PROJECT OPENSKY

AIRBUS INDUSTRIE

A340-200/300

TAXI, TAKEOFF, CLIMB, CRUISE, DESCENT & LANDING

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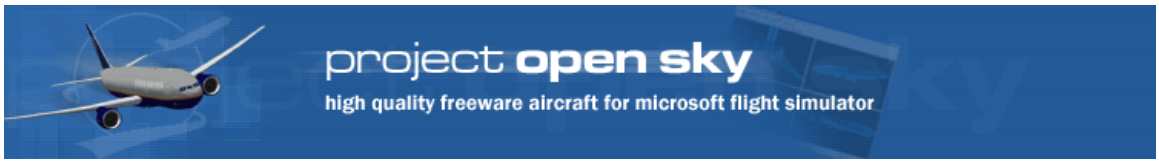

Disclaimer

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Any exact similarities between this manual and Project Opensky aircraft to actually aircraft, procedures, or airline carriers are strictly coincidental.

The procedures contained within are this author's interpretation of generic flight operations. These procedures are not always accurate in all situations.

All diagrams have been recreated to mimic actual procedures or scenarios, however, are not taken from actual materials whatsoever.

This manual is not intended for real world flight.

Project Opensky aircraft are intended as a freeware add-on for Microsoft Flight Simulator 2004.

Project Opensky Boeing A340-200/-300
Version 2004.8.0

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Flight model based on the most realistic data for the Airbus A340-200, -300, and actual flight experience on A340 series flight decks.

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.

