A320 NORMAL PROCEDURES

Last Updated: 23rd NOV 2020

SAFETY EXTERIOR INSPECTION PRELIMINARY COCKPIT PREPARATION SAFA CHECKLIST WALKAROUND BEFORE BOARDING CLEARANCE COCKPIT PREPARATION **TAKEOFF BRIEFING** EMERGENCY BRIEFING BEFORE START CLEARANCE AT START CLEARANCE **ENGINE START - MANUAL** ENGINE START – AUTOMATIC AFTER START TAXI **BEFORE TAKEOFF** TAKEOFF AFTER TAKEOFF CLIMB **TOP OF CLIMB** CRUISE

DESCENT PREPARATION

APPROACH BRIEFING

DESCENT

APPROACH

TYPE OF APPROACHES

STANDARD ILS APPROACH

AUTOLAND WARNING

GO AROUND

RNAV (GNSS) APPROACH – FINAL APP

RNAV (GNSS) APPROACH - FPA

RNAV (GNSS) – FINAL APP OR FPA

RNP APCH / RNAV (GNSS)

VOR APPROACH – TRK / FPA

CIRCLING APPROACH

VISUAL APPROACH

LANDING

AFTER LANDING

PARKING

SECURING THE AIRCRAFT

POST FLIGHT EXTERIOR INSPECTION

DISCLAIMER

SAFETY EXTERIOR INSPECTION

- Wheel Chocks
- Landing Gear Doors
- APU Area

PRELIMINARY COCKPIT PREPARATION by CM2 - OVERVIEW

V	Clearance	Check from TECH LOG
G	Power UP	Use External Power / APU
Č.	Light UP	Set Cockpit Lighting
	Temperature Control	Ground Cart / APU / Cargo Heat
?	Aircraft Status	Check on ECAM and TECH LOG
	Safety Checks	Before Walkaround

PRELIMINARY COCKPIT PREPARATION – EXPANDED

	CLEARANCE
•	Tech Log – Check Aircraft Released to Service

POWER UP				
WEATHER RADAR ¹	Radar – OFF			
This is the only step	Windshear / PWS– OFF			
that is to be done in	Gain knob – AUTO/CAL			
the transit checks.	Mode Selector – As Required			
	Masters Switch 1 and 2 – OFF			
ENGINE	Mode Selector – NORM			
LANDING GEAR	Lever – Down			
WIPERS	Both Selectors – OFF			
ELECTRICS	 AVAIL Light ON – EXT PWR ON AVAIL Light OFF: A/C Not Electrically Supplied for > 6 hours Batt Voltage Check ² Above 25.5 V – Batt 1,2 AUTO At or Below 25.5 V – Charge for 20 mins and check again ³ A/C Electrically Supplied within < 6 hours 			
	 Batt 1,2 AUTO ⁴ 			

1. Procedures throughout this document refer to Collins WXR-1200. For Honeywell RDR-4000 (installed in some aircraft like AP-BMX), please refer to the <u>A320 Line Training</u> Document.

2. Check batteries voltage with Batt Pb OFF.

3. Charge batteries with Batt Pb on AUTO. Check charging on ELEC page (i.e. battery contactor closed)

4. Batt voltage >25.5 ensures a charge above 50%. If APU is to be started on batteries then start within 30 mins of putting Batt Pb on AUTO (delay of more than 35 mins can lead to battery charge of <25% of max capacity).



APU

• APU Fire Test and Start:

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- Use ground support if possible and delay APU start
- After master switch, wait at least 3s before selecting APU START pb.

LIGHT UP

• Cockpit Lights – As Required

TEMPERATURE CONTROL

- Air Conditioning:
 - Do not use APU bleed with LP or HP ground air unit connected
 - Verify through BLEED page if there is pressure in the bleed air system
 - If 1 pack is sufficient then switch off the other one, swap packs on each flight to avoid wear of one pack
- Cargo Heat

	AIRCRAFT STATUS ON ECAM & TECH LOG ¹				
RCL	Press RCL for 3s to review cleared or cancelled warnings.				
DOOR	IF OXY Pressure is half boxed in Amber – Check MIN FLT CREW OXY CHART (FCOM Limitations)				
HYD	Check Reservoir Fluid Level				
ENG	Check Oil Quantity >9.5qt + Estimated Consumption (average consumption is 0.5 qt/h)				

1. Check the HOOR on ECAM: <u>Hydraulic, Oxygen, Oil, R</u>ecall. Check Tech Log by cross checking it with ECAM recall status, review CF items (CDL if applicable) & associated MEL / dispatch procedures, previous snags and their rectification, periodic checks validity and then sign to accept it.

	BEFORE WALKAROUND			
		SPEEDBRAKES Lever – Check Retracted and Disarmed		
	F/GIL	FLAPS Position – Check ECAM to confirm	n that it agrees with handle position	
		ACCU Pressure – Check in Green (Use Y	Cellow electric pump ¹ to recharge if req.)	
S E	PARKING BRAKE	Handle – On (With 1 brake > 500°C, avoid	d parking brakes unless necessary)	
A		Brake Pressure Indicator – Check Normal		
E D	ALT BRAKES ²	Yellow Pump – Off Chocks – On Parking Brakes – Off Brake Pedals – Press to Check Pressure on Brake Pressure Indicator ³ Brake Pedals Release – Parking Brakes ON ⁴		
	ATIS	Both CM1 and CM2 will obtain Airfield Data.		
	OEB	Check in QRH OEB section (particularly applicable Red OEBs)		
S T A N D I N	EMER EQUIPMENT	 Life Jackets Smoke Hoods Gloves Axe Portable Fire Extinguisher Oxygen Masks (goggles attached) Escape Ropes 	Imagine yourself wearing a " <u>Life</u> <u>Jacket</u> " and a " <u>Smoke Hood</u> ". Then putting on your " <u>Gloves</u> " with " <u>Axe</u> " in one hand and " <u>Fire Extinguisher</u> " in the other. You then use the " <u>Rope</u> " to exit the cockpit to breath some fresh " <u>Oxygen</u> ".	
G	СВ	Rear and Overhead Circuit Breaker Panel	S	
	GEAR PINS / COVERS	Onboard and Stowed		

1. Yellow electric pump pressurizes Yellow & Green systems. Ground clearance required prior to using it.

2. Check before first flight of the day.

3. Pressure must build up without delay symmetrically on left & right sides for the same application simultaneously applied on left & right pedals. With full pedal deflection, the pressure must be between 2000 and 2700 PSI.

4. Parking brake must be on for exterior inspection to check brake wear indicators.



SAFA (Safety Assessment of Foreign Aircraft) CHECKLIST

RAMP INSPECTION CHECKLIST

Date:	Flight No:	Sector:	
Station:	A/C Reg:	A/C Type:	

Station	h: A/C Reg:	A/C Type:				
	FLIGHT DE	СК	Checked			
A01	General Condition	Cleanliness & tidine	ss 🗌	Procedures		
A03	Emergency Equipments	As per FCO	м 🗆	Aircraft Equip		
A04	OM, Jeppesen /ipad	Upto da	te 🛛	Crew Item		
A05	Checklists/QRH	Upto da	te 🛛	Aircraft Docs		
A07	MEL	On board / ip	ad 🛛	Crew Item	CREW ITEMS	
A08	Certificate of Registration	Doc Fold	er 🛛		1) IPAD 2) DOCS	
A09	Noise Certificate CAA (PAK)	Doc Fold	er 🛛		3) TORCH	
A10	AOC	Valid & Doc Fold	er 🛛			
A11	Radio License	Valid & Doc Fold	er 🛛	Aircraft Docs	AIRCRAFT DOCS	
A12	Certificate of Airworthiness	Valid & Doc Fold	er 🛛			
A13	Operational Flight Plan	Approved, signed by PIC & pro	of 🛛		3) CHECKLISTS	
		of Fuel scoring on F	PL		4) FLIGHT PLAN	
A14	Mass & Balance Manual	Upto da	te 🛛		5) TRIM SHEET	
	Load (Trim) sheet	Accura	су	Aircraft Docs	AIRCRAFT EQUIP	
A17	Harness	For each Flight crew includi	ng 🛛		1) HARNESS	
		Torso restrain for pilo	ots	Aircraft Equip	2) EMER EQUIP	
A19	Flash Light (Torch)	For each crew & serviceabili	ty 🛛		PROCEDURES	
A20	Flight Crew License Available Crew Item					
A21	Flight Log Book /ipad	Availab	le 🛛		2) PROPER PREFLIGH	
A22	Maintenance Release & Boxes fil	led Proper documentati	on 🛛			
	of Maint. Work 8	& signed off Captain's acceptan	ce			
A23	Defect Notification & rectification	n C/F iter	ns 🛛	Aircraft Docs		
	as per MEL chapter, category &	time limit mentioned in Tech L	og			
	including Placa	rding. C/F summary list signed	off			
A24	Preflight Inspection	Comple	te 🛛	Procedures		
Cantai	n / First officer			1		
Name	in / mise officer	Signature		-		
Name						
$= \sum_{n=1}^{\infty} (n+1)(n+1)(n+1)(n+1)(n+1)(n+1)(n+1)(n+1)$						

WALKAROUND - CM2



BEFORE BOARDING CLEARANCE

		CM1	CM2		
		Man		Check Hard Copies	
			Aircraft Document File		
A	Altitude	Flight altitude, time & related weather.	•	Airline Operating Certificate	
B	Baggage	Baggage & seating related CG issues.	•	German / KSA GACA Cert. (if req) C of A	
С	Communication	Intercom, discrete code & cockpit door.	•	C of R Weight Schedule Fuel Carpet	
D	Documents	Valid crew (cabin/cockpit) documents.	•	Wireless License Emergency Equipment Location Chart	
E	Emergencies	Evacuation, emergency descent etc.	•	Insurance Certificate Residual Disinfection Certificate	
			Aircraft	Manuals	
		Machine		ORH (Rest in iPad)	
	Technical State	us and Dispatch Procedures	•	Technical Logbook	
		Environment	<u>Other</u>		
	 Weather condi Cabin Status (¹ 	tions temperature, catering etc.)	• • •	Misc. Blank Forms File Latest revision record (within 20 days) Flight Pack List	

COCKPIT PREPARATION



- A fast **IRS alignment** must be performed if a complete IRS alignment is not necessary and the difference between the IRS position and the FMGC position is at or above 5 NM.
- **Pack Flow**: LO if the number of occupants is below 141 and HI for abnormally hot and humid conditions.
- BAT buttons OFF then ON to initiate a charging cycle. After 10 secs <u>charging current</u> should be < 60 A & decreasing. If not, then after the end of the charging cycle perform this check again.

