

# A320 NORMAL PROCEDURES

Last Updated: 15<sup>th</sup> FEB 2022

SAFETY EXTERIOR INSPECTION

PRELIMINARY COCKPIT PREPARATION

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EMERGENCY BRIEFING

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AT PUSH & START CLEARANCE

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ENGINE START – AUTOMATIC

AFTER START

TAXI

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BEFORE TAKEOFF

TAKEOFF

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CLIMB

TOP OF CLIMB

CRUISE

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ARRIVAL BRIEFING

DESCENT

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STANDARD ILS APPROACH

AUTOLAND WARNING

GO AROUND

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RNAV (GNSS) APPROACH – FPA

RNAV (GNSS) – FINAL APP OR FPA

RNP APCH / RNAV (GNSS)

VOR APPROACH – TRK / FPA

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VISUAL APPROACH

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PARKING

SECURING THE AIRCRAFT

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DISCLAIMER

## SAFETY EXTERIOR INSPECTION – CM2

- Wheel Chocks
- Landing Gear Doors
- APU Area

## PRELIMINARY COCKPIT PREPARATION OVERVIEW



1	AIRCRAFT SETUP	CM2
2	ELEC POWER	Battery Check & External power – CM2
3	APU	RMP Setting – PF Fire Test & Starting – CM2
4	ADIRS	CM2



L	LIGHTS	CM1 + CM2
E	EFB	CM1 + CM2
A	ACCEPTANCE	Recall Warnings & Acceptance – CM1 TECH-LOG, MEL/CDL, QRH (A/C Config Summary, OEB) – CM1 + CM2
P	PERFORMANCE	Preliminary Takeoff Performance Calculation– CM1 + CM2
BEFORE WALKAROUND		PM

## PRELIMINARY COCKPIT PREPARATION – EXPANDED

AIRCRAFT SETUP	
<b>WEATHER RADAR</b> <sup>1</sup> <i>This is the only step that is to be done in the transit checks.</i>	Radar – OFF
	Windshear / PWS– OFF
	Gain knob – AUTO/CAL
	Mode Selector – As Required
<b>ENGINE</b>	Masters Switch 1 and 2 – OFF
	Mode Selector – NORM
<b>LANDING GEAR</b>	Lever – Down
<b>WIPERS</b>	Both Selectors – OFF

BATTERY CHECK & EXTERNAL POWER	
<b>ELECTRICS</b>	<ul style="list-style-type: none"> <li>• A/C Not Electrically Supplied for &gt; 6 hours               <ul style="list-style-type: none"> <li>➤ Batt Voltage Check <sup>2</sup> <ul style="list-style-type: none"> <li>○ Above 25.5 V – Batt 1,2 AUTO</li> <li>○ At or Below 25.5 V – Charge for 20 mins and check again <sup>3</sup></li> </ul> </li> </ul> </li> <li>• A/C Electrically Supplied within &lt; 6 hours               <ul style="list-style-type: none"> <li>➤ Batt 1,2 AUTO <sup>4</sup> <ul style="list-style-type: none"> <li>○ EXT PWR ON if AVAIL light is on.</li> </ul> </li> </ul> </li> </ul>

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 [A320 Line Training](#) Document.

2. Check batteries voltage with Batt Pb OFF.

3. Charge with Batt Pb on AUTO & EXT PWR ON. 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	
<ul style="list-style-type: none"> <li>• RMP               <ul style="list-style-type: none"> <li>○ Power – ON</li> <li>○ Nav Light - OFF</li> <li>○ SEL Light OFF</li> <li>○ FREQ – TUNE (communication frequencies)</li> </ul> </li> <li>• APU               <ul style="list-style-type: none"> <li>○ Fire Test – Perform <sup>1</sup></li> <li>○ Start – Perform <sup>2</sup></li> <li>○ Bleed – ON (temperature as required) <sup>3</sup></li> </ul> </li> </ul>	

1. Automatic shutdown of APU & discharge of APU fire extinguisher bottle may occur if APU FIRE test pb is pressed for more than 3 seconds. APU fire pb switch is lighted partially if AC power not available.