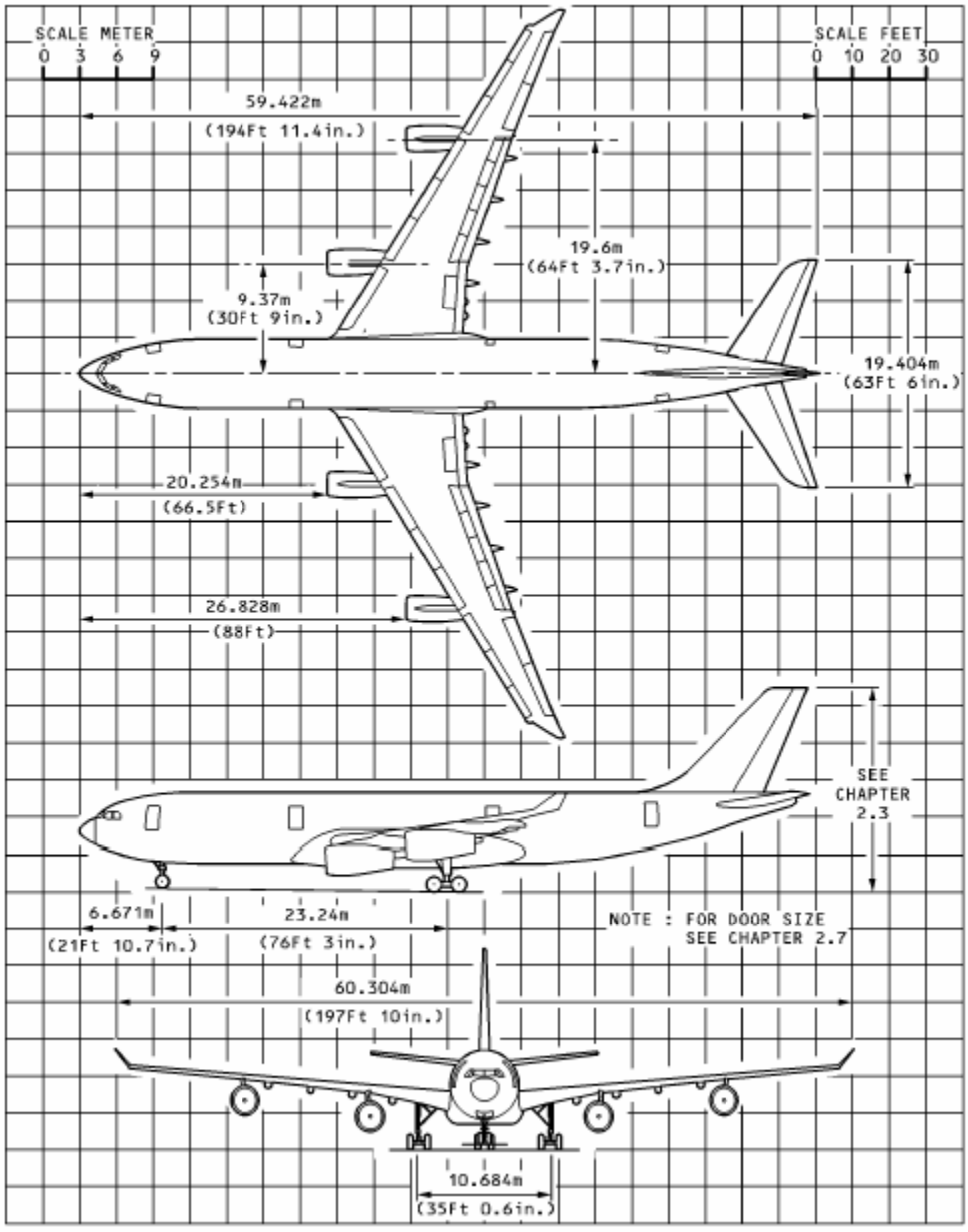
PRINCIPLE DIMENSION AND AREAS

Airbus A340-200, A340-300 – Aircraft Reference Manual

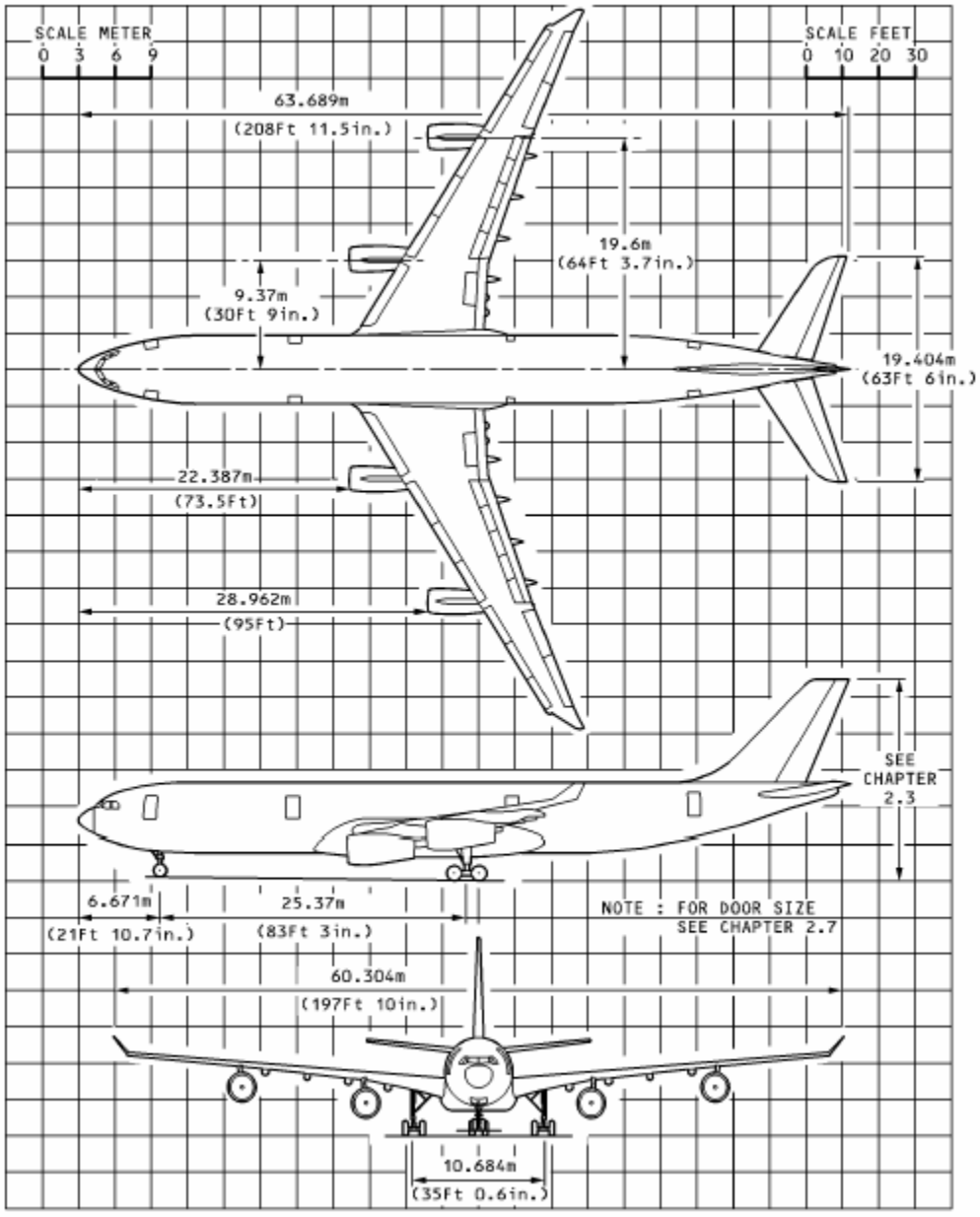
Flight Simulator 2002 Professional Edition

Airbus A340-200/-300 - Specs

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



Dimensions (-300):
Span 197 ft 10 in
Length 208 ft 12 in
Height 57 ft 20 in



Engines:
GE CFM56-5C (-200)
TO Thrust Rating: 31,500 lb X 4

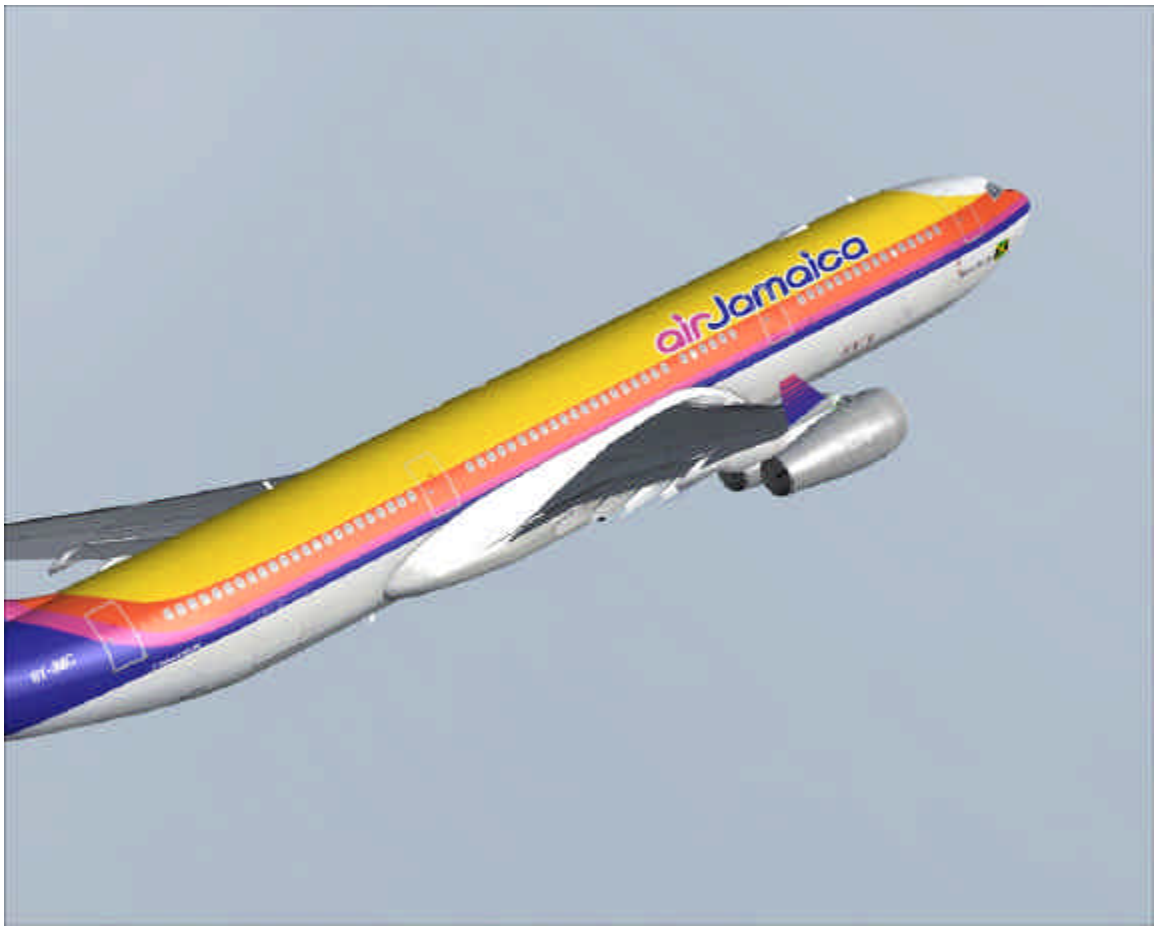
GE CFM56-5C4 (-300)
TO Thrust Rating: 34,000 lb X 4