- Third <u>ACP PA knob</u> on RECEPT allows CVR recording of cabin announcements. Set volume > medium range.
- Use of the ISIS bugs function is not recommended.
- If clock date is incorrect set it manually and keep the mode to internal (INT) for the whole flight. <u>Clock date</u> <u>initialization must be completed in less than a minute</u> otherwise, CFDS will have to be reset by a maintenance procedure in order to synchronize the lower ECAM time display with the cockpit clock display. For time precision keep the clock in GPS or INT by syncing it with GPS at least once per day.
- Insert the weights in **FMGC** after completing all other insertions to avoid cycles of prediction computations.
- Thrust Reduction Altitude 1000 feet AAL. Acceleration Altitude 3000 feet AAL.
- Cost Index 21 according to bulletin issued on 27th June 2019. Keep a track of latest circulars.
- Check the accuracy of tropopause value to ensure accuracy of FMS predictions.
- Do not engage autothrust on ground, as it may generate the AUTO FLT A/THR OFF warning at engine start.
- Note <u>altimeter readings</u> (QNH) on the CFP. Maximum altitude difference between:
 - PFD and PFD = ± 20 feet.
 - PFD and Elevation = \pm 75 feet (RVSM tolerance).
 - PFD and ISIS = \pm 100 feet.
- After testing the oxygen masks, check that there is no REGUL LO PR message on DOOR/OXY page. Due to
 residual pressure between the LP valve and oxygen masks, an LP valve failed in the closed position may go
 undetected during oxygen masks test. Absence of <u>REGUL LO PR</u> message ensures that LP valve is open.
- Check that CAB PRESS page displays LDG ELEV AUTO.
- Check on STS page if **INOP SYS** display is compatible with MEL.
- Check <u>IRS alignment</u> on POSITION MONITOR page. Distance between each IRS and the FMS position should be lower than 5 NM. Confirm on ND aircraft position with that of airport, SID and surrounding NAVAIDs.
- Calculate <u>Takeoff Performance</u>. CM2 will compute preliminary TO performance data, note it on the CFP and hand it over to CM1 who will cross check it with his own RTOW charts. Max QNH ALT from RTOW charts will be inserted as the ENG OUT ACC.

OAT	AT CONF 1+F Max Weight / Flex or Lowest Speeds CONF					NF 2		
С	TAILWIND	WIND	HEADWIND	HEADWIND	TAILWIND	WIND	HEADWIND	HEADWIND
	-10 KT	0 KT	10 KT	20 KT	-10 KT	0 KT	10 KT	20 KT
60	61.2 3/4	63.5 3/4	64.2 3/4	64.9 4/4	61.3 3/4	63.6 3/4	64.3 4/4	65.0 4/4
	133/33/35	141/41/42	143/43/44	144/44/45	131/31/34	138/38/41	138/38/41	140/40/43
56	63.2 3/4	66.0 3/4	66.8 3/4	67.6 4/4	63.7 3/4	66.2 3/4	67.0 4/4	67.8 4/4
	133/35/37	141/41/42	144/44/45	145/45/47	131/31/34	139/39/42	140/40/43	141/41/45
52	65.3 3/4	68.6 3/4	69.6 3/4	70.3 3/4	66.1 3/4	68.8 3/4	69.7 3/4	70.6 4/4
	134/37/39	141/41/43	144/44/45	147/47/48	131/32/36	139/39/42	141/41/45	143/43/47
34	69.8 3/9	74.0 3/4	75.3 3/4	76.5 3/4	71.3 3/4	74.8 3/4	75.9 3/4	76.9 3/4
	136/42/45	143/47/49	146/48/50	149/49/51	133/36/41	141/41/45	143/43/47	146/46/50
32	70.0 3/9	74.2 3/4	75.5 3/4	76.7 3/4	71.5 3/4	74.9 3/4	76.0 3/4	77.0 3/4
	136/42/45	144/47/49	146/48/50	149/49/51	133/36/41	141/41/45	143/43/48	146/46/50
D QNH HPA			I	NFLUENCE OF D	ELTA PRESSURE			
-10.0	-0.6 -2	-0.7 -2	-0.7 -2	-0.8 -2	-0.6 -2	-0.7 -2	-0.6 -1	-0.5 -1
	0/ 0/ -1	0/ 0/ 0	0/ 0/ 0	0/ 0/ 0	0/ 0/ 0	-1/ -1/ -1	-1/ -1/ -2	-1/ -1/ -2
	(+64) -0.6 -2	(+64) -0.7 -2	(+64) -0.9 -2	(+64) -0.8 -2	(+64) -0.6 -2	(+64) -0.7 -2	(+64) -0.6 -1	(+64) -0.6 -1
	0/ 0/ 0	0/ 0/ 0	0/ 0/ 0	0/ 0/ 0	0/ 0/ 0	-1/ 0/ 0	-1/ 0/ 0	-1/ 0/ 0
	INFLUENCE OF RUNWAY CONDITION							
WET	-2.8 -6	-1.9 -4	-1.2 -2	-1.5 -3	-1.7 -4	-1.6 -3	-0.7 -1	-0.5 -1
	-19/ -3/ -3	-16/ -1/ -1	-15/ -1/ -1	-13/ -1/ -1	-18/ -2/ -2	-14/ -1/ -1	-12/ -2/ -2	-11/ -3/ -3
	(+64) -3.9 -8	(+64) -1.9 -4	(+64) -1.4 -3	(+64) -1.5 -3	(+64) -1.7 -4	(+64) -1.6 -3	(+64) -0.7 -1	(+64) -0.5 -1
	-18/ 0/ 0	-16/ 0/ 0	-15/ 0/ 0	-13/ 0/ 0	-18/ 0/ 0	-14/ 0/ 0	-12/ 0/ 0	-11/ 0/ 0

Performance Limit

Flex Limit

TAKEOFF BRIEFING – PF

1

AIRFIELD	 Weather Terminal Area NOTAMS Frequencies to be used
AIRCRAFT	 Technical Status FMS DATA Page ¹ Type and Model FMS INIT- B Page ²
STARTUP	 ATC Procedures (push and start procedures) A/C Procedures (engine start etc.)
ΤΑΧΙ	Routing to the anticipated runway
RUNWAY INFO	 Dimensions (Length, Width, Stopway) Surface Condition Lighting
TAKEOFF	 FMS PERF TAKEOFF Page ³ TO RWY TO CONF Flex / TOGA (Packs / Anti-ice – ON / OFF) V1, VR, V2 Transition Altitude Thrust Reduction / ACC Altitude
DEPARTURE	 Normal SID – Routing and Constraints Engine Out SID – Routing and Constraint Navigation Frequencies to be used (RAD NAV) MSA
SPECIAL PROCEDURES	 NADP Weather Terrain Failure of Communication







Finish the briefing by reviewing the following

FROM FIST5A	THV001 ↔ UTC SPD/ALT	6	CLIMB THV001 CRZ OPT REC MAX FL360 FL360 FL385
H144* 900 c144*	BRG144* 1 0000 153/ 900 TRK144* 4		<report< th=""></report<>
C356* TOU (SPD) (LTM)	8 8 8 8 8 8 8 8 8 8 8 8 8 8		BRG /DIST 123* /1.7 PREDECTIVE
DEST EGLL27R	UTC DIST EFOB 0122 532 4.4 ↑↓		CGPS CONSTRUCTED ACCUR ESTIMATED 1.00NM HIGH 0.08NM
DIR PROG	PERF NIT DATA		SEC INDEX +COPY ACTIVE <sec f-pln="" perf=""> SEC F-PLN PERF></sec>

EMERGENCY BRIEFING – CM1

• This will be left/right hand seat takeoff.

Failure Before 100 Knots or V1

- For any failure before 100 knots or V1, clearly CALL OUT THE MALFUNCTION and I will call STOP or GO.
- If the call is <u>STOP</u>, I will apply the <u>REJECTED TAKEOFF PROCEDURE</u> and bring the aeroplane to a complete stop.
- I will set the PARKING BRAKE and call "ATTENTION CREW AT STATION".
- You will monitor <u>REV GREEN</u> and <u>DECEL</u> and silence any <u>AURAL WARNING</u> and inform <u>ATC</u>.
- Thereafter you will carry out <u>ECAM</u> actions on my command.
- IF EVACUATION is required, we will carry out the "Emergency Evacuation Checklist".

Failure After V1

- For any failure after V1, takeoff will be continued and <u>NO ACTION BEFORE 400</u> feet AGL <u>EXCEPT</u> silencing of any <u>AURAL WARNING</u> and <u>GEAR UP</u>.
- Reaching 400 feet AGL, ECAM actions on my command.
- For engine failure / damage / fire, when ENGINE IS SECURED: Stop ECAM, level off, accelerate and cleanup.
- If <u>ENGINE IS NOT SECURED</u>: Continue climbing until engine is secured, but not above EO maximum acceleration altitude.
- At <u>GREEN DOT</u> <u>OPEN CLB</u>, select <u>MCT</u>.
- Resume ECAM, complete AFTER T/O C/L and check the STATUS.
- <u>FLY</u> (a) EO Routing (b) SID (c) Radar Vectors (c) Immediate Turn Back.

REJECTED TAKEOFF:

Before 100 knots (Less serious. Abort is at Captain's discretion depending on the circumstances)					
Any ECAM Warning / Ca	Any ECAM Warning / Caution.				
Between 100 knots & \	/1 (More Serious. Be	e go minded except for a few situations, as mentioned below)			
	Left Hand Items	Side Stick Fault			
	Right Hand Items	Thrust Lever Fault			
Failures with ECAM		Fire			
	Engine Items	Failure			
		Reverser Unlocked or Fault.			
	Sudden loss of thrust.				
	Any major failure.				
Failures without ECAM	If aeroplane is unsa	afe to fly due any reason.			
	Tire failure within a engine parameter full runway length a	20 knots of V1: Unless debris from the tire causes noticeable fluctuation, it is better to takeoff, reduce fuel load and land with available.			
Weather	Windshear.				
Note: Exceeding EGT red line or nose gear vibration should not result in an abort above 100 knots *					

* FCTM > Abnormal and Emergency Procedures > MISC > Rejected Takeoff.

BEFORE START CLEARANCE



	CM1	CM2	
Seat Position	Adj	ust	
Fuel ¹	FOB – Check agair	nst FPL and ECAM	
Load Sheet ²	Cross Check Check		
FMS Takeoff Data	Cross Check & Insert Calculate ³		
MCDU	PERF TO – PF and F-PLN – PM		
External Power ⁴	AVAIL / Disconnect		
Checklist ⁵	BEFORE COCKPIT PREP GEAR PINS and COVERS SIGNS ADIRS FUEL QUANTITY TO DATA BARO REF	E START Down to the Line COMPLETED (BOTH)	

1. Check computerized fuel figures for gross errors (Ref: Flight Plan Tables in FCOM performance). Also check that "Last Flight FOB + Uplift = Current FOB". Discrepancy allowed is 400 Kg for refueling up to 6 tons, 500 Kg between 6 and 12 tons and 600 Kg for more than 12 tons. Discrepancies above these figures require maintenance action.