2. Use ground support & delay APU start. After master switch, wait 3s before selecting APU START pb. Keep external power on to reduce APU load especially in hot weather. Follow LIM-APU-Start/Shutdown during refueling/defueling.

3. Do not use APU bleed with LP or HP ground air unit connected. To determine if HP ground air unit is connected, check BLEED page to see if there is pressure in the bleed air system.

## ADIRS

- ALL IR Modes – SEL to NAV
- A complete IRS alignment must be performed in the following cases:
  - Before the first flight of the day, or
  - When there is a crew change, or
  - When the departure airport is located between latitudes 2 ° North and 2 ° South, or
  - When the GPS is not available and the NAVAID coverage is poor on the expected route, or
  - When the GPS is not available and the expected flight time is more than 3 hours.
- A fast IRS alignment must be performed if:
  - A complete IRS alignment is not necessary and
  - Difference between IRS position & FMGC position is at or above 5 NM (Position Monitor Page).

## LIGHT UP

- Cockpit Lights – As Required

## EFB

- Version – Check
- Initialization – Start

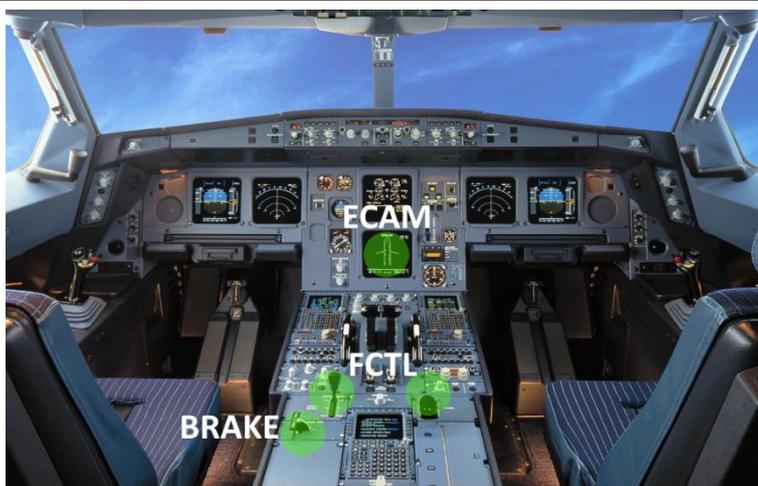
## AIRCRAFT ACCEPTANCE

- RCL – Push for 3 second to recall all cleared/cancelled warnings.
- Technical Log – Check
- MEL/ CDL – Check
- QRH:
  - A/C Reg, MSN, Revision & Insertion Date
  - OEB – Check
  - A/C CONFIG SUMMARY – Check (Ops Data)
- A/C Acceptance – Perform

## PRELIMINARY PERFORMANCE

- IPAD:
  - Jeppesen FD Pro – Check Updated
  - Fly Smart – Check Updated
  - Digital Crew App:
    - Operator's Data – EO SID Check Updated
    - Manuals – Check Updated
- Airfield Data – Obtain
- Preliminary Performance – Compute and Cross Check
- NAV Charts – Prepare
- Contingencies – Discuss (EO SID etc.)

## BEFORE WALKAROUND



**BEFORE WALKAROUND – SEATED**

- **ECAM SD PAGES:**
  - ENG – Check Oil Quantity <sup>1</sup>
  - HYD – Check Reservoir Fluid Level <sup>2</sup>
  - DOOR – Check Oxygen pressure <sup>3</sup>
  
- **FCTL:** <sup>4</sup>
  - Flaps – Confirm Flap position agrees with the handle position.
  - SPD Brake – Check retracted and disarmed.
  