Weight and Capacities
MaxTOW: 507,400 lb (-200)
ZFW: 343,242 lb (-200)
Max Fuel Cap.: 36,750 US Gal (248,430 lb)

Performance
Typical Cruise Speed:
M.82 - Normal Cruise
M.84 – Max/High Speed Cruise

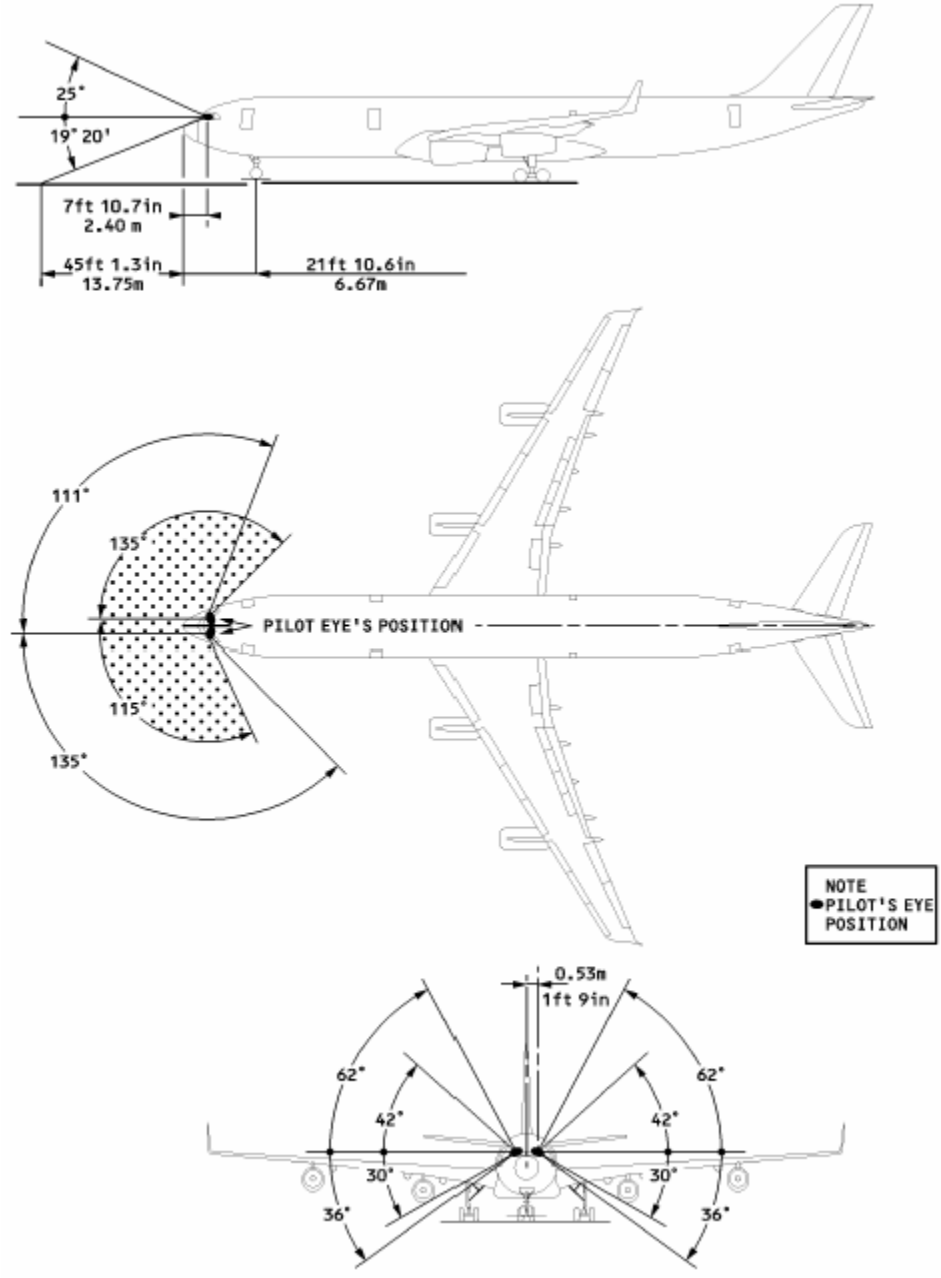
Range: 6,650 nm (-200), 5,700 nm (-300)

Fuel flow: 3300 pph per engine (13,200 pph total) @ cruise FL370



BASIC PILOT INFORMATION

Pilot's view reference point is approximately 19.20 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) The nose wheel steering and the engine thrust are used to taxi the airplane.