2. Actual ZFW > Estimated ZFW by 2000 Kgs requires a new flight plan (OETB: FLT OPS/TECH/14/ Fri Apr 21 2017). No change in CG is required if passenger or weight changes (loading/off-loading) are restricted to (a) 1 passenger with baggage in Zone A or D OR (b) 2 passengers with baggage in zone B or C OR (c) 50Kg in forward or rear hold OR (d) 100 Kg in aft hold (Ref: Weight Report). CM2 will announce ZFW and ZFWCG, which will be inserted in FMS by CM1. CM2 will also announce TOCG and TO FUEL. CM1 will announce TOW from FMS and CM2 will confirm from Load Sheet. CM1 will cross check, record time and sign when all formalities are completed.

3. Trim Position for THS, V1, VR, V2 and FLEX temperature.

4. Disconnect all externals (AC VAN, GPU etc.) and confirm push back tug is connected.

5. Standard Call for Checklist. CM1: "Before Start Checklist". CM2: "Down to the Line" (once done).

AT START CLEARANCE

	CM1	CM2	
Push / Start Clearance	From Ground Crew ¹	From ATC	
ATC Transponder		Set as Required	
Windows (Deers ²	Check Classed	Check Closed	
Windows / Doors -	Check Closed	PA Announcement ³	
Slides ²	Check	Armed	
Beacon	ON		
Thrust Levers	ldle		
ACCU Press. Indicator	Check		
	NWS STRG DISC MEMO – Displayed ⁴		
	Before Start Checklist – Below the Line		
	Parking Brake – OFF ⁵	Note – Time	
Pushback Required	Announce – OFF Blocks Time	Clock – Start	
	Pushback Competed – Parking Brake ON		
	Brake Pressure – Check		
	Tow Bar – Disconnect		
	Parking Brake – ON		
Pushback Not Required	Brake Pressure – Check		
· · · · · · · · · · · · · · · · · · ·	Before Start Checklist – Below the Line		
	BEFORE Below t	E START he Line	
Checklist ⁶	WINDOWS/DOORS	CLOSED (BOTH)	
	THR LEVERS	IDLE	
	PARKING BRAKE		

1. Confirm if they are ready and communicate to them start sequence and ATC push back clearance.

2. Confirm on DOOR page.

3. "Cabin crew prepare for departure, arm the door slides and cross check"

4. If this message is not displayed but ground crew confirms that NWS bypass pin is in towing position, then do not start engine during pushback (to avoid possible nose landing gear damage upon green hydraulic pressurization). Ref to MEL (NWS Electrical Deactivation Box) for dispatch. In case of a power push, NWS selector should remain in normal position for steering (Ref: PRO-NOR-SUP-MISC-D Pushback with Power Push Unit).

5. When asked by ground crew.

6. Standard Call for Checklist. CM1: "Below the Line". CM2: "Before Start Checklist Complete" (once done).



STARTUP COCKTAIL

MANUAL ENGINE START WITH EXT PNEUMATIC & ELEC POWER FOLLOWED BY CROSS BLEED ENG START IN NORMAL AUTO MODE

BEFORE START

- PACKS Both OFF
- APU and ENG Bleeds ALL OFF
- X BLEED OPEN

ENG 2 START

- ENG MAN START Pb ON
- N2 22% (or max motoring, min 20%) ENG MASTER ON
- EGT Check increasing within 15 seconds
- N2 50% Check start valve closure (between 50-56%)
- ENG MAN START Pb OFF

AFTER ENG 2 START

- EXT POWER Deselect to AVAIL & Disconnect
- EXT Pneumatic Remove
- PACKS Both ON
- ENG Bleed 2 ON

ENG 1 START

- Area Clear
- ENG 2 Thrust Adjust (for 30 psi)
- ENG 1 Start (normal auto mode)

AFTER ENG 1 START

- THRUST Idle
- X BLEED AUTO
- ENG BLEED 1 ON

<u>Note: This is a "Read and Do"</u> <u>Supplementary Procedure in FCOM</u>

ENGINE START – AUTOMATIC¹

	• •••	6 110	
	CM1	CM2	
	IGN / Start		
Engine Mode Selector	Announce: "Engine 2 Start"		
Engine 2 Master Switch	ON ²		
Sequence of Events	 Monitor: N2 Increases – Start Valve Inline, Bleed Pressure Green, Oil Pressure Rises. N2 16% – Indication of Active Ignitor A or B. N2 22% – FF Increases (may cross approx. 200 Kg/h). EGT & N1 – Increases within 15s (max) after fuel is ON. N2 50% – Start valve closure starts & Igniter indication Off. 		
Idle Parameters	Approx: ³ • N1 – 20%. • N2 – 60%. • EGT – 400°C. • FF – 300 Kg/h.		
	Grey Background on N2 Indication Dis	sappear ⁴	
Engine 1 Start ⁵	Same as for Engine 2		
Pack Valves	Both reopen with a 30s delay	v after 2 nd engine N2 is >50%	
1. Manual starting (FCOM PRO-NOR-SUP-ENG – CM2 reads & CM1 acts) is recommended in following cases:			
 Engine Stall Engine EGT Over Limit Low Start Air Pressure 			
 When Expecting a Start Abort, due to: Degraded bleed performance in hot and high conditions High Residual EGT / Reduced EGT margin in hot and high conditions Marginal performance of external pneumatic cart Intermittent ECAM ENG IGN FAULT during first start of the day 		nditions t and high conditions start of the day	
A Dry Crail	A Dry Crank is performed		
2. ON when all amber crosses & messages have disappeared from engine parameters (on upper ECAM) and bleed pressure is available (on lower ECAM). In case of electrical supply failure during start (loss of ECAM DUs), abort start and perform a 30s dry crank.			

3. Approximate ISA sea level values rounded off for painless absorption.

4. During start if fuel leak is reported from the engine drain mast, run the engine at idle for 5 min. If leak does not disappear then maintenance action is required.

5. PTU FAULT is triggered, if second engine is started within 40s following the end of the cargo doors operation. The warning can be reset by switching the yellow ELEC pump ON, then OFF.

	CM1	CM2
Engine Mode Selector	Normal ¹	
APU Bleed	OFF ²	
Engine Anti-ice	As Required ³	
Wing Anti-ice ⁴	As Required	
APU Master Switch	OFF (if not required)	
Ground Spoilers		Arm
Rudder Trim		Zero
Flaps	Takeoff Position ⁵	
Pitch Trim Handwheel		Set
Status Reminder	Check Not Displayed – If displayed then check ECAM status	
	Announce:	
Ground Crew	"Clear to Disconnect"	
	"Hand Signal on the Left / Right"	
N/W STEER DISC MEMO	Check – Not Displayed	
	AFTER	START
	ANTI ICE	AS RQRD
Checklist ⁶	ECAM STATUS	CHECKED
		% SET

1. This is a cue to do "After Start" procedure.

2. This action enables to avoid ingestion of engine exhaust gases. If APU is necessary for performance purpose then bleed can be selected ON before takeoff.

3. Must be ON during all ground operation, when icing conditions (OAT/TAT < 10° C with visible moisture) exist or are anticipated. In case you are anticipating icing conditions enroute, it's not a bad idea (even in non-icing conditions) to check engine anti-ice serviceability by turning it on momentarily and verifying that the fault light goes out and there is an increase of idle N1. During ground operation in icing conditions and OAT +3°C or less for > 30 mins, carry out ice shedding procedure i.e. 70% N1 for 30s every 30 mins and also just before takeoff. If this is not possible then power setting and dwell time as high as practical. In freezing rain, drizzle, fog or heavy snow, ice shedding may be enhanced, by additional run ups at intervals, to not exceed 10 min, advancing throttles to 70 % N1 momentarily (no hold time).

4. APU bleed not authorized for using wing anti ice. In icing conditions, wing anti-ice <u>may be</u> turned on to prevent ice accretion on the wing leading edge. It <u>must be</u> turned on if there is evidence of ice accretion, such as ice on the visual indicator, or on the wipers, or with the SEVERE ICE DETECTED alert. Ice accretion is considered severe when the ice accumulation on the airframe reaches approximately 5mm thick or more.

5. In icing conditions with rain, slush or snow, maintain flaps retracted until takeoff point.

6. After receiving the hand signal from the ground crew, CM1/CM2 will call "HAND SIGNAL RECEIVED AND BYPASS PIN SIGHTED". Then CM1 will ask for "AFTER START CHECKLIST".





	CM1			CM2
	Clearance			Obtain
Ρ	Taxi Light	ON ²		
Α	Flight Controls	Check (before taxi clearance if unal	le then before arm	ning the autobrakes)
D	Area Classanaa	Call: "Clear Left Side"	Call: "C	Clear Right Side"
ĸ	Area Clearance	Call: "Hand Signal	By Pass Pin Sight	ted"
Т	Parking Brake	OFF		
1	Brake Pressure		Cł	neck Zero ³
-	Brake Pedals	Press and Call: "BRAKE CHECK"	Call: "PRI	ESSURE ZERO" ⁴
	ATC Clearance	Confirm for	any Changes	
P A R	Runway Change • Direction • Surface Conditions	Verify	Update: • FMS • Perfo • •	and FCU ormance Thrust: FLX / TOGA Config: Flaps Speed: V1, VR, V2
T 2	Departure ChangeSID / Radar Vectors		Update: • FMS	and FCU
	Takeoff Briefing	By PF (if there is any change)		
	Flight Instruments	Check / Set • PFD / ND • ISIS	Check / Set PFD / FD -	/ ND Both ON
Ρ		PF ND – WX Radar	PM ND – Terrain M	Node ⁵
Α	Final Chaoka	Cabin Report – Receive	Surveillance Pr AT	adar – ON ⁶ redictive WS – AUTO <u>TC Code / Mode – Set</u>
R	Final Checks	"CABIN SECURED FOR TAKEOFF"	Brakes Au	utobrake – Max
т			Memo TC	O Config – Test ⁷ O Memo – Check No Blue
3	Checklist	BEFORE TAKEOFF Down to the Line FLIGHT CONTROLS. CHECKED (BOTH FLT INST. CHECKED (BOTH BRIEFING. CONFIRMED FLAP SETTING. CONF V1 . VR . V2 /FLX TEMP. (BOTH ATC. SET	ECAM MEMO - AUTO BRK MAX - SIGNS ON - CABIN READY (≪) - SPLRS ARM - FLAPS TO - TO CONFIG NORM	TO NO BLUE

1. Operate the engine at or near idle for at least 2 mins before advancing to high power. Taxi time at idle may be included in the warm up period. Speed 20 knots on straight taxi routes and for turns of 90° or more, speed less than 10 knots. Accelerate to 30kts, then one smooth brake application to decelerate to 10kts. The aircraft is correctly aligned when the centerline is lined-up between the PFD and ND. A/C needs a runway width of 30M (98 feet) for a 180° turn. The GS for the entire maneuver should be between 5 to 8 kts, to prevent the width of the turn from increasing.

