
25/25	180 KIAS/.40M

10) Increase speed to 230 – 250 in accordance with ATC instructions (max 250 KTS below 10,000 FT).

11) For full maneuverability beneath 10,000 FT, slats must be fully retracted with aircraft at minimum safe airspeed.

CLIMB

1) Select highest FLEX N1 setting. Once climb thrust or airspeed is set, the autopilot will compensate for environmental condition changes automatically during the climb.

2) It is recommended that the aircraft be flown manually up to 15,000 FT, weather and ATC traffic conditions permitting. However, in high traffic conditions, to easy the workload of the pilot, the autopilot MCP altitude intervention may be engaged above a minimum altitude of 80 FT with the landing gear up.

3) Climb settings use a 10 – 20% derate of thrust up to 10,000 FT, then increases linearly to max thrust at 30,000 FT.

4) For **enroute climb**, climb at a rate of 1800 - 3000 FPM, pursuant to ATC and traffic conditions. If there are no altitude or airspeed restrictions, accelerate to the recommended speed. The sooner the aircraft can be accelerated to the proper climb speed, the more fuel and time efficient the flight.

5) As **engine and wing icing** may occur during the climb and descent, the engine anti-icing system should be in the AUTO or ON position whenever icing is possible. NOTE: Failure to do so may result in engine stall, overheating, or engine damage.

6) **For normal economy climb**, follow ATC speed restrictions of 250 KTS below 10,000 FT. If permitted by ATC and no speed restriction below 10,000 FT, increase speed to 280 KTS. Above 10,000 FT, climb at 300 KTS or .785 MACH. Climb speed table is as follows:

ALTITUDE	**SPEED**
Sea Level to 10,000 FT	250 KTS
Above 10,000 FT	300 KTS/.780 MACH

7) **Max climb speed** is 300 knots until reaching .800 MACH at initial cruise altitude.

8) **For engine out climb**, speed and performance various with gross weight and altitude, however 260 knots at 1000 – 1500 FPM may be used.

9) Set **standard barometer** above airport transition level (depends on local airport geography).

CRUISE

1) **Cruise** at .78 MACH (Econ), .80 MACH (High Speed Cruise), .82 MACH (Max Cruise).

2) **Headwinds** will increase engine power, reduce cruise speed and decrease range.

3) **Tailwinds** will decrease engine power, increase cruise speed and increase range.

4) Follow previously entered FMC waypoints.

5) **Fuel Freeze --** Extended operation at cruise altitude will lower fuel temperature. Fuel cools at a rate of 3 degrees C per hour, with a max of 12 degrees C in extreme conditions. Fuel temperatures tend to follow TAT (total air temperature). To raise fuel temperature/TAT, a combination of factors can be employed:

   - Descend into warmer air.
   - Deviate to warmer air.
   - Increase Mach speed.

   An increase of 0.01 MACH will increase TAT by 0.5 – 0.7 degrees C.

6) **Increased fuel burn** can result from:
   - High TAT
   - Lower cruiser altitude than originally planned.
   - More than 2,000 FT above the optimum calculated altitude.
   - Speed faster or slower than .78 MACH cruise.
   - Strong headwind.
   - Unbalanced fuel.
   - Improper aircraft trim.

7) **Fuel penalties** are:

   - 2000 FT above optimum – 3 percent increase in fuel usage
   - 4000 FT below optimum – 5 percent increase in fuel usage
   - 8000 FT below optimum –12 percent increase in fuel usage
   - M.01 above M.78 – 3 percent increase in fuel usage
   - Higher climb rates, 3000 fpm over 29,000 – increased fuel usage

8) In the case of **engine out cruise**, it may be necessary to descend. NOTE: For an engine failure, divert to the nearest available airfield to avoid overstressing engines and unnecessary risk. Use good judgement to select an airfield that can accommodate an aircraft of this size. Consideration must also be giving to ground facilities to accommodate number of passengers on board.

9) Trim aircraft for proper elevator alignment.

10) In case of engine out cruise, trim rudder for directional alignment.

11) Deviate from flight plan for weather, turbulence, or traffic as necessary after receiving clearance from ATC.

DESCENT

1) Descent at pre-determined TOD (Top of Decent)

2) Descend at 300 KT above 10,000 FT.

3) Use speedbrakes or thrust to minimize vertical path error.

4) Proper descent planning is necessary to ensure proper speed and altitude at the arrival point. Distance required for descent is 3NM/1000FT. Descent rates are as follows:

Intended Speed	**Decent Rate**	
	CLEAN	WITH SPEEDBRAKES
.78 MACH/300 KTS	2500 FPM	5500 FPM
250 KTS	1400 FPM	3500 FPM
VREF 30 + 80 KTS	1100 FPM	2400 FPM

5) Plan to descend so that aircraft is at approximately 10,000 FT above ground level, 250 KTS, 30 miles from airport.