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

3) Set takeoff flaps. Opensky recommended setting is Flaps position 2.

4) 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).

5) 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.

6) 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.

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

8) Make sure you know the taxi turning radius. **Caution: The A340-200/-300 is an extremely long aircraft. Take particular care of the wheelbase when turning.**

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

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

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

12) 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.

13) 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.

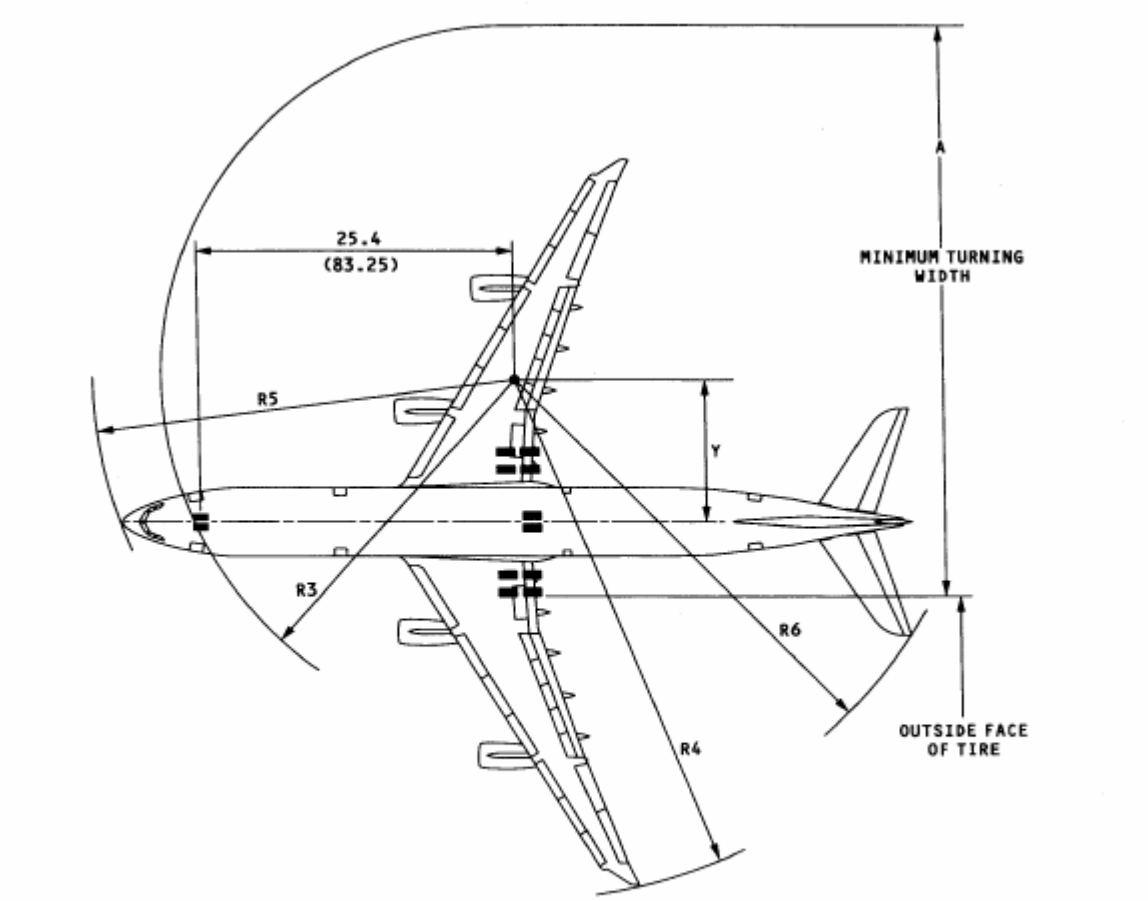
14) Use the Inertial Reference System (IRS) in the ground speed (GS) mode to monitor the taxi speed.

15) 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.

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

17) 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.

18) 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 60 degree steering angle is 166 FT:



TYPE OF TURN	EFFECTIVE TURN ANGLE	Y	A	R3	R4	R5	R6
2	60.60°	14.4 (47.2)	50.6 (166.0)	29.9 (98.0)	45.6 (149.7)	35.2 (115.5)	39.6 (130.1)

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 55% N1, pause briefly to verify that engines have stabilized.

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

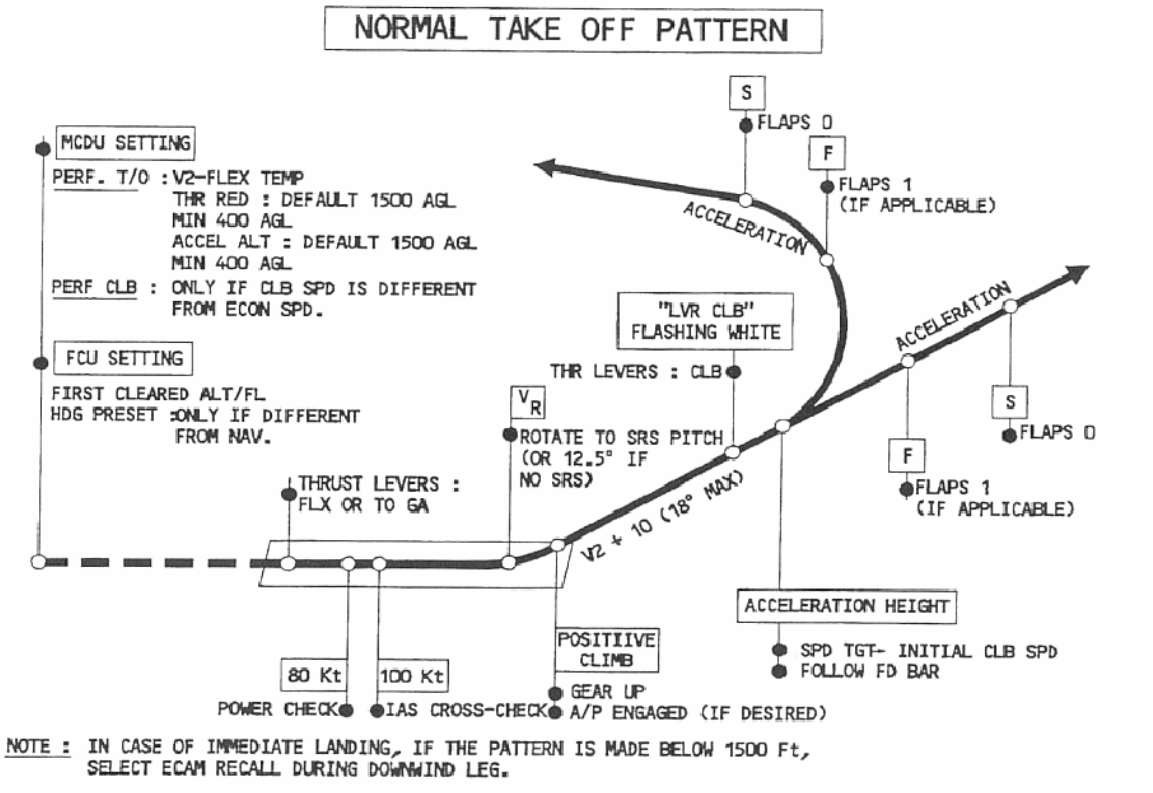
4) Increase power smoothly to pre-determined N1 speeds based on aircraft takeoff weight, (85% - 105% N1). This can either be done manually or using the autothrottle with the autopilot engaged.