2. At night, also switch on runway turn off lights if required.

3. There may be slight residual pressure for a short time.

4. After ensuring that there is no brake pressure indication on triple gauge.

5. After checking weather radar, the PM for the sector will select Terrain Mode on the ND.

6. To check radar with auto tilt function, set MULTISCAN to MAN. If weather is not significant, down tilt to display ground echoes. Once checked put it back to AUTO. Gain must be manually set to +4, when MULTISCAN is set to AUTO & when flying below FL 200. Scanning the departure path at takeoff will also be done in MAN mode (max tilt +15°) and then back to AUTO. Without auto tilt function (AP-BLB & C), after checking, keep the tilt to 4° if not suspecting adverse weather.

7. On receiving cabin ready report from LCC.

```
TAXI – PART 1
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TAXI – PART 2





			Radar – ON
So S		Surveillance	Predictive WS – AUTO
			ATC Code / Mode – Set
Bad	в	Brakes	Autobrake – Max
Manaami		Maria	TO Config – Test
Wemory	IVI	Memo	TO Memo – Check No Blue

180 DEG TURN ON RUNWAY (CM1 as PF)

- Min runway width 30m (should give additional margin when runway is wet / contaminated).
- Ground Speed around 5-8 knots during the entire procedure (5 knots on wet runway).
- Taxi on the right of runway.
- Initial turn 25 deg from runway axis.
- When sitting over the runway edge line, turn right with full tiller deflection.
- Differential thrust and brakes can be used if required.
- When turn is complete, align with centerline and release tiller to neutral before stopping.

BEFORE TAKEOFF

	CM1	CM2	
Takeoff Clearance		Obtain	
Exterior Lights		ON ¹	
Engine Mode		As Required ²	
TCAS		TA or TA/RA	
Cabin Crew		Advise ³	
Brake Fans ⁴		OFF	
Packs		As Required ⁵	
Sliding Table	Stowed		
Approach Path	Check Clear – Visually and through TCAS		
Takeoff Runway	Confirm		
Checklist	BEFORE TAKEOFF Below the Line TAKEOFF RWY CONFIRMED (BOTH) CABIN CREW ADVISED TCAS TA OR TA /RA ENG MODE SELAS RQRD PACKSAS RQRD		

1. At CM1's command, strobe ON at line up clearance and nose, landing & turn off ON at takeoff clearance.

2. IGN if standing water, rain or turbulence.

3. On PA – "Cabin Crew Take Your Stations for Takeoff".

4. If an arc is displayed on WHEEL page above brake temp, set brake fans ON. Fan cools the temp sensor faster than the brakes since the sensor is not located within the brake material itself. Turning the fan OFF will indicate an increase in temp therefore select fans OFF if temp with fans ON is <150°C, else delay takeoff. Brake fans should not be used for takeoff (to prevent FOD to fans & brakes). Fans OFF brake temp limit for takeoff is 300°C. This limit is to ensure that, in case of hydraulic fluid leakage, the fluid that may come into contact with brake units, does not ignite in the wheel well. The limit does not respect maximum brake energy limitation, in case of a high energy rejected takeoff.

5. Consider Packs OFF or APU bleed ON provided wing anti-ice is OFF. Packs OFF reduces fuel consumption & will improve performance when using TOGA thrust. During Flex T/O, it reduces takeoff EGT & therefore maintenance costs.

CAPTAINS TAKE OFF ONLY:

A Line Captain may allow FO to carry out a takeoff if:

- Runway is not contaminated (Slippery or Wet).
- Crosswind component does not exceed 15 knots.
- RVR / Visibility is 800 meters or more.
- TOGW does not exceed 90% of allowed maximum TOGW.



TAKEOFF

	PF	PM	
Takeoff ¹	Announce – "TAKEOFF"		
Standard Takeoff ² X-wind < 20 & No Tailwind	 Thrust – N1 50% (1.05 EPR) Brakes – Release Thrust – FLX / TOGA ³ Sidestick – ½ FWD up to 80, Neutral by 100 ⁴ 	Chrono – Start	
Standard Takeoff ² X-wind > 20 or with Tailwind	 Thrust – N1 50% (1.05 EPR) Brakes – Release Thrust – N1 70% – FLX / TOGA ⁵ Sidestick – Full FWD up to 80, Neutral by 100 	Chrono – Start	
PFD / ND Announce – FMA Monitor • FMA – C • FMS Post		Monitor ⁶ • FMA – On PFD • FMS Position – On ND	
80 Knots		Check – Takeoff N1(EPR) Announce – "THRUST SET" Monitor – PFD & ENG Indications ⁷	
100 Knots	Check	Announce – "1 HUNDRED KNOTS"	
At V1 & VR		Announce – "V1" & "ROTATE"	
Positive Climb	Order – "L/G UP"	Announce – "POSITIVE CLIMB"	
Thrust Reduction Altitude 8	Thrust Levers – CL	Packs – On (if applicable) ⁹	
Acceleration Altitude	Target Speed – Check FMA – Monitor ¹⁰		
F Speed ¹¹	Flaps 1 – Order	Flaps 1 – Select	
S Speed	Flaps 0 – Order	Flaps 0 – Select Spoilers – Disarm Ext Lights – Set ¹²	

1. Check: Time, Fuel & Engine Parameters. Min visibility is 125m (Ref: Bulletin FLTOPS/SI/1/Thu Jan 03 2019).

2. Rolling takeoff is also permitted.

3. Captain's hand will be on thrust levers until V1.

4. To counter nose-up effect of setting engine takeoff thrust. Speeds (80 & 100) are in knots.

5. Rapidly increase thrust to 70% (1.15 EPR) then progressively to reach takeoff thrust by 40kts ground speed. For background information, read "Engine Intermix Operation" in FCOM > Procedures > Special Operations.

6. Check FMA for MAN TOGA(FLX), SRS/RWY/BLANK, A/THR (Blue). Check FMS position on ND (A/C on centerline). If GPS primary not available, check FMS position update.



7. Monitor Airspeed, N1 & EGT throughout the takeoff. Below 80 knots, EGT over limit will trigger ECAM & takeoff can be aborted but above 80 it is inhibited. EGT can exceed red line above 80 but do not reject takeoff above 100 knots. ECAM procedure should be applied after lift-off when appropriate flight path is established and aircraft is at least 400 ft AGL.

8. NADP1 (thrust min 800ft, acceleration 3000ft) to be used. NADP n/a in significant turbulence or wind shear.

9. Packs ON before reducing thrust will increase EGT. Set Pack 2 ON 10s after Pack 1 for passenger comfort.

10. FMA changes at ACC ALT:

THR CLB	CLB	NAV	AP1
	ALT		1FD2
		I I	A/THR

11. In CONF 1+F, F speed does not appear.

12. Nose light and Turnoff OFF, others as required.

	PF	РМ		
TCAS		TA / RA		
Engine Mode		As Required		
APU		Bleed & Master Switch – As Req.		
Anti-Ice		As Required		
Checklist – To The Line	AFTER TAKEOFF / CLIMB LDG GEAR	UP ED ON TH)		

LOW VISIBILITY TAKEOFF

PREPARATION

- Review crew qualification & currency.
- LVP must be in force if RVR/VIS is < 400m.
- Takeoff Alternate is required if visibility is below landing minima. •
- Review NOTAMS for closed taxiways, runways & construction.
- Uplift extra fuel for expected delays (higher of 30 mins or anticipated delay).
- Brief cabin crew about sterile cockpit (no unnecessary cockpit or intercom calls). •

PERFORMANCE

- No contaminated runway takeoff if RVR/VIS < 200m.
- Auto Thrust & Auto Brake must be serviceable if RVR/VIS < 200m.
- Full thrust takeoff is recommended.
- Use flap settings that gives lowest takeoff speeds (payload permitting).

EXECUTION

- Be careful about taxi routing and CAT II/III holding points.
- Max taxi speed is 10 knots.
- Any checklist action is to be done while stationary with parking brakes ON.
- Double check runway direction after lineup (use localizer, ND, runway marking etc.)
- Use roll out bar (if available) for lateral guidance during takeoff.
- If visual references are lost below 100 knots, takeoff may be rejected.
- If takeoff is rejected then keep all landing lights on after stopping for emergency services to easily identify the a/c.
- If visual references are lost above 100 knots, takeoff should be continued.



HOW TO HANDLE TURBULENCE

		PF	РМ	
	MCDU	PERF CLB	F-PLN	
т	Transition Altitude	Set Standard ¹		
•	Hunshien Annuae	After Takeoff / Climb C	Checklist – Below the Line	
		Call – "Ten Thousand Feet Checks"	Call – "Ten Thousand Feet"	
т	Ten Thousand Feet	EFIS – CSTR / ARPT	Landing Lights – Retract Seat Belts – As Req. EFIS – ARPT ECAM Memo / Pressurization – Review NAVAIDS – Clear Manually Tuned VORs SEC F-PLN – Copy active FPLN or as req. OPT / MAX ALT – Check ²	
т	Tilt / Terrain	WX Radar – Adjust Tilt ³	Terrain OFF & WX Radar on ND At 10000 ft or Highest MSA, whichever is later	
т	Twenty Thousand Feet	WX Radar – Adjust Gain ⁴		
	Speeds	ECON – Managed Best L/D – Green Dot Best ROC – Turbulence (thumb rule) Turbulence ⁵ : 250 up till FL200 275/.76 above FL200		

1. Call Outs: PF: "Set Standard". PM: "Standard Set Cross Checked, Passing FL__". PF: "Checked". On STD, transponder does not transmit to ATC the standard barometric reference. Transmission is based on last QNH selected. Upon ATC notification of an incorrect reference, select 1013 manually then set STD. Transmitted aircraft altitude is not affected. Only FCU selected altitude may be misinterpreted.

2. If ATC limits CRZ FL to a lower level than the one in FMGS (higher is not an issue) then insert this lower CRZ FL in PROG page otherwise there will be no transition to cruise phase. Managed speed targets & Mach are not modified & SOFT ALT mode will not be available. FMA will display ALT instead of ALT CRZ. Soft Altitude (managed guidance) corrects minor deviations from Mach target by allowing \pm 50 feet variation from the cruise flight level. This improves fuel efficiency & passenger comfort & minimizes changes in thrust. (basically, sacrifices altitude to maintain Mach target instead of doing so by changing thrust).

3. Adjust tilt during climb for radars without auto tilt function. With auto tilt, if weather display is ambiguous or unexpected, use manual tilt in order to better analyze the weather situation. In particular below FL 200, for situations with low-level weather, weather with low reflectivity or in front of suspected active cells, switch to manual mode and adjust tilt setting downward until weather is detected or ground clutter appears on upper part of display.