6) At average gross weights, it requires 60 seconds and 5 NMs to decelerate from 300 KTS to 250 KTS for level flight without use of the speedbrakes. It requires 110 seconds to slow from 300 KTS to minimum clean airspeed. Using speedbrakes will reduce the times and distances by half.

7) Arm speedbrakes and autobraking to position Low or Med on initial descent.

8) Set airport altimeter below transition level.

9) Avoid using the landing gear for drag above 180-200 KTS to avoid damage to doors or passenger discomfort due to buffeting.

10) **Recommended approach planning**, ATC and airport rules permitting:

- 250 KTS below 10,000 FT, 30 miles from airport.
- 180-230 KTS, 23 miles from airport.
- Slow to VREF+10 at GS capture.
- VREF, 5 – 7 miles from airport.

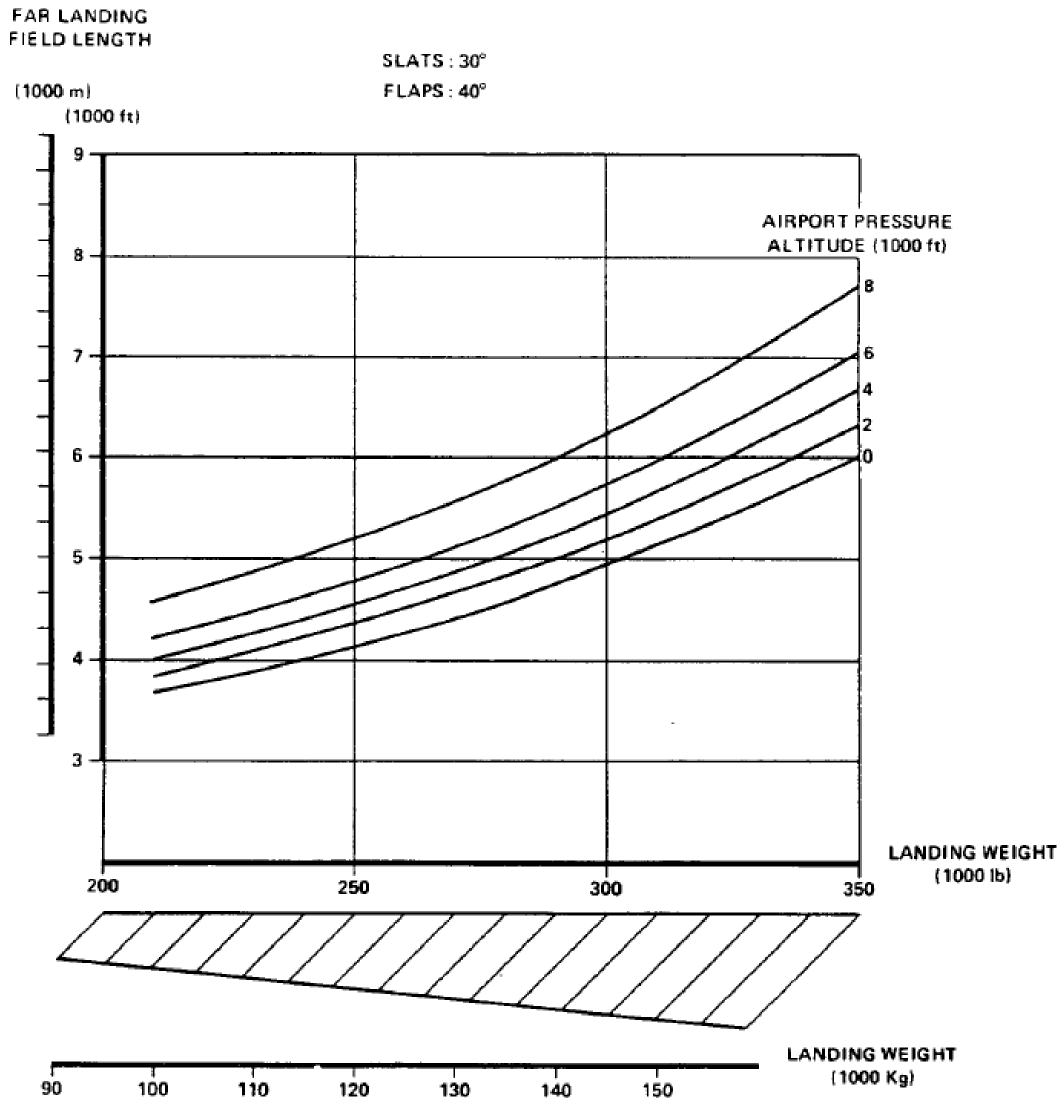
11) **In case of rapid descend due to depressurization**, bring aircraft down to a safe altitude as smoothly as possible. Using the autopilot is recommended. Check for structural damage. Avoid high load maneuvering.