5) At Vr, smoothly rotate aircraft 8 degrees upwards at a pitch rate of 2 – 3 degrees per second. **<u>Caution:</u> DO NOT rotate more than 8 degrees to avoid tail strike.**

6) Hold nose at +12.5 degrees after positive rate of climb is confirmed, then raise landing gear after V2 (see below).

7) Set initial climbout speed to **V2+10 KTS, 1500 fpm. Caution: do not exceed 15 degrees of bank below 230 knots on initial climbout.**

8) Maintain +12.5 degrees climb to 1500 FT, or obstacle clearance, whichever is higher. +10.0 degrees climb after 1500 FT. **Caution: 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:

Slat Position	Max Speed
1	250
2	210
3	180
4	160

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 - 2500 FPM, pursuant to ATC and traffic conditions. If there is 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 .820 MACH. Climb speed table is as follows:

ALTITUDE	SPEED
Sea Level to 10,000 FT	250 KTS
Above 10,000 FT	300 KTS/.820 MACH

7) **Max climb speed** is 300 knots until reaching .820 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 .82 MACH.

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 .82 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.82 – 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 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
.820 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 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.

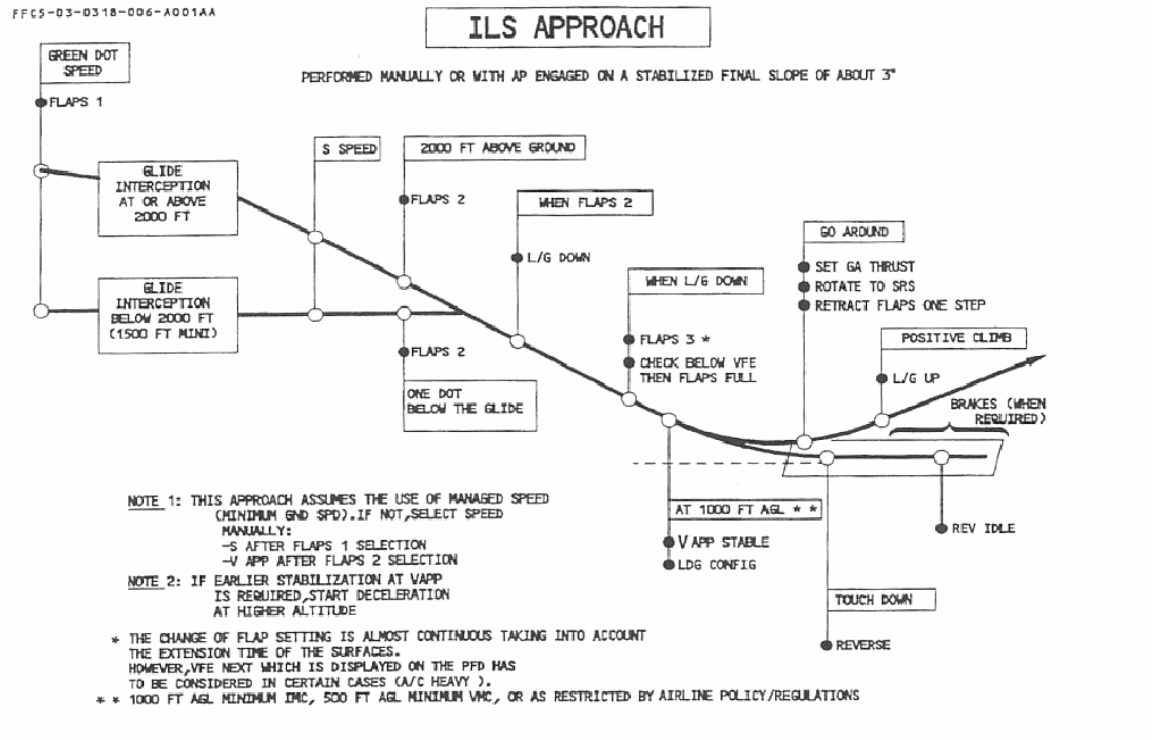
12) **Stall recovery** can be accomplished by lowering the aircraft's nose and increasing power at once to gain airspeed. Beware of terrain. Accelerate to VREF 30 + 80 KTS. Do not retract gear until confirmed stall recovery and positive rate of climb. Keep nose at 5 degrees above the horizon or less.

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) Under normal conditions land at VREF @ flaps position 4.