4. For radars with auto tilt, set GAIN back to CAL from +4 when MULTISCAN selector is in AUTO & flying above FL200.

5. Ref to QRH abnormal & emergency miscellaneous section for severe turbulence procedure.

10 000 ft FLOW PATTERN



TOP OF CLIMB

	PF	PM
ТОС	Rate of Climb – Adjust	TOC Fuel / Time – Note

<u>ICAO</u>: ICAO PANS-OPS Doc. 8168 (within or outside RVSM airspace): Rate of climb/descent to an assigned level, especially with autopilot, should be less 1500 ft/min throughout the last 1000 feet when the pilot is made aware of another aircraft at or approaching an adjacent level, unless otherwise instructed by ATC. This avoids unnecessary ACAS II RAs. These procedures are to be specified by operators. http://www.theairlinepilots.com/forumarchive/guickref/acas.pdf

<u>PIA OM Part A – 6.6.3 – Level Off</u>: To prevent divergence of assigned level, or undesirable "g" forces, it is important to monitor closely the flight progress, especially when flying manually. Rate of climb/descent to be within 500/1000 ft/min (not to exceed 1000 ft/min) in RVSM airspace when approaching the selected altitude or when changing flight levels.

<u>Jeppesen - Air Traffic Control - UK Rules and Procedures – Maximum Rates of Climb and Descent</u>: Approaching a flight level the vertical closure speed should not be excessive. About 1500ft to a level, the vertical speed should be a maximum of 1500ft per minute and ideally to between 1000ft per minute and 500ft per minute.

HOW TO REMEMBER WHAT YOU NEED FOR FLIGHT INTO RVSM CRUISING LEVELS

It's all about Altitude & Maintaining it correctly	Required Equipment
What is the source of altitude?	ADR – So you need at least two.
What converts it into graphics for you to see?	DMC – So you need at least two.
Where do you see the Altitude?	PFD – So you need both of them.
How will you set the altitude you want to maintain?	FCU – One channel is good enough.
How will you hold the altitude accurately?	Autopilot – One is good enough.
Who will warn YOU, that you are not maintaining the altitude correctly?	FWC – One is good enough.
Who will warn ATC, that you are not maintaining the altitude correctly?	Transponder – One is good enough.

Items that need Dual channels have D (for Dual) in it. ADR, DMC, PFD.

A318/A3 FL OPER/	8 19/A320/A321 Ight Crew Ating Manual	PROCEDURES SPECIAL OPERATIONS REDUCED VERTICAL SEPARATION MINIMUM - RVSM		SM
		Com	parison of Altitude Indication	on (ft)
Flight Level	Speed or Mach Number	Difference between ADR1 and ADR2 (on PFDs)	Difference between ADR3 and ADR1/2 (on PFDs)	Difference between STBY ALTI and ADRs
FL 50	250 kt	50 (15 m)	65 (20 m)	130 (40 m)
FL 100	250 kt	55 (17 m)	80 (24 m)	185 (56 m)
FL 200	300 kt	90 (27 m)	135 (41 m)	295 (90 m)
FL 300	M 0.78	130 (40 m)	195 (59 m)	390 (119 m)
FL 390	M 0.78	130 (40 m)	195 (59 m)	445 (136 m)

HOW TO HANDLE FUEL TEMPERATURE

Fuel temperature will slowly reduce towards TAT. The rate of cooling of fuel can be expected to be in the order of 3°C/hour with a maximum of 12°C/hour in the most extreme conditions. If fuel temperature approaches the minimum allowed, the ECAM outputs a caution. Consideration should be given to achieving a higher TAT by descending or diverting to a warmer air mass. Below the tropopause, a 4000 ft descent gives a 7°C increase in TAT. In severe cases, a descent to as low as 25000 ft may be required. Increasing Mach number will also increase TAT. An increase of M0.01 produces approximately 0.7 °C increase in TAT. In either case, up to 1 hour may be required for fuel temperature to stabilize. The crew should consider the fuel penalty associated with either of these actions.

			PF	РМ
	Antenna	١	WX Radar – Adjust Tilt ¹	
Α	Altimeter			Note hourly readings (RVSM req.)
	ACAS			TCAS – Set to ALL
в	Boundaries		FIR Entry / Exit Time or	other Area Procedures
С	Company			Departure Message – Send ²
D	Documentation			Flight Plan, Logbook, Debrief – Complete
F	ECAM	Men	no and SD Pages – Review	
E	Enroute			Enroute Alternates / ETP ³
F	Fuel			Fuel Score – Every 30 mins
G	Gain (WX Radar)	Check ⁴		
н	High Altitude Winds			Wind Data Entries – Check ⁵
			UP Performance:	DOWN Performance (if FMGS fails):
	Inflight Performance	Vertical	Step Flight Level	 Green Dot Speed ⁶ Single Engine Ceiling
1		Lateral	 Waypoint Track & Distance NAV Accuracy ⁷ 	
	Inhaled Oxygen?	O2 Mask – Check Stowed		

1. For radars with auto tilt function, if display is ambiguous or unexpected, use manual tilt for a better analysis. In particular below FL 200, for situations with low-level weather, weather with low reflectivity or in front of suspected active cells, switch to manual mode and adjust tilt setting downward until weather is detected or ground clutter appears on the upper part of the display. Regardless of auto or manual tilt, a range of 80nm for PF ND and 160nm for PM ND is a good combination for weather awareness (use shorter ranges for short-distance weather). Over water flights have no ground returns so as an initial setting, following approx. tilt settings can be used for radars without auto tilt function: -6° for 40nm, -2° for 80nm and -1° for 160 or 320nm.

2. Departure message to company can also be relayed during climb (time permitting, above 10,000 feet, outside TMA) comprising of: Blocks off and Airborne time, ETA, Actual ZFW and any special message or reason of delay.

3. Note down actual weather for enroute alternates on flight plan. Suitable airport pairs should be entered on the ETP page for FMS to calculate the ETP that can be inserted as Place/Distance point in SEC F-PLN for enroute diversions. Single engine cruise distance in still air, ISA conditions is 350nm.

4. For radars with auto tilt function, set GAIN to CAL above FL200 or +4 below FL200, if MULTISCAN is set to AUTO.

5. When there is a difference of either 30° or 30 knots for the wind data and 5° C for temperature deviation.

6. Green dot speed can also be manually calculated as below:

A) Below 20,000 feet = (2 × weight in tons) + 85.

B) For every 1000 ft above 20000 = 1 + A.

e.g. At 20,000 feet and 60 tons, green dot = $(2 \times 60) + 85 = 205$. At 25000 feet it is 205 + 5 = 210.

7. Perform NAV accuracy check if: "GPS Primary Lost" appears on ND, PROG page displays "LOW" accuracy, "NAV ACCUR DOWNGRAD" appears on MCDU or in "IRS Only Navigation". If error \leq 3nm then FM position is reliable, if not then use raw data for navigation. In case of significant mismatch between display and

REQUIRED ACCUR ESTIMATED 0.5NM LOW 0.60NM NAV ACCUR DOWNGRAD

real position use raw data navigation (possibly switching to ROSE VOR, so as not to be misled by FM data).

All alphabets have one item to do except the vowels!

DESCENT PREPARATION

	PF	РМ
		Check – Weather / Type of Approaches ¹
Planning	Confirm – Landing Performance AUTOBRAKE – AS REQ ²	Check – <u>Landing Performance</u> ³ FLAPS – GPWS LDG FLAP 3 If Not FULL
Preparation	FMS Image: Second stress of the second stress of	
Approach Briefing	DIR PROG PERF INIT	
Descent Clearance	Cleared Altitude – Set on FCU	Obtain from ATC TCAS – Set to Below ⁶

1. Obtain destination & alternate weather approx.15 mins before TOD. Check fuel predictions for destination & alternate to estimate any extra holding time available. Also give arrival message to company (ETA, a/c status, requests etc.)

2. LO – Long runways, MED – Short or contaminated runways. Pedal braking may be considered on very long runways if it is anticipated that braking will not be needed or on very short runways to apply full manual braking without delay.

3. On WET runways (condition GOOD), crew may select REV IDLE, if inflight landing distance assessment is computed with (i) "MEDIUM–POOR" performance (ii) "No Reverser Credit" and the assessment result is within the LDA. Best combination to reduce fuel and brake wear is CONF3 + REV Idle + Autobrake LO. If landing distance is a priority then consider Flaps FULL + REV Max + Autobrake MED. Riding the brakes by overriding the autobrake or using autobrake MED with CONF3 and REV IDLE increases brake oxidation (which may be severe).

4. The FMS may have deleted the altitude constraints that are at or above the CRZ FL. If a TOO STEEP PATH message is displayed after the final descent point, do not use FINAL APP guidance for approach.

5. Do not insert gust value. Ground Speed Mini function (manage speed mode) takes into account instantaneous gust.

6. Just prior to TOD, cycling fasten seat belt sign twice gives a clue to the cabin crew about descent phase.



APPROACH BRIEFING

AIRCRAFT	Technical Status	
AIRFIELD (DEST & ALT)	Weather Terminal information – NOTAMS etc. Fuel – Extra Holding	
STAR	 NAV Frequencies Routing and Constraints Transition Level MSA 	
APPRPOACH	 NAV Frequencies Approach and Minima Transition Level MSA Obstacles Restricted / Prohibited areas 	
GOAROUND	ATC Procedure Aircraft Procedure	
RUNWAY	Dimensions (Length, Width, Distance beyond G/S) Surface Condition Lighting	
ΤΑΧΙ	Routing and Parking	
SPECIAL PROCEDURES Weather (Circumnavigation etc.) Terrain Failures (Communication, MEL etc.)		

DESCENT¹

		PF	PM	
	MCDU	PROG / PERF DES	F-PLN	
	Speeds	Managed – If Not then: o 0.78 / 300 till FL100 o 250 below FL100		
Т	Twenty Thousand Feet	WX Radar – Adjust Gain ²		
т	Tilt	WX Radar – Adjust Tilt	Terrain ON ND At 10000 ft or Highest MSA, whichever is earlier	