- **Brakes:**
  - Parking Brake:
    - ACC Pressure – Check in Green <sup>5</sup>
    - Parking Brake Handle – ON <sup>6</sup>
    - Brake Pressure Indicator – Check Normal
  
  - Alternate Brake – Check: <sup>7</sup>
    - Yellow Elec Pump – Off
    - Chocks – On
    - Parking Brakes – Off
    - Brake Pedals – Press to Check Pressure on Brake Pressure Indicator <sup>8</sup>
    - Brake Pedals Release – Parking Brakes ON

**BEFORE WALKAROUND – STANDING**

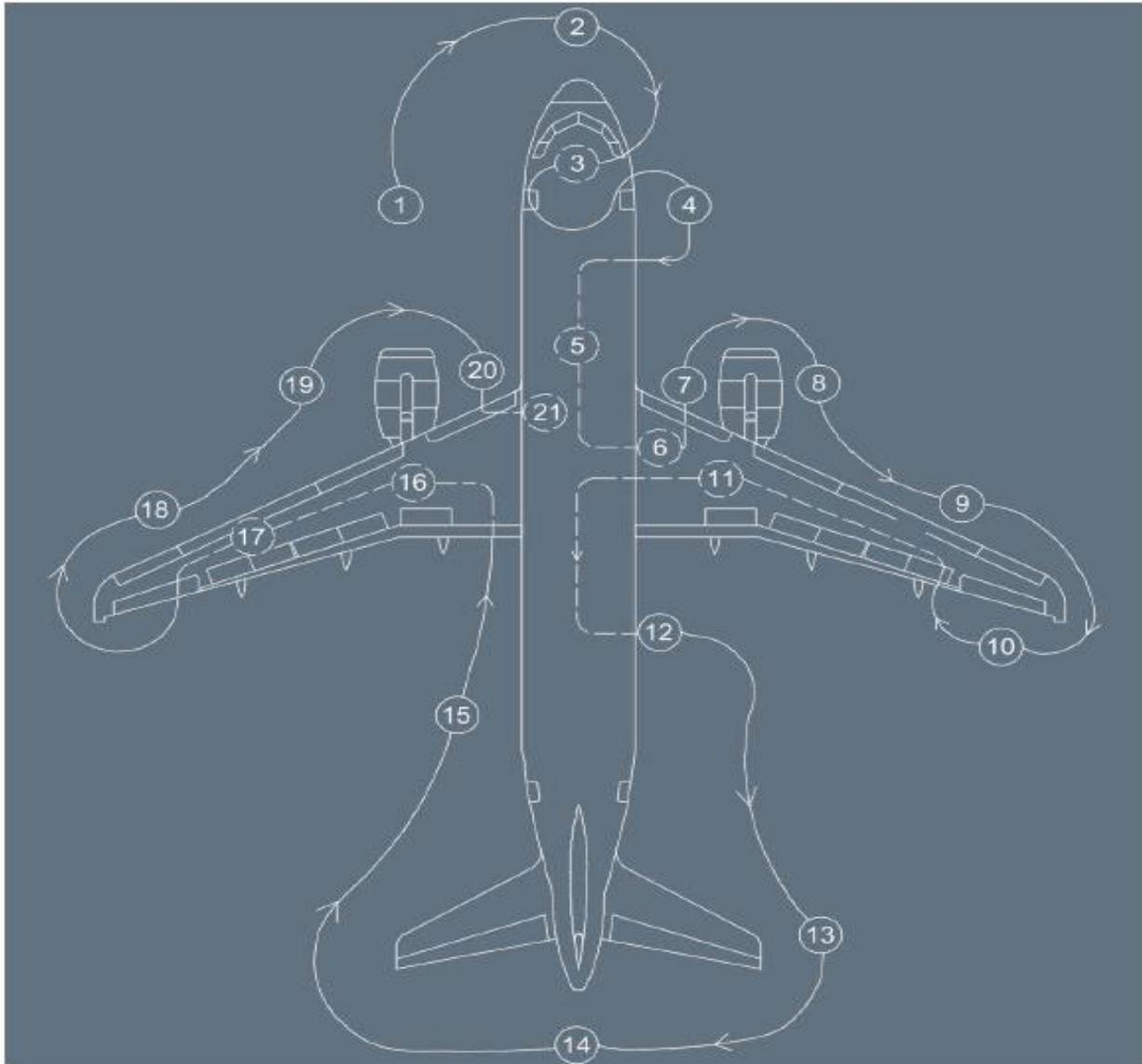
- **Emergency Equipment – Check** <sup>9</sup>
  - Life Jackets
  - Smoke Hoods
  - Gloves
  - Axe
  - Portable Fire Extinguisher
  - Oxygen Masks (goggles attached)
  - Escape Ropes
  