12) **Stall recovery** can be accomplished by lowering the aircraft's nose and increasing power at once to gain airspeed. Beware of terrain. Accelerate to VREF 30 + 80 KTS. Do not retract gear until confirmed stall recovery and positive rate of climb. Keep nose at 5 degrees above the horizon or less.

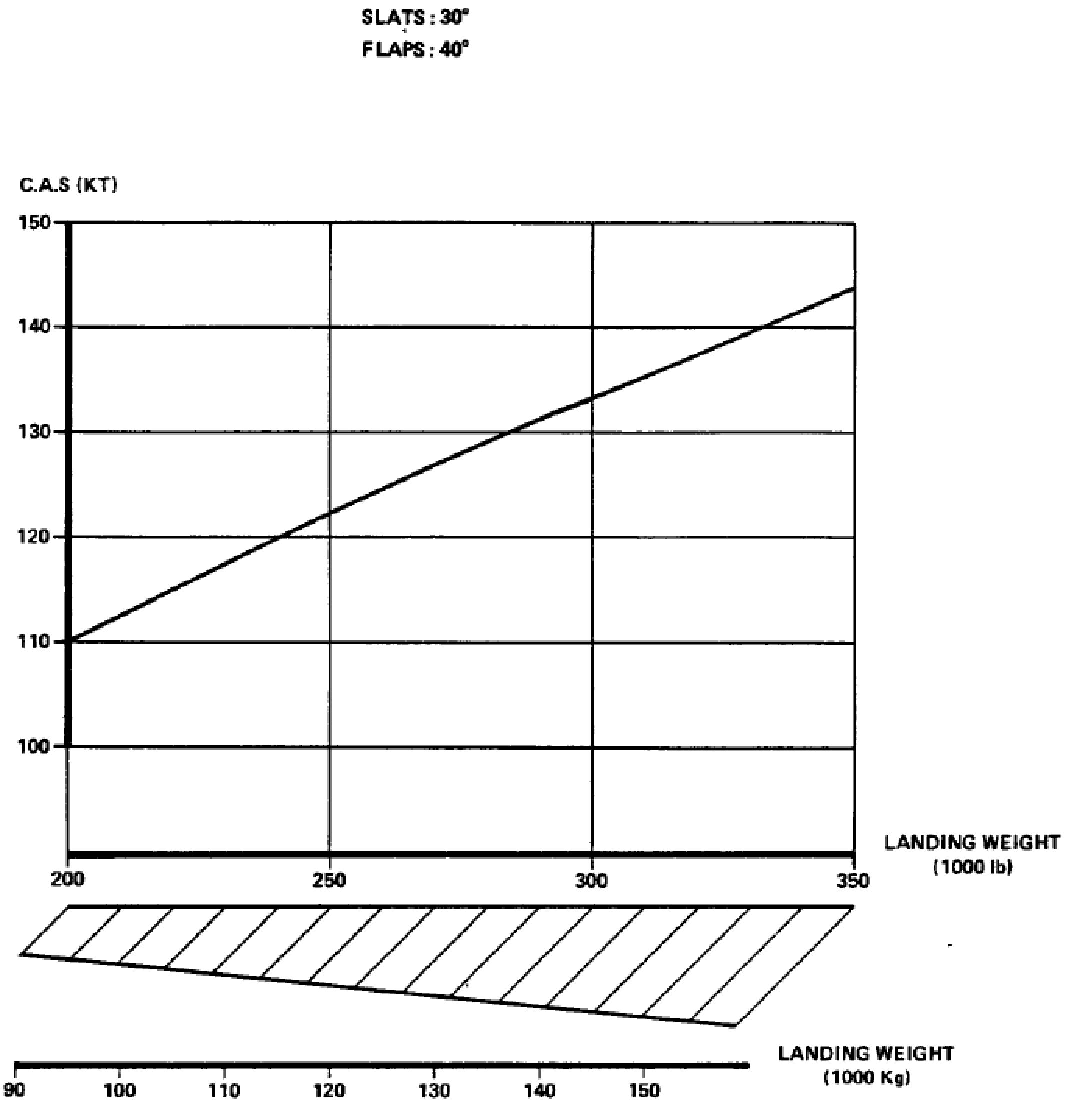
13) If deployed, do not retract slats during the recovery, as it will result in altitude loss.