		Call – "Ten Thousand Ft Checks"	Call – "Ten Thousand Feet"	
			Landing Lights – Set	
			Seat Belts – ON	
		EFIS – CSTR	EFIS – CSTR	
Т	Ten Thousand Feet	LS ³ – As Required	LS – As Required	
		NAV Accuracy – Check ⁴	RAD NAV – Selected / Identified	
			ENG MODE – As Req	
			ECAM Status – Check ⁵	
Т	Transition Level	Set QNH		
			APPROACH	
	Checklist	BRIEFING CONFIRMED		
		ECAM STATUSCHECKED		
		BARO RE	FSET (BOTH)	
		ENG MOL	JE SELAS KUKU	

1. Approaching assigned level, monitor ROD (reduce to 1000 fpm or less). For a change of 1000 feet or less, descent rate not more than 500 fpm. Max ROD: 2000 fpm when descending below 5000 feet AGL and 1000 fpm below 2000 feet AGL.

2. For radars with auto tilt function, set GAIN to +4, when MULTISCAN selector is set to AUTO & when flying below FL200. If display is ambiguous or unexpected, use manual tilt for a better analysis. In particular below FL200, for situations with low-level weather, weather with low reflectivity or in front of suspected active cells, switch to manual mode & adjust tilt setting downward until weather is detected or ground return appears on upper part of ND. For radars without auto tilt function, adjust tilt to keep ground returns on top of the ND. For approach keep tilt to 4° to avoid ground clutter.

3. Check LOC/GS scales & deviations and also IDENT on PFD. If wrong or no ident, check the audio ident.

4. If GPS Primary function is not available, crosscheck NAV ACCURACY using the PROG page (BRG /DIST computed data), and the ND (VOR /DME raw data).

5. Especially any aspect affecting the approach and landing.



HOLDING SPEEDS: See Jeppesen – Air Traffic Control – Flight Procedures (Doc 8168) – Holding Procedures.



Four things you cannot afford not to think about while transitioning to the approach phase:

- Speed control (Green Dot) Verify auto deceleration or carry it out manually (make yourself comfortable).
- Arming the Approach (APPR Pb) Forget and see what happens.
- Configuration (Flaps / Gears) Plan your points on the chart beforehand where you will take flaps / gears.
- **Go around** altitude setting (on FCU) Plan ahead, it wasn't raining when Noah made the ark.

TYPE OF APPROACHES

Decelerated Approach: Refers to an approach where aircraft reaches 1000 feet in landing configuration at VAPP. In most cases, this equates to aircraft being in CONF1 and S speed at the FAF. This technique is recommended for ILS and FINAL APP (vertical managed guidance).

Early Stabilized Approach: Refers to an approach where the aircraft reaches FAF in landing configuration at VAPP. This technique is recommended for non-precision approaches (LOC FPA, NAV FPA and TRK FPA). To get a valuable deceleration pseudo waypoint and to ensure a timely deceleration, the pilot should enter VAPP as a speed constraint at the FAF.

Discontinued Approach

When at or above the FCU selected altitude:

- GO AROUND, or
- Discontinued Approach Technique^{*}
 - Announce "CANCEL APPROACH"
 - $\circ \quad \mbox{Disarm AP/FD Approach Mode} \mbox{APPR / LOC Pb}$
 - $\circ \quad \mbox{Select Lateral Mode} \mbox{NAV / HDG}$
 - Select Vertical Mode VS / LEVEL OFF
 - Select and Adjust SPEED

When below the FCU selected altitude,

• GO AROUND

* Since thrust levers are not set to TOGA, FMS does not engage the Go-Around phase and remains in the approach phase. It does not string the previous approach in the active F-PLN. Flying over, or close to the airport will sequence the destination waypoint and therefore there will be no "destination" in F-PLN. Lateral revision will then be required to redefine the destination.

STANDARD ILS APPROACH¹

	PF	РМ	
Approach Phase ²	Activate or Set Green Dot Speed	NAV Accuracy – Check ³	
Intercept Heading	APPR – Press AP – Engage Both		
LOC / GS	Check Armed / Captured ⁴		
3NM from FDP	FLAPS	1 – S SPEED ⁵	
GS *	GO AROUN	ID ALTITUDE – SET	
At 2000 Ft AGL (min) 6	FLAPS	2 – F SPEED ⁷	
When Flaps 2	L/G DOWN – Order	 L/G Down – Select Auto Brake – Confirm / Change Mode Lights: Nose – TO Turnoff – ON Ground Spoilers – Arm 	
When L/G Down	FLAPS 3 – Order	Flaps 3 – Select ECAM – Check Wheel Page ⁸ Triple Indicator – Check Residual Pressure ⁹	
	FLAPS FULL	L ¹⁰ – TARGET SPEED	
When Flaps 3		 Cabin Crew – Advise ¹¹ Landing Memo – Check No Blue A/THR – Speed Mode or OFF Wing Anti-Ice – OFF ¹² 	
Checklist ¹³	LANDING CABIN CREWADVISED ATHRSPEED/OFF AUTOBRAKEAS RQRD	ECAM MEMOLDG NO BLUE - LDG GEAR DN - SIGNS ON - CABIN READY (≪) - SPLRS ARM - FLAPS SET	
At 1000 Ft (IMC or VMC)	Call – Checked ¹⁴	One Thousand – Monitor / Announce	
At Minimum + 100		One Hundred Above – Monitor / Announce	
At Minimum	Continue / Go Around – Announce	MINIMUM – Monitor / Announce	

1. For CAT1, set DA/DH into MDA field on PERF APPR page (altitude reference will be taken from pressure altimeter).

2. APPR phase activates automatically when overflying DECEL pseudo waypoint in NAV mode. In HDG MODE activate it manually on PERF DES page, approximately 15 NM from touchdown (20 NM as per SOP).

3. If GPS Primary is lost. If NAV accuracy is low, at least one ND must be in ROSE LS / VOR depending on the approach.

4. Glide interception from above: (1) APPR Pb pressed (2) Set FCU ALT above aircraft altitude (3) V/S Mode @ 1500-2000 fpm. Above 2000 speed will increase towards VFE. At VFE, AP will maintain VFE but reduce VS without mode reversion. Gear down and Flaps 2 will give the best rate of descent. (4) At GS* set missed approach altitude.

5. For decelerated approaches, FLAPS 1 should be selected at least 3nm before the final descent point and a/c to be established on final descent with FLAPS 1 & S speed at or above 2000 ft AGL. If tailwind > 20 knots or glide slope angle is > 3.5° then an early stabilized approach is recommended.

6. Speed brakes not recommended below 2000 feet.

7. Intercepting the flight path below 2000 feet AGL, select Flaps 2 at one dot below flight path.

8. One green triangle (and also "LDG GEAR DN" MEMO message) is sufficient to indicate gear down-locked.

9. Alternate braking test at lowering gear may leave residual pressure. Apply residual braking procedure in that case.

10. Retract speed brakes before selecting full flaps. To minimize flaps wear, extend flaps at VFE-15 when possible.

11. "Cabin Crew at your Stations for Landing".

12. "ON" only in severe icing (5mm+ accretion). With ice accretion, min speed should be VLS+10 in all CONF & VLS+5 in Full CONF. If there is ice accretion & wing anti-ice is not operative, then min speed should be VLS+10 / Green dot.

13. Landing memo appears below 2000 feet. After go-around if the aircraft does not climb above 2200 feet RA, then on the subsequent approach it will appear below 800 feet RA.

14. By 1000 feet approach must be stabilized. <u>SPEED: +10/-5</u> Knots (if predicted tailwind at landing > 10kts, decelerated approach not permitted) – <u>PITCH: +10°/-2.5°</u> – <u>BANK: 7°</u> – <u>SINK RATE: 1000 fpm</u> – <u>LOC / GLIDE</u>: ½ dot. Hands on thrust levers & sidestick with <u>THRUST NOT BELOW</u> the required minimum. All briefings & <u>CHECKLISTS COMPLETED</u>.

AUTOLAND WARNING



FLASHES when:

- The aircraft is close to the ground (<200ft), and
- AP is supposed to land the aircraft (engaged in LAND or FLARE mode), and
- Something from the following happens:
 - AP does not do what it is supposed to do:
 - Disengages
 - Long Flare
 - LOC problem (above 15 feet):
 - LOC deviation exceeds ¼ dot (scale flashes)
 - LOC signal is lost (FD vertical bar flashes)
 - GLIDE problem (above 100 feet):
 - GLIDE deviation exceeds 1 dot (scale flashes)
 - GLIDE signal is lost (FD horizontal bar flashes)
 - RA Problem:
 - > They don't agree (difference greater than 15ft)

GO AROUND

	PF	PM	
Initial Actions	Thrust Levers – TOGA ¹		
	Rotation – Perform ²	Flaps – One Notch Up If Full then 3. If 3 then 2	
	Announce – Go Around, Flaps		
FMA	Announce ³		
Positive Climb	L/G	UP	
501	NAV / HDG – As Required ⁴		
	AP – As Required ⁵		
Thrust Reduction ALT	Thrust Levers – CL		
Acceleration ALT	 Target Speed – Green Dot ⁶ F Speed – Flaps 1 Order S Speed – Flaps 0 Order 	 F Speed – Flaps 1 Select No Stopping at Flaps 2 S Speed – Flaps 0 Select Ground Spoilers – Disarm Lights – Nose/Turnoff OFF ⁷ 	
Checklist	After Takeoff / Climb Checklist – Down to the Line 8		

1. TOGA detent engages the go around phase with associated AP/FD modes. If TOGA thrust is not required then thrust levers can be retarded after briefly putting them in TOGA detent. CL detent gives the benefit of A/THR.

SRS

CLB

GATRK

2. Initially pitch 15° with all engine operating and approximately 12.5° with one engine, thereafter follow FD SRS.

MAN

TOGA

3. MAN TOGA / SRS / GA TRK / A/THR in Blue.

4. Minimum 100 feet.

5. Go-around can be flown with both autopilots. Engagement of any other mode disengages AP2.

6. If speed does not increase, then check and pull the ALT knob.

7. Other lights as per policy.

8. "NAV" to follow missed approach, "Activate APP Phase" to prepare for a second approach.

RNAV (GNSS) APPROACH ¹ – FINAL APP GUIDANCE ²

	PF	РМ	
	Aircraft Equipment – Check ³ CDS Brimary Availability Ch	add for DNAV/(CNSS) Approach	
Descent Prep	GPS Primary Availability – Check for RNAV(GNSS) Approach		
	F-PLN A – Set and Compare I	MCDU & Charted Paths ⁴	
	Go Around Strategy – Review ⁵	Weather – Check OAT and QNH ⁶	
	• GPS Primary – Check Availability ⁷		
10,000 Feet	 NAV Accuracy – Check ⁸ 		
	 BARO Ref – Set ⁹ 		
	 APPR – Press ¹¹ APP NAV – Check armed / engaged FINAL – Check armed ¹² 		