- **CB Panels – Check:**
  - Overhead (49 VU)
  - Rear (121, 122, 123, 124, 125 VU)
  
- **Landing Gear Pins & Covers – Onboard and Stowed**

1. *FCOM Limitations ENG OIL. Oil quantity >9.5qt + Estimated Consumption (approx. 0.5 qt/h).*
2. *Fluid volume may change with OAT and appear out of range w/o any low air pressure/level warning. Contact maintenance in this case.*
3. *If half boxed in amber, refer to FCOM LIM-OXY Minimum Flight Crew Oxygen Pressure.*
4. *For a flight control surface/handle position disagree, check with maintenance before applying hydraulic power.*
5. *Use yellow electric pump to recharge if required. Yellow & Green systems required ground clearance before use.*
6. *With 1 brake > 500°C, or 350°C with brake fans ON, avoid parking brakes unless necessary. Parking brake must be on for exterior inspection to check brake wear indicators.*
7. *Check before first flight of the day.*
8. *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.*
9. *Imagine yourself wearing a "Life Jacket" and a "Smoke Hood". Then putting on your "Gloves" with "Axe" in one hand and "Fire Extinguisher" in the other. You then use the "Rope" to exit the cockpit to breath some fresh "Oxygen".*

## EXTERIOR WALKAROUND

Flight crew must perform a complete walkaround before each flight and ensure:

- General condition of the aircraft is satisfactory.
- Visible aircraft components and equipment are safe.
  - No impact/damage to the structure.
  - No evident fuel, oil, or hydraulic leak.
  - All ground access doors are closed.
- Parking brake must be ON in order to check the brake wear indicators.



# BEFORE BOARDING CLEARANCE

CM1			CM2															
Man			Check															
<p align="center"><b>Cabin Crew Briefing</b></p> <table border="1"> <tr> <td><b>A</b></td> <td><b>Altitude</b></td> <td>Flight altitude, time &amp; related weather.</td> </tr> <tr> <td><b>B</b></td> <td><b>Baggage</b></td> <td>Baggage &amp; seating related CG issues.</td> </tr> <tr> <td><b>C</b></td> <td><b>Communication</b></td> <td>Intercom, discrete code &amp; cockpit door.</td> </tr> <tr> <td><b>D</b></td> <td><b>Documents</b></td> <td>Valid crew (cabin/cockpit) documents.</td> </tr> <tr> <td><b>E</b></td> <td><b>Emergencies</b></td> <td>Evacuation, emergency descent etc.</td> </tr> </table>			<b>A</b>	<b>Altitude</b>	Flight altitude, time & related weather.	<b>B</b>	<b>Baggage</b>	Baggage & seating related CG issues.	<b>C</b>	<b>Communication</b>	Intercom, discrete code & cockpit door.	<b>D</b>	<b>Documents</b>	Valid crew (cabin/cockpit) documents.	<b>E</b>	<b>Emergencies</b>	Evacuation, emergency descent etc.	<p><b><u>Aircraft Onboard Documents</u></b></p> <ul style="list-style-type: none"> <li>• Certificate of Registration</li> <li>• Certificate of Airworthiness</li> <li>• Air Operator Certificate</li> <li>• Insurance Certificate</li> <li>• Certificate of Radio Installation</li> <li>• Mobile Wireless License</li> <li>• Weight Certificate</li> <li>• Noise Certificate</li> <li>• RVSM Certificate</li> <li>• IPAD Approval</li> <li>• Fuel Carnet</li> <li>• Residual Disinfection Certificate</li> <li>• Dent and Repair Chart</li> <li>• Emergency Equipment Location Chart</li> <li>• GACA Foreign Operator Authorization</li> </ul> <p><b><u>Other</u></b></p> <ul style="list-style-type: none"> <li>• SAFA checklist *</li> <li>• Misc. Blank Forms File</li> <li>• Latest revision record (within 20 days)</li> <li>• Flight Pack List</li> </ul>
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<p align="center"><b>Machine</b></p> <ul style="list-style-type: none"> <li>• Technical Status</li> </ul>																		
<p align="center"><b>Environment</b></p> <ul style="list-style-type: none"> <li>• Weather conditions</li> <li>• Cabin Status (temperature, catering etc.)</li> </ul>																		