16) **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 + 5.** Be stabilized by 1000 feet above field level. This means, gear down, flaps 4, Vref +5 and engines spooled. Plan to cross the runway threshold at Vref. The A340 will maintain nose up angle of +4 degrees.



17) **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.

18) A stabilized approach at Vref +5 will result in a pitch attitude of 3-4 degrees nose up. Cross the threshold at Vref. If flaring, begin the landing flare at about 30ft. Only about 1-2 degrees of pitch up is necessary. 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 nose wheel 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.

19) 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.

20) The Project Opensky A340 is a CATII/III aircraft, meaning the aircraft is capable of landing on autopilot in conditions where visibility is down to 50ft AGL.

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

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

23) Disengage autobraking at 60 knots or as necessary.

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

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

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

27) Taxi to gate.

Project Opensky – A340 – Frequently Asked Questions

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

A) 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 A340 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 A340-200 or –300?

A) Climb at 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 FL280, 290. Step climb to final cruise altitude as weight permits.

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 +3 - +4 degrees nose up. Fly straight at the glideslope intercept at about 180 – 190 knots. At intercept, lower the landing gear and extend to flaps 4. The A340 will maintain about 4 degrees nose up attitude. If you are seeing more than this, adjust your trim.

Q) Should I flare on landing?

A) To avoid tail strike, it is recommended to fly the aircraft straight onto the runway.

Q) My CFM56-5C2 powered airframe seems considerably slower than the CFM56-5C4. I can't climb as quickly. Is this correct?

There are 3 engine choices floating around out there for the A340 – the CFM56-5C2, -5C3 and -5C4. The 5C4 is currently more popular, being mounted on many higher gross weight models. The CFM56-5C2 is rated at 31,200 lbs of thrust per engine, the -5C3 at 32,500 and the -5C4 at 34,000 lbs. The difference is about 11,200 lbs of thrust, which is considerable. Remember, the lighter you are, the faster you will climb, so plan for this in your fuel and payload, and when you choose your flightplan.

Frequently Asked Questions – Asking real pilots – Answers straight from the pros.

Q) Please explain some general characteristics of an A340?

A) A340-200 is a bit more underpowered than –300 as it has about 10,000 less total lbs of thrust.

Taxiing the A340 is pretty easy. You should never exceed 32 – 33% 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.

When you rotate an A340, rotate to 8 degrees. In a HEAVY situation, the plane may not leave the ground immediately. Although the main gear is still on the ground while the nose gear is in the air, you've already rotated the plane after Vr for some distance. This distance is actually the take off transition distance. When you find that altitude is starting to rise, you may then rotate her up to max 12.5 degree. (After 12.5, tailstrike is for sure). The total time to do this would be about 2-4 seconds. This matches the theory of 3 degree / second.

Remember that the pitch angle is NOT equal to flight path angle. When you pitch at 12.5 degrees during the first 0-1500ft, the plane may actually fly at 8 degrees only. Pitch Angle = Angle of Attack here. Due to high wing loading (ie. on a heavy plane), this means you need to fly at a high angle of attack in order to make the plane feel comfortable to climb.

After 1500 ft, you may lower your pitch to 10 for acceleration, but again, the pitch not equal to flight path angle. Make sure you retract all the flaps before adjust higher your vertical speed. We need the 'Green dot' speed asap.

For full loading of an A343 (i.e. flying at 275000kg with 110 tons fuel onboard), you need to stay at FL290 for some time-- 45 mins at least before going to FL330. However, this does not mean the plane could not climb high and fast at that moment. The plane would actually match the formula--'Endurance' in flight dynamics. It depends on how long the plane is scheduled to stay in the air that day. It does not mean the plane is heavy and could not climb high and fast. The A340 could make VS +3000ft/min at heavy situation, but she won't do that. Again, as it is according to that Endurance formula, we actually factor in the air density, speed, range, coefficient of lift, drag, and wind elements into the formula.

As for climbing, people need to get over this notion that planes climb straight to their cruise altittude. Typical climb profile to initial flight level for the A340-300 is 1500 fpm to 1500 AGL, 250 knots 1800 fpm to 10000FT, increase to 300 knots over 10000 FT, 1800 fpm to FL240, 1300 fpm to FL270. Initial flight level typically is somewhere between FL280 or FL290. Final climb is about 300 fpm to FL280 or 290.

Landing angle is about 4 degrees nose up. More than Boeings.

Airbuses use more rudder in a turn than Boeings.

On landing, gear down, flaps out, N1 around 60 – 66% N1.

Q) What are some sample Vspeeds?
A) Takeoff Speeds (CONF 1 = Flaps 1, CONF 2 = Flaps 2)