Cleared for Approach ¹⁰	 Configuration: Intercept/base leg – Flaps 1 5nm from FDP – Flaps 2 4nm from FDP – L/G Down 3nm from FDP – Flaps 3 2nm from FDP – Flaps Full 		
Final Descent Point (FDP)	 FINAL APP – Check Engaged Go Around Altitude – Set Flight Parameters – Monitor ¹³ 		
Minimum + 100		ONE HUNDRED ABOVE – Monitor / Announce	
Minimum	Announce: • Continue: > AP – OFF, FD – As Required ¹⁴ > TRK FPA – Select > Runway Track – Check Set (if req.) • Go Around:	MINIMUM – Monitor / Announce	

1. ICAO PBN Equivalence: RNP APCH = RNAV (GNSS) & RNP AR APCH = RNAV (RNP).

2. For RNAV/GNSS approaches with LNAV & LNAV/VNAV minima & for conventional VOR/NDB approaches.

3. PRO-SPO-51 RNP APCH.

4. Set VAPP at FDP. If "Too Steep Path" message appears after FDP, don't use FINAL APP guidance, use NAV/TRK FPA. MCDU & charted path tolerances are: 0.1° for vertical path & 1° for lateral track. For radio NAVAID approach; 3° for lateral track.

5. Degraded Nav Management: For RNAV(GNSS) with LNAV & LNAV/VNAV minima: Continue if GPS primary is lost on 1 ND only or NAV accuracy is downgraded on 1 FMGS only, otherwise discontinue. Also discontinue for position disagree. For VOR/NDB: Continue with raw data in NAV FPA for unsat vertical guidance & TRK FPA for unsat lateral guidance.

6. If OAT < Min Charted Temperature then no vertical managed guidance. For Altitude Temperature Correction see FCOM – PER-OPD-GEN. For RNAV (GNSS) approach with LNAV VNAV minima, use of QNH from a remote station is prohibited.

7. On at least 1 FMS for RNAV(GNSS).

8. In case of low accuracy use TRK FPA mode.

9. Maximum discrepancy between altimeters is 100ft.

10. Set FDP altitude constraint on FCU and engage managed descent.

11. It is recommended to arm this mode when the TO waypoint is the FDP. If pressed earlier, FINAL APP mode may engage. As a consequence, resulting speed and altitude management in FINAL APP may be inappropriate before FDP.

12. At FDP, a blue arrow on ND indicates that FINAL APP engagement conditions are met.

13. For RNAV(GNSS) XTK error not >0.1nm, discontinue if XTK > 0.3nm. With LNAV/VNAV minima, VDEV not >1/2 dot (50ft), discontinue if VDEV >3/4 dot (75ft). For conventional NAVAID check distance vs altitude raw data.

14. If FD guidance (Minima – MAP) is not relevant or followed then FD off. After MAP disregard FD as it reverts to HDG/VS.

RNAV (GNSS) APPROACH – FPA GUIDANCE¹

	PF	РМ	
Descent Prep	 Aircraft Equipment – Check ² GPS Primary Availability – Check for RNAV(GNSS) Approach F-PLN A – Compare MCDU & Charted Paths ³ 		
	Go Around Strategy – Review ⁴		
10,000 Feet	 GPS Primary – Check Availability ⁵ NAV Accuracy – Check ⁶ 		
On Final Intercept HDG	 Lateral Guidance – Set (NAV / LOC) Call for Flaps 1 TRK/FPA – Select Lateral Path – Intercept 		
Before Final Descent Point ⁷	5 NM from FDP – Flaps 2 4 NM from FDP – L/G Down 3 NM from FDP – Flaps 3 2 NM from FDP – Flaps Full 1 NM from FDP – FPA Set 0.3 NM from FDP – FPA Engage + GA Altitude Set (when below GA altitude)		
After Final Descent Point	 Position / Flightpath – Adjust Flight Parameters – Monitor ⁸ 		
Minimum + 100	One Hundred Above – Monitor / Announce		
Minimum ⁹	Announce: • Continue: > AP, FD – OFF > Runway Track – Check Set (if req.) • Go Around:	MINIMUM – Monitor / Announce	

1. For RNAV(GNSS) approaches using mixed NAV FPA guidance with LNAV minima only and for conventional VOR/NDB approaches using mixed NAV FPA or TRK FPA guidance. Also, for LOC only and BC approaches. Use TRK FPA if approach is not stored in database or nav accuracy is low.

2. PRO-SPO-51 RNP APCH.

3. Set VAPP at FDP. Disregard V/DEV info (yoyo) on PFD if "Too Steep Path" message appears after FDP. MCDU & charted lateral path tolerance in NAV FPA is 1° for RNAV (GNSS) and 3° for conventional radio NAVAID approach. In all other cases use TRK FPA mode.

4. Degraded Navigation Management: For RNAV(GNSS) with LNAV: Continue if GPS primary is lost on one ND only or nav accuracy is downgraded on one FMGS only, otherwise discontinue. Also discontinue for position disagree and when XTK error is >0.3 NM. For VOR/NDB in NAV FPA: Continue with raw data in TRK FPA for unsat lateral guidance.

5. On at least 1 FMS for RNAV(GNSS).

6. In case of low accuracy use TRK mode.

7. It is recommended to use early stabilized approach technique for vertically selected approaches.

8. For NAV FPA XTK error not >0.1nm. For LOC/BC lateral guidance not > ½ dot. For TRK mode, lateral limit is ½ dot or 2.5° for VOR & 5° for NDB. Cross check distance vs altitude and raw data in case of conventional NAVAID.

9. To prevent descending below MDA(H) add 50 feet margin for all NPA including where DA/MDA(H) is given. This shall not be applicable where LNAV/VNAV minima is used. (Ref: Bulletin FLTOPS/SI/1/Thu Jan 03 2019).

SUMMARY OF RNAV (GNSS) APPROACH WITH FINAL APP OR FPA GUIDANCE

To avoid an overwhelming number of steps, a simplified common procedure to understand and fly an RNAV GNSS approach by using either FPA guidance or Final Approach guidance is as follows:

- Approach at Green Dot speed.
- On final intercept heading or base leg, select Flaps 1 and fly the S Speed.
- Lateral Guidance NAV / LOC to capture the centerline.
- 2 min before FDP, start configuring for flaps 2, gears down, flaps 3 and flaps full.

If S speed is around 180-190 knots, 2 mins would be roughly 6 nm. This is more flexible (especially for a last-minute change in approach) than the typical 5,4,3,2,1 method as you don't have to go heads down in FMS and Charts to plan and visualize your deceleration and configuration points. Just knowing the ETA of FDP would be enough.

- 1 nm from FDP:
 - For FPA Guidance:
 - Select TRK / FPA.
 - Set required FPA.
 - Engage FPA at 0.3 nm from FDP.
 - For Final APP Guidance:
 - Arm APPR
 - Check Arming / Engagement.
- GA Altitude Set when below GA altitude.

RNP APCH / RNAV(GNSS)

RNP APCH operations correspond to RNAV(GNSS) or RNAV(GPS) operations. The minimum equipment required to start RNP APCH operations is:

- One FMGC
- One GPS
- Two IRS
- One MCDU
- One FD
- One PFD on the PF side
- Two NDs (temporary display of ND info via PFD/ND switch is permitted on PM side)
- Two FCU channels.

VOR APPROACH IN (TRK / FPA) SELECTED MODE

Radar Vectors:

- On Final Intercept Heading:
 - o TRK/FPA
 - Rose VOR (PF), NAV (PM)
 - Flaps 1
 Note: Make the "V" for VOR
- On Final Inbound Leg before FDP:
 - \circ 5 NM from FDP Flaps 2
 - \circ 4 NM from FDP L/G Down
 - 3 NM from FDP Flaps 3
 - o 2 NM from FDP Flaps Full
 - 1 NM from FDP FPA Set
 - 0.3 NM from FDP FPA Engage + GA Altitude Set (below GA altitude)
- On Final Inbound Leg after FDP:
 - o Flight Parameters Monitor (distance vs altitude and raw data)
 - Position / Flightpath Adjust
- At Minimums (if landing):
 - AP OFF
 - FD OFF
 - o RWY TRK Check Set

Overhead VOR:

- Activate approach phase.
- 3nm short of overhead position Make the "V" for VOR as mentioned above.
- 5nm from FDP on inbound track Carry out the steps mentioned above.
- Approximately 1nm before the end of the outbound leg, set inbound course on RAD NAV page for both pilots.
- At the start of procedure turn, maintain procedure turn altitude until established on inbound course (half the fullscale deflection for VOR and +-5° for NDB).



Prerequisites	•	 Higher of the following: Published minima on charts. MDH 600 ft AGL, Visibility 2400 meters. F-PLN – Approach & Missed Approach Procedure
	•	SEC F-PLN – Copy Active F-PLN & Revise Runway ¹
Approach	٠	Speed – F Speed (also insert it as a constraint at FAF)
Арргоаст	•	Configuration – L/G Down, CONF 3 & Spoilers Armed
	•	MDA Level off and set G/A altitude Select TRK FPA and proceed to downwind (45° for 30s)
	•	Downwind – Activate SEC F-PLN
Circling	•	Abeam Threshold – Check time 3 sec/100 feet
	•	Before Descending to Runway – AP/FD OFF
	•	Landing Configuration – As appropriate (ensuring early stabilization)
	•	Landing Checklist – Complete
1. When SEC F-Pl instrument approac missed approach of maneuver to the mi runway, to return to approach procedure	LN is activated, the h, therefore if visual f the initial instrumen issed approach shou the circling altitude e.	G/A procedure in the FMS is associated with landing runway and not with references are lost, initiate a go around using selected guidance, following the t approach (unless otherwise specified). The transition from the visual (circling) IId be initiated by a climbing turn, within the circling area, towards the landing or higher, immediately followed by interception and execution of the missed



VISUAL APPROACH

A visual approach shall ONLY be accepted if following criteria is met:

- \circ Visibility is more than 5 km.
- Positive contact with the ground.
- o Vertical distance from cloud base at least 2000ft.
- Any other proceeding traffic is in sight.
- During day only.



VISUAL APPROACH (TAKEOFF AND LANDING)

- Select ND mode selector to Rose NAV & RANGE 10 NM.
- Landing runway should be selected on MCDU, however visual references must be used for flying.
- After Airborne LG UP & Pull Heading
- Climb to 1500 feet circuit height.
- Select Flaps 1 & Activate Approach.
- After T/O Checklist.
- <u>FDs</u> OFF <u>Bird</u> ON Set <u>Downwind Track</u>.
- Consider wind vector (top left corner of ND) for bank angle selection. In headwind bank less (about 15°) and for tailwind bank more (about 25°) so that the downwind is at about 2.5 – 3 nm (margin of inner range circle).