14) In the event of engine out approach, approach at VREF+5 @ flaps position 3.

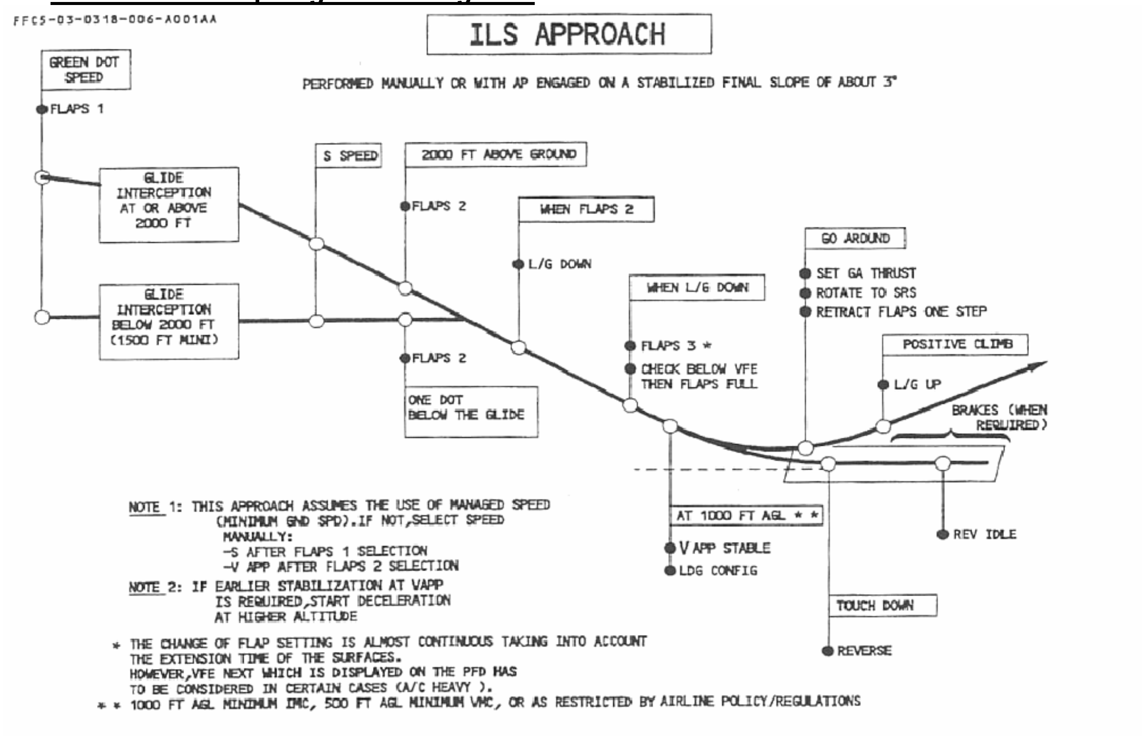
15) Determine the aircraft required runway length based on the gross weight:



16) Under normal conditions land at VREF @ flaps position 4. Final approach speeds for the A300-600R are as follows. **Be certain to add the aircraft wind component** to eliminate excessive nose positive pitch upwards:



17) ILS Approach - During initial maneuvering for the approach, extend flaps to position 1 and slow to 180-200kts. When the localizer is alive, extend flaps to 2 and maintain speed, keep at 180 knots. **At glideslope intercept, extend the landing gear, extend flaps to 4 and slow to Vref + 10.** Be stabilized by 1000 feet above field level. This means, gear down, flaps 4, Vref + 10 and engines spooled. Plan to cross the runway threshold at Vref. **<u>The A300 will maintain nose up angle of +4 degrees.</u>**



18) **Visual Approach** - Similar to the ILS approach. The major difference is that aircraft must be stabilized by 500 feet above field level, as opposed to 1000 feet.

19) A stabilized approach at Vref + 10 will result in a pitch attitude of 4 - 5 degrees nose up. Cross the threshold at Vref. Begin the landing flare at about 30ft. Only about 1-2 degrees of pitch up is necessary. The tail will strike at approximately 9 degrees. Slowly reduce thrust to nearly idle. Landing with thrust at idle will result in a firm touchdown. Set thrust just above idle. At touchdown, fly the nosewheel on. At touchdown, autospoilers should deploy. Deploy reverse thrust. Normally, autobrakes Low position is sufficient stopping power. Med is sufficient for short or wet runways. Be out of reverse thrust by 80kts to prevent foreign object damage to the engines.