## \* SAFA (Safety Assessment of Foreign Aircraft) CHECKLIST

RAMP INSPECTION CHECKLIST									
Date:	Flight No:	Sector:							
Station:	A/C Reg:	A/C Type:							
Prepared by Safety & QA	FLIGHT DECK			Checked					
	A01	General Condition.....	Cleanliness & tidiness	<input type="checkbox"/>	Procedures				
	A03	Emergency Equipments.....	As per FCOM	<input type="checkbox"/>	Aircraft Equip				
	A04	OM, Jeppesen /ipad.....	Upto date	<input type="checkbox"/>	Crew Item				
	A05	Checklists/QRH.....	Upto date	<input type="checkbox"/>	Aircraft Docs				
	A07	MEL.....	On board / ipad	<input type="checkbox"/>	Crew Item				
	A08	Certificate of Registration.....	Doc Folder	<input type="checkbox"/>	Aircraft Docs				
	A09	Noise Certificate CAA (PAK).....	Doc Folder	<input type="checkbox"/>					
	A10	AOC.....	Valid & Doc Folder	<input type="checkbox"/>					
	A11	Radio License.....	Valid & Doc Folder	<input type="checkbox"/>					
	A12	Certificate of Airworthiness .....	Valid & Doc Folder	<input type="checkbox"/>					
	A13	Operational Flight Plan.....	Approved, signed by PIC & proof of Fuel scoring on FPL	<input type="checkbox"/>					
	A14	Mass & Balance Manual.....	Upto date	<input type="checkbox"/>		Aircraft Docs			
	A17	Harness.....	For each Flight crew including Torso restrain for pilots	<input type="checkbox"/>	Aircraft Equip				
	A19	Flash Light (Torch).....	For each crew & serviceability	<input type="checkbox"/>	Crew Item				
	A20	Flight Crew License.....	Available	<input type="checkbox"/>	Aircraft Docs				
	A21	Flight Log Book /ipad .....	Available	<input type="checkbox"/>					
	A22	Maintenance Release & Boxes filled.....	Proper documentation of Maint. Work & signed off Captain's acceptance	<input type="checkbox"/>	Aircraft Docs				
	A23	Defect Notification & rectification.....	C/F items as per MEL chapter, category & time limit mentioned in Tech Log including Placarding. C/F summary list signed off	<input type="checkbox"/>					
	A24	Preflight Inspection.....	Complete	<input type="checkbox"/>	Procedures				
	<table border="1"> <tr> <th colspan="2">Captain / First officer</th> </tr> <tr> <td>Name</td> <td>Signature</td> </tr> </table>					Captain / First officer		Name	Signature
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	Name	Signature							

S&QA/06/SAFA/2017(OPS)

Rev. 04 (26<sup>th</sup> Oct., 2017)

(IA)