- Approach Checklist.
- Abeam threshold check time for 45 secs (3 sec/100 feet, +1 sec for wind).
- Approaching end of downwind Flaps 2
- End of downwind <u>turning for base</u> Gears down and then Flaps 3
- On base leg descend at about 300-400 fpm and Flaps Full
- Landing <u>checklist</u>
- Stabilize by 500 feet.

LANDING¹

	PF	PM
Approx. 30 Feet	Flare – Perform ² Thrust – Idle ³	Attitude – Monitor ⁴
Touchdown ⁵	Reverse – Idle or Max	Spoilers – Check / Announce: "SPOILERS / NO SPOILERS" ⁶ Reversers – Check Announce: "REVERSE GREEN / NO REVERSE"
Brakes	As Required ⁷	Deceleration – Check / Announce: "DECEL / NO DECEL"
70 Knots	Thrust Levers – Reverse Idle	"70 KNOTS" – Announce ⁸
Taxi Speed	Reversers – Stow ⁹	
Before 20 Knots	Autobrake – Disengage	

1. Line Captain to perform landing if (1) crosswind > 15 knots (2) contaminated or slippery runway (3) any abnormality (4) Cloud base is such that either runway or its lighting is visible from not less than 1000 ft above runway threshold for a non-precision approach and not less than 500 ft for a precision approach.

2. Typical pitch increment in the flare is approximately 4°, which leads to -1° flight path angle associated with a 10 knots speed decay. Do not allow the aeroplane to float.

3. In manual landing "Retard" call out is triggered at 20 feet as a reminder to retard thrust levers to idle. At the latest, thrust levers shall be at IDLE detent upon touchdown. Ground spoilers are inhibited if this is not done.

4. Pitch <10° and Bank <7°. PM to call "PITCH, PITCH" if pitch reaches 10°. Tailstrike occurs if pitch >13.5 (11.5 with gears compressed). PM to call "BANK, BANK" if bank angle reaches 7°. Wingtip or engine scrape occurs if roll >20 (16 with gears compressed).

5. A landing should not be attempted immediately after high bounce, as thrust may be required to soften the second touchdown and the remaining runway length may not be sufficient to stop the aircraft.

6. If no spoilers: Verify both levers at idle or reverse detent. Set both levers to max reverse and fully press brake pedals. If spoilers not armed: Reverse thrust selection will extend them.

7. Autobrake is not activated if ground spoilers are not activated.

8. If FO is PF, he will transfer control to Captain and will assume PM duties.

9. On snow-covered grounds stow at 25 kts and for autoland stow reversers at the end of rollout along with disengaging the autopilot. Do not move thrust levers beyond FWD IDLE position.



AFTER LANDING

	CM1	CM2	
Ground Spoilers	Disarm	Cue to start the procedure	
	Exterior Lights – Set ¹	 Radar – OFF PWS – OFF Engine Mode Selector – Norm Flaps – Retract ² TCAS – Standby ATC – AS required APU – Start ³ Anti-ice – As required ⁴ Brake Temperature – Check ⁵ 	
	AFTER L FLAPS SPOIL FBS	AFTER LANDING FLAPSRETRACTED SPOILERS DISABMED	
Checklist °	APU RADAR PREDICTIVE WINDSHEA	START OFF R SYSTEM OFF	

1. Strobe AUTO after vacating runway, Landing lights retract, Others as required.

2. a) <u>Cold Weather Check</u>: Set flaps 0 except if approach was in icing conditions or runway is contaminated. Ground crew will have to check for obstructing ice before retraction.

b) <u>Hot Weather Check:</u> On ground, hot weather may cause overheating to be detected around the bleed ducts in the wings, resulting in "AIR L (R) WING LEAK" warnings. This can be avoided by keeping the slats in Configuration 1 when the OAT is above 30°C. In case of terminating flights where securing aircraft C/L is to be completed, flaps should be retracted to position 0.

3. Delay as long as possible. Use 1 Pack if possible and change packs between flights to avoid wear on 1 pack.

4. Ground operation in icing conditions for more than 30 minutes require ice shedding procedure.

5. Delay brake fans for at least 5 min after landing or before stopping at the gate (whichever occurs first). If turnaround time is short or brake temperature is likely to exceed 500°C, use brake fans disregarding the above restriction. If one brake temp exceeds 900°C, maintenance action is due. Other After Landing Flow Pattern



indications for required maintenance actions are a significant difference in brake temperature between wheels of same gear e.g. One wheel indicating 600°C while all others less than 450°C implies brake binding or permanent brake application on that wheel. Conversely, one wheel at or below 60°C whereas others beyond 210°C, implies potential loss of braking on that wheel.

6. This checklist is not "Challenge and Response" type and is to be done silently.

PARKING¹

	CM1			CM2	
	ACCU Pressure – Check ³		Anti-Ice – OFF		
Parked at Gate ²	Parking Brakes – ON ⁴			APU:	
	Brake Pressure Indicator – Check			 Available – APU Bleed ON ³ Not Available – EXT PWR ON 	
Engines	Engine Master Switch – Both OFF	6		Engine Parameters – Monitor	
	Beacon – OFF			Cabin Crow Advice on RA7	
	Seat Belts – OFF			Cabin Crew – Advise on PA	
Mice De Kome	Slides – Check Disarmed				
wise. Do items				Fuel Pumps – OFF	
	Exterior Lights – As Req.			ATC – Standby	
				Brake Fan – OFF when not required	
Ground Contact	Confirm – Chocks in Place				
Ground Contact	Parking Brake – As Required ⁸				
Checklist	PARKING APU BLEEDON ENGINESOFF SEAT BELTSOFF EXT LTAS RQRD FUEL PUMPSOFF PARK BRK and CHOCKSAS RQRD Consider HEAVY RAIN				
		I	ł	IRS – Check Performance ⁹	
Performance Monitoring		F	=	Fuel Quantity – Check ¹⁰	
		E	Ξ	ECAM – Check Status	
Display Units	Dim				
Report ¹¹	Severe Icing Conditions				

1. Prior to performing this, consider "Ground Operations in Heavy Rain" (PRO-NOR-SUP-ADVWXR). In heavy rain, water may enter the avionics ventilation system via the skin air inlet valve. EXTRACT Pb to OVRD will close the inlet valve but will cause reduction in cooling. So, packs should be on for air-conditioning to compensate the cooling reduction.

2. On entering the apron, taxi speed should not exceed 5 knots & taxi lights OFF on final turn to parking stand.

3. In case of low pressure, chocks are required before engine 1 shutdown.

4. If one brake temperature is >500°C (or 350 with fans on), avoid parking brakes unless necessary.

5. Just before engine shutdown to avoid exhaust fumes.

6. No less than 3 minutes after high thrust operation. Check engine parameters decreasing.

7. "Cabin Crew Prepare for Arrival, Disarm Door Slides and Cross Check". In case of U/S APU and if there is any delay in connecting the GPU, carry out disarming announcement before engine shutdown.

8. Release after chocks on, if one brake temperature above 300°C (150 with fans on). If necessary (slippery tarmac), keep parking brake on. With a flat nose gear tire, keep parking brake on, to avoid aircraft yawing at brake release.

9. NAV TIME is the cumulated block time since the latest IRS alignment (fast or complete). On MCDU POSITION MONITOR page, read the deviation of each IRS position from the FMGC position and check that the value does not exceed the limits mentioned in FCOM PRO-NOR-SOP-22, Parking Procedures (graph shown on the next page).

10. FOB + FU = Departure Fuel. If not (unusual discrepancy) then maintenance action is due. On terminating flights, mention arrival fuel in tech log & time of this entry (min 5 minutes after engine shutdown for fuel quantity on gauges to settle down) for fuel control monitoring (Circular Ref: FLTOPS/SI/10/FriApr192019).

11. Report severe icing conditions in logbook, requiring inspections of "engines fan acoustic panels" during walkaround. In icing conditions with $OAT < +3^{\circ}C$, record "Taxi in Time" in logbook for determining the remaining allowed taxi-out time for the next flight.





SECURING THE AIRCRAFT¹

	CM1	CM2	
Do Items	Parking Brake – Check ON ² ADIRS – All IR Mode Selectors OFF ³	Oxygen Crew Supply – OFF Exterior Lights – OFF Maintenance Bus – As required ⁴ APU – Bleed and Master switch OFF ⁵ Emergency Exit Lights and Signs – OFF External Power – As Required Battery – 1 & 2 OFF ⁶	
Checklist ⁷	SECURING T ADIRS OXYGEN APU BLEED EMER EXIT LT SIGNS APU AND BAT	SECURING THE AIRCRAFT ADIRS OFF OXYGEN OFF APU BLEED OFF EMER EXIT LT OFF SIGNS OFF APU AND BAT OFF	

1. Prior to this, adverse weather supplementary procedures (PRO-NOR-SUP-ADVWXR) should be taken into account.

Consider COLD WEATHER

2. Keep it on to reduce the hydraulic leak rate.

3. To avoid damage to Rudder Travel Limit Unit mechanical stop, the SLATS/FLAPS should be retracted before all ADIRS are set to OFF simultaneously. After ADIRS shutdown wait 10s before electrical shutdown, for ADIRS to memorize the most recent data.

4. If ELEC power is required for servicing, set overhead MAINT BUS sw (FWD Cabin) ON, before setting a/c power off.

5. APU & Packs to be kept ON for disembarkation or if transit time is less than 2 hrs. If there are local restrictions or GPU & AC van are available at no extra cost, APU will be shut down after GPU & AC van have been connected.

6. Wait till APU flap is closed (about 2 min after the APU AVAIL light goes out) otherwise it may cause smoke in the cabin during the next flight. With batteries off and APU running, APU fire extinguishing is not available.

7. This checklist is "Read and Do" type.

POST FLIGHT EXTERIOR INSPECTION – BY CM2



Disclaimer: "A320 Normal Procedures" are personal notes of the undersigned for training only. These notes do not sanction any pilot to violate his/her Company's Standard Operating Procedures, Aircraft Manuals or Manufacturer's Recommendations.

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