CONFIGURATION 1 + F = 0 FT				PRESSURE ALTITUDE	
TREF = 30°C TMAX = 55°C			DRY RUNWAY SLOPE = 0%	MAX TO WEIGHT (1000 KG) CODES IAS(KT): V1 / Vr / V2	
TEMP. (°C)	CORRECTED RUNWAY LENGTH (M)				
	3000	3250	3500	3750	4000
-20	278.8 3/6 148/57/66	286.0 3/6 146/60/68	293.0 3/6 144/62/70	299.8 3/6 142/64/72	303.7 3/6 142/67/75
-10	274.1 3/6 146/56/65	281.1 3/6 144/58/67	288.1 3/6 142/61/69	294.4 3/6 140/63/71	301.4 3/6 139/65/73
0	269.7 3/6 144/54/64	276.6 3/6 142/57/66	283.5 3/6 140/59/68	290.3 3/6 139/61/70	295.9 3/6 138/63/71
10	265.7 3/6 143/53/63	272.6 3/6 141/56/65	279.4 3/9 139/58/67	286.2 3/6 138/60/69	291.4 3/6 137/62/70
20	262.0 3/6 143/52/62	269.0 3/6 141/55/64	275.7 3/9 139/57/66	282.4 3/6 137/59/68	288.6 3/6 136/61/69
30	258.5 3/9 142/52/61	266.2 3/6 141/54/63	272.7 3/9 139/57/65	279.2 3/9 138/59/67	285.6 3/6 137/61/68
32	255.1 3/9 141/51/60	263.0 3/6 141/54/62	269.3 3/9 139/56/64	275.7 3/6 137/58/66	282.0 3/6 136/60/67
34	251.1 3/9 139/50/58	259.4 3/6 141/53/61	265.7 3/9 139/55/63	271.9 3/6 137/57/65	278.1 3/6 136/59/66
36	247.5 3/3 139/49/57	256.4 3/6 141/52/60	262.5 3/9 140/54/62	268.5 3/9 138/56/64	274.5 3/6 137/58/65
38	244.0 3/3 138/48/56	253.5 3/6 142/51/59	259.5 3/9 140/53/61	265.3 3/9 139/55/63	271.1 3/9 137/57/64
40	240.4 3/3 137/47/55	250.0 3/9 142/50/58	256.4 3/6 141/53/60	262.0 3/9 139/55/62	267.6 3/9 138/56/63
42	236.6 3/3 135/46/54	245.9 3/9 140/49/57	252.8 3/6 141/52/59	258.3 3/9 139/54/61	263.8 3/9 138/56/62
44	232.5 3/3 134/144/53	241.7 3/3 139/48/56	249.0 3/6 141/51/58	254.4 3/9 139/53/59	258.6 3/9 138/55/61
46	228.7 3/3 134/43/51	237.7 3/3 138/47/54	245.9 3/6 142/50/57	251.1 3/6 141/52/58	253.4 2/3 140/55/61

A340 Quick Reference Tables, CONF 2

CONFIGURATION 2 = 0 FT			PRESSURE ALTITUDE		
TREF = 30°C TMAX = 55°C			DRY RUNWAY SLOPE = 0%	MAX TO WEIGHT (1000 KG) CODES IAS(KT): V1 / Vr / V2	
TEMP. (°C)	CORRECTED RUNWAY LENGTH (M)				
	2500	2750	3000	3250	3500
-20	261.9 3/9 140/47/57	273.3 3/9 143/51/60	284.0 3/6 147/55/63	291.6 3/6 145/57/65	294.8 3/6 145/61/68
-10	257.7 3/9 138/46/56	269.0 3/9 142/50/59	279.6 3/6 145/53/62	286.9 3/6 143/56/64	292.6 3/6 142/58/66
0	253.6 3/9 137/44/55	264.7 3/9 140/48/58	275.2 3/6 143/52/61	282.4 3/6 142/54/63	289.3 3/6 140/57/65
10	249.6 3/9 135/43/54	260.8 3/9 139/47/57	271.2 3/6 142/51/60	278.4 3/6 141/53/62	285.1 3/9 139/55/63
20	245.8 3/9 134/42/52	256.9 3/9 138/46/56	267.2 3/9 141/50/59	274.7 3/6 140/52/61	281.4 3/9 138/55/62
30	242.5 3/9 132/41/51	253.6 3/9 137/46/55	263.6 3/9 140/49/58	271.8 3/6 141/52/60	278.3 3/9 139/54/62
32	* 239.3 3/9 132/41/50	250.3 3/9 136/45/54	260.2 3/9 139/48/57	268.3 3/6 140/51/59	274.8 3/6 138/53/61
34	* 235.5 3/3 130/40/49	246.7 3/9 135/44/53	256.4 3/9 139/47/56	264.7 3/6 140/50/58	271.0 3/6 138/52/60
36	* 232.2 3/3 130/39/48	243.2 3/9 135/43/52	252.9 3/9 138/46/55	261.6 3/6 141/49/57	267.7 3/9 139/51/59
38	* 228.9 3/3 129/38/47	239.8 3/9 134/42/51	249.5 3/9 138/46/54	258.4 3/9 141/49/56	264.6 3/9 139/51/58
40	* 225.6 3/3 129/37/46	236.3 3/9 133/41/50	246.0 3/9 137/45/53	254.7 3/9 140/48/55	261.3 3/6 140/50/57
42	* 222.1 3/9 139/36/45	232.6 3/3 132/40/48	242.3 3/9 137/44/51	250.8 3/9 140/47/54	256.7 3/6 140/49/56
44	* 218.3 3/9 129/35/44	* 228.6 3/3 132/39/47	238.3 3/9 136/43/50	246.6 3/9 139/46/53	251.7 3/6 141/49/56
46	* 214.8 3/3 129/34/43	* 224.9 3/3 131/38/46	234.5 3/9 135/42/49	242.7 3/9 138/45/52	246.7 3/6 142/49/55

Operating Final Approach Speeds

[OPERATING SPEEDS (KT)									
	TAKE-OFF		APPROACH						
			CONF 1		CONF 2		CONF 3		
W (1,000 KG)	F	S	S	VLS	F	VLS	F	VLS	VREF
280	171	233	203	193	184	173	178	170	167
260	165	222	203	185	184	165	177	164	161
240	158	213	203	178	184	158	169	157	155
220	152	204	203	171	179	152	163	151	148
200	144	195	195	163	170	145	154	144	141
180	137	185	185	154	162	137	147	136	134
160	130	174	174	146	153	129	139	128	126
140	130	163	163	137	153	125	139	125	125]

Cruise Weight/Altitude:

GREEN DOT SPEED (kt) ALL ENGINES OPERATIVE			
W (1000 kg)	at or below FL 200	FL 300	FL 400
280	283	293	303
260	271	281	291
240	259	269	279
220	247	257	267
200	235	245	255
180	223	233	243
160	211	221	231
140	199	209	219

GREEN DOT SPEED WITH ONE OR TWO ENGINES INOP : Subtract 10 kt from these values.