**CREW ITEMS**

- 1) IPAD
- 2) DOCS
- 3) TORCH

**AIRCRAFT DOCS**

- 1) TECH LOG
- 2) DOC FOLDER
- 3) CHECKLISTS
- 4) FLIGHT PLAN
- 5) TRIM SHEET

**AIRCRAFT EQUIP**

- 1) HARNESS
- 2) EMER EQUIP

**PROCEDURES**

- 1) CLEAN COCKPIT
- 2) PROPER PREFLIGHT

# COCKPIT PREPARATION

→ PF Actions   
 → CM1 Actions   
 → CM2 Actions

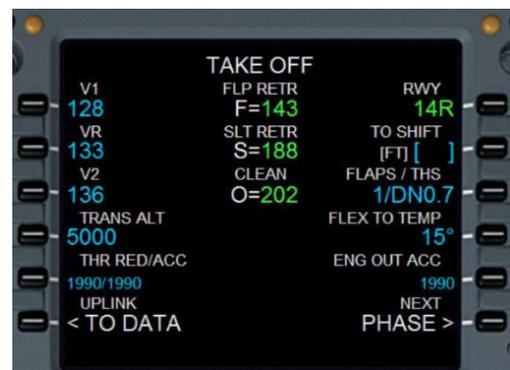
① Overhead panel  
② Center instrument panel  
③ Pedestal  
④ FMGS preparation, and when both pilots are seated:  
⑤ Glareshield  
⑥ Lateral consoles and CM2 panel

Navigation	STATUS INIT A F-PLN (SEC F-PLN) RAD NAV	<p> <span style="color: green;">①</span> STATUS      <span style="color: green;">③</span> F-PLN  <span style="color: green;">②</span> INIT A      <span style="color: green;">④</span> SEC F-PLN      <span style="color: green;">⑤</span> RAD NAV                 </p>
Performance	INIT B PERF	<p> <span style="color: yellow;">①</span> INIT B      <span style="color: yellow;">②</span> PERF                 </p>

- 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 **charging current** should be < 60 A & decreasing. If not, then after the end of the charging cycle perform this check again.
- If center tank is < 200 kg for the flight and if affected by FUEL CTR TK PUMPS LO PR cautions the set FUEL MODE SEL to MAN and CTR TK PUMPS to OFF. If the FUEL MODE SEL is unduly left in the MAN position on ground, when CTR TK PUMPS or CTR TK XFR pb-sw are not in the OFF position then there is a possibility of fuel spillage. Do not transmit on HF during refueling, defueling or fuel transfer. Only perform HF radio checks when appropriate (i.e. no personnel in the immediate vicinity).
- Third **ACP PA knob** on RECEIPT allows CVR recording of cabin announcements. Set volume  $\geq$  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. **Clock date initialization must be completed in less than a minute** 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 – As mentioned in the flight plan. 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 **altimeter readings** (QNH) on the CFP. Maximum altitude difference between:
  - PFD and PFD =  $\pm 20$  feet.
  - PFD and Elevation =  $\pm 75$  feet (RVSM tolerance).
  - PFD and ISIS =  $\pm 100$  feet.
- To prevent hearing damage while performing oxygen mask test, inform ground crew connected to the intercom system that a loud noise may be heard in the headset. After testing, 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 **REGUL LO PR** 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 **IRS alignment** 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.