20) For **wind correction**, add ½ the steady state wind plus all of the gust factor to the Vref. Do not add more than 20 kts. When landing in a crosswind, do not bank excessively as wingtip or engine pod strike may occur.

21) The Commercial Level Simulations A300 is a CATII/III aircraft, meaning the aircraft is capable of landing on autopilot in conditions where visibility is down to 50ft AGL.

22) Land the aircraft. **To avoid tail strike, do not flare, flying the aircraft straight onto the runway**.

23) Disengage (autopilot autothrottle will disengage) reverse thrust at 80 knots.

24) Disengage autobraking at 60 knots or as necessary.

25) Turn off onto high-speed taxiways at 30 knots or less.

26) Reverse thrust is most effective at higher speeds. Slow to safe taxi speed with braking and exit the runway.

27) Decelerate to 8 – 12 knots for 90 degree turns.

28) Taxi to gate.

Frequently Asked Questions – Flight Operations Only

Q) How do I calculate the range for the plane for my weight?

A) See page 8.

Q) How do I calculate the required takeoff runway length for my weight?

A) See page 9.

Q) How do I calculate the required landing runway length for my weight?

A) See page 18.

Q) How do I calculate my takeoff speeds?

A) See page 9.

Q) How do I calculate fuel required for the trip?

A) Use the FS2004 Flight planner and Navigation logs. The CLS A300 has been optimized for use with the default flight planner. Be certain to add 10,000 lbs of additional fuel for your 200 nm international reserves / deviation required fuel.

Q) How do I taxi the A300?

A) Taxiing the A300 easy. You should never exceed 34 – 36% N1 even when heavy to break away and start rolling. Should coast when heavy at about 29% N1. When light, should coast at idle thrust. Not accelerate, but coast.

Q) Turning seems a bit wide. How much space to I need to make a 180 degree turn?

A) See pages 11 and 12.

Q) How fast should I go for taxi turns?

A) 20 – 30 knots for high speed taxi way turnoffs, 8 – 12 knots for 90 degree turns, and 3 – 5 knots for 180 degree turns.

Q) Climbout seems a bit slow when heavy… Am I doing this right?

A) Accelerate the engines to 102.0 % N1. After vR, rotate the nose upwards smoothly. Avoid overrotation. When the wheels are off the ground, raise the landing gear as soon as reasonably possible to gain airspeed. Hold max 1500 fpm until 1500' AGL. Lower the nose as necessary to gain airspeed. The A300 will climb, however, speed is crucial. If terrain permits, do not sacrifice airspeed for altitude.

Q) So what's a typical climb profile like for an A300?

A) Climb to 1500 fpm to 1500' AGL, then accelerate to 250 knots (or ATC restriction) @ 1800 FPM. Pulling sharply on the flight stick will result in rapid airspeed loss from bleeding airspeed. Above 10,000' feet, accelerate to 300 knots, 1800 fpm. Initial flight level when heavy should be in the neighborhood of FL310. Step climb to final cruise altitude as weight permits to FL350.

Q) After initial climbout, I can't climb quickly or am loosing too much airspeed. What could be wrong?

A) Verify that you only have the fuel you need, do not simply fill up to 100% fuel on all tanks. Other than that, confirm your gear is up and flaps are clean.

Q) The handling of the A300 seems a lot different than a Boeing during a turn. Why is this?

A) Airbus traditionally uses more rudder in a turn than Boeings.

Q) What is my typical cruise altitude?

A) Initial flight level is 31,000 ft. Typical cruise is 35,000 ft. Again, wind, air temperature and ATC restrictions all play a factor. The A300-600R operating ceiling is 35,000 ft.

Q) Nose angle seems high on landing? Different than Boeings. Is this correct?

A) Yes, Airbuses are more angled on approach, where Boeing aircraft are more flat. Verify your trim and landing weight, however, you should see about +4 to +5 degrees nose up. Fly straight at the glideslope intercept at about 180 – 190 knots at flaps position 1 or 2, depending on your weight. At intercept, lower the landing gear and extend to flaps 4 @ VREF + 10 knots. The A300 will maintain about 4 degrees nose up attitude. Cross the threshold at VREF. If you are seeing more pitch up than this, adjust your trim or increase your airspeed. Remember, to add ½ the steady wind component and all of the gust speed component to your approach speed calculations.

Q) Should I flare on landing?

A) To avoid tail strike, it is recommended to fly the aircraft straight onto the runway. The struts will absorb the impact energy.

Q) Typically what engine speeds should I be seeing? Do the engines really work this hard?

A) Yes. Of course, it varies by atmospheric conditions, but typically, at cruise, you should see about 88 – 89% N1 @ M.80, or less.