	Vls CONF 0 (kt)					
	1.23 VS			0.3 g buffet margin		
W (1000 kg)	FL 0	FL 100	FL 200	FL 200	FL 300	FL 400
280	237	251	261	265	276	
260	226	239	250	252	265	
240	217	228	240	238	254	
220	208	213	229	224	242	
200	199	203	217	210	228	
180	189	189	202	195	213	225
160	178	178	186	179	197	209
140	166	166	170	162	179	194

Cruise Performace - M.82, Climb/Descent 300 knots (next page):

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING

CRUISE : M.82 - DESCENT : M.82/300KT/250KT - IMC PROCEDURE : 330 KG (6MIN)

REF. INITIAL WEIGHT = 190000 KG — ISA — **FUEL CONSUMED (KG)**
NORMAL AIR CONDITIONING — CG = 37.0 %
ANTI-ICING OFF — **TIME (H.MIN)**

AIR DIST. (NM)	FLIGHT LEVEL 310	330	350	370	390	410	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL310 FL330	FL350 FL370	FL390 FL410
500	6262 1.13	5920 1.14	5641 1.14	5465 1.14	5307 1.14		7	14	23
1000	13171 2.16	12465 2.17	11872 2.18	11484 2.18	11361 2.18	11566 2.18	20	34	61
1500	20003 3.18	18913 3.19	18004 3.21	17354 3.22	17174 3.22	17411 3.22	31	52	83
2000	26766 4.20	25276 4.22	24044 4.24	23080 4.26	22046 4.26	23030 4.26	41	67	111
2500	33463 5.22	31569 5.25	30003 5.28	28747 5.29	20366 5.29	28449 5.30	50	80	136
3000	40098 6.25	37790 6.28	35879 6.31	34328 6.33	33742 6.33	33713 6.33	59	91	150
3500	46677 7.27	43960 7.31	41675 7.34	39028 7.37	30974 7.37	38938 7.37	66	100	177
4000	53202 8.29	50068 8.33	47394 8.38	45251 8.40	44060 8.40	43844 8.41	73	109	195
4500	59676 9.31	56124 9.36	53051 9.41	50600 9.44	49031 9.44	48775 9.44	79	118	209
5000	66109 10.33	62126 10.39	58646 10.45	55004 10.48	53972 10.48	53596 10.48	04	126	223
5500	72494 11.36	68081 11.42	64200 11.48	61100 11.51	58821 11.51	58268 11.52	09	133	235
6000	78852 12.38	73990 12.45	69712 12.51	66270 12.55	63657 12.55	62829 12.55	93	139	244
6500	85165 13.40	79869 13.47	75191 13.55	71377 13.59	68470 13.59	67294 13.59	96	143	252
7000	91448 14.42	85707 14.50	00645 14.58	76424 15.02	73219 15.03	71667 15.03	101	147	257
7500	97695 15.44	91536 15.53	06050 16.01	81412 16.06	77927 16.06	75956 16.07	109	150	260

PACK FLOW LO	PACK FLOW HI OR/ AND CARGO COOL ON	ENGINE ANTI-ICE ON	TOTAL ANTI-ICE ON
ΔFUEL = -0.5 %	ΔFUEL = +1 %	ΔFUEL = +2 %	ΔFUEL = +4 %

FLIP23 A340-313E CFM56-5C4E 3610 U8701.000011 026000 .7000 .00000 300 0800800100 276100 90174 10890 CL-F0-04-10-130

NOTE : THE ASTERISK MEANS THAT A STEP CLIMB OF 4000 FEET MUST BE FLOWN TO REACH THE CORRESPONDING FLIGHT LEVEL.

Landing distances – Conf 4 (Flaps Position 4)

ACTUAL LANDING DISTANCE (METERS)											CORRECTIONS (%) ON LANDING DISTANCE			
WEIGHT(1000KG)			130	150	170	190	210	230	250	270	PER 1000FT ABOVE SL	4 REV. OP.	PER 10KT TAIL WIND	PER 10KT HEAD WIND
RUNWAY CONDITION		MODE												
DRY		MED	1680	1700	1820	1960	2090	2220	2370	2560	+ 3	0	+15	-2
		LOW	2120	2160	2340	2530	2710	2900	3070	3250	+ 3	0	+16	-2
WET		MED	1680	1730	1900	2090	2290	2470	2640	2830	+ 3	0	+19	-3
		LOW	2120	2160	2340	2530	2710	2900	3070	3250	+ 3	0	+17	-2
C	6.3mm (1/4inch)	MED	1920	2020	2270	2540	2820	3080	3330	3550	+ 4	-12	+23	-4
O	WATER	LOW	2040	2090	2320	2570	2850	3120	3360	3590	+ 4	-2	+22	-3
V	12.7mm (1/2inch)	MED	1780	1880	2100	2340	2580	2830	3040	3250	+ 4	-9	+22	-4
E	WATER	LOW	1950	2010	2190	2400	2630	2860	3070	3280	+ 4	-1	+20	-3
R	6.3mm (1/4inch)	MED	1870	1960	2180	2440	2700	2940	3170	3380	+ 5	-12	+22	-4
E	SLUSH	LOW	2000	2050	2250	2480	2730	2970	3200	3440	+ 4	-2	+21	-3
D	12.7mm (1/2inch)	MED	1770	1860	2040	2270	2500	2730	2930	3140	+ 4	-10	+21	-4
	SLUSH	LOW	1930	1990	2160	2350	2560	2780	2970	3170	+ 4	-2	+19	-3
W	COMPACTED	MED	1850	1920	2090	2290	2480	2650	2790	2920	+ 3	-8	+17	-3
I	SNOW	LOW	2090	2130	2310	2510	2710	2900	3070	3230	+ 3	-2	+17	-2
T	ICE	MED	3200	3390	3750	4120	4500	4840	5120	5390	+ 4	-26	+27	-5
H		LOW	3230	3420	3770	4150	4530	4860	5160	5420	+ 4	-25	+27	-5

Landing Speeds:

Approx – 363,200 lbs ZFW w/20,000 lbs FOB (161,400 kg)
VREF = 132 – 145 knots