# DEPARTURE BRIEFING <sup>1</sup>

<b>AIRCRAFT</b>	<ul style="list-style-type: none"> <li>• FMS             <ul style="list-style-type: none"> <li>➢ DATA Page                 <ul style="list-style-type: none"> <li>▪ Type and Model</li> <li>▪ APD &amp; Nav Database Date</li> </ul> </li> <li>➢ FMS INIT- B Pag                 <ul style="list-style-type: none"> <li>▪ Block Fuel (FOB on EWD)</li> <li>▪ Estimated TOW</li> <li>▪ Extra Time / Fuel at Destination</li> </ul> </li> <li>➢ PERF TAKEOFF Pag                 <ul style="list-style-type: none"> <li>▪ TO RWY</li> <li>▪ TO CONF</li> <li>▪ Flex / TOGA</li> <li>▪ V1, VR, V2</li> <li>▪ Transition Altitude</li> <li>▪ Thrust Reduction / ACC Altitude</li> </ul> </li> <li>➢ F-PLN &amp; PROG Page                 <ul style="list-style-type: none"> <li>▪ Route Waypoints</li> <li>▪ Time, Distance and Fuel</li> <li>▪ Strategy in secondary flight plan</li> </ul> </li> </ul> </li> </ul>
<b>WEATHER &amp; NOTAMS</b>	<ul style="list-style-type: none"> <li>• Weather reports and applicable procedures</li> <li>• Applicable NOTAMS and procedures</li> </ul>
<b>STARTUP &amp; TAXI</b>	<ul style="list-style-type: none"> <li>• ATC Procedures (push and start procedures)</li> <li>• A/C Procedures (engine start etc.)</li> <li>• Routing to the anticipated runway</li> </ul>
<b>RUNWAY</b>	<ul style="list-style-type: none"> <li>• Dimensions (Length, Width, Stopway)</li> <li>• Surface Condition</li> <li>• Lighting</li> <li>• Packs / Anti ice – On/Off Takeoff</li> </ul>
<b>DEPARTURE</b>	<ul style="list-style-type: none"> <li>• Normal SID – Routing and Constraints</li> <li>• Engine Out SID – Routing and Constraint</li> <li>• Navigation Frequencies to be used (RAD NAV)</li> <li>• MSA</li> </ul>
<b>SPECIAL PROCEDURES</b>	<ul style="list-style-type: none"> <li>• NADP</li> <li>• Weather</li> <li>• Terrain</li> <li>• Failures (Communication etc.)</li> </ul>



1. The main purpose of a briefing is that all team members should have the same game plan to achieve the target which in this case is a safe flight from A to B.

The game plan in this case comprises of:

- a) Identifying threats.
- b) Identifying deviations from routine line operations.



c) Agreement on: "Actions to Mitigate Identified Threats" and "Strategies to Tackle Deviations".

Instead of giving too much importance to "which crew (PF or PM)" will brief "which element" and losing the bigger picture, it is important to keep the briefing interactive and in a logical sequence so that in the end everyone has the same mental image regarding the game plan.

## EMERGENCY BRIEFING

- 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 STOP, I will apply the REJECTED TAKEOFF PROCEDURE and bring the aeroplane to a complete stop.
- I will set the PARKING BRAKE and call “ATTENTION CREW AT STATION”.
- You will monitor REV GREEN and DECEL and silence any AURAL WARNING and inform ATC.
- Thereafter you will carry out ECAM 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 NO ACTION BEFORE 400 feet AGL EXCEPT silencing of any AURAL WARNING and GEAR UP.
- 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 ENGINE IS NOT SECURED: Continue climbing until engine is secured, but not above EO maximum acceleration altitude.
- At GREEN DOT OPEN CLB, select MCT.
- Resume ECAM, complete AFTER T/O C/L and check the STATUS.
- FLY (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 / Caution.

### Between 100 knots & V1 (More Serious. Be go minded except for a few situations, as mentioned below)

Failures with ECAM	Left Hand Items	Side Stick Fault
	Right Hand Items	Thrust Lever Fault
	Engine Items	Fire
		Failure
		Reverser Unlocked or Fault.
Failures without ECAM	Sudden loss of thrust.	
	Any major failure.	
	If aeroplane is unsafe to fly due any reason.	
	Tire failure within 20 knots of V1: Unless debris from tire causes noticeable engine parameter fluctuation, takeoff, reduce fuel load & land with full RWY length 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.

### COCKPIT PREPARATION

GEAR PINS & COVERS.....	REMOVED
FUEL QUANTITY.....	____ KG/LB
SEAT BELTS.....	ON
ADIRS.....	NAV
BARO REF.....	____ (BOTH)

## BEFORE PUSHBACK AND START CLEARANCE



	PF	PM
<b>Seat Position</b>	Adjust	
<b>Fuel</b> <sup>1</sup>	Cross Check on 2 Screens (ECAM FOB + SD) and 2 Documents (Flight Plan + Load Sheet)	
<b>Load Sheet</b> <sup>2</sup>	Check / Revise	Check / Cross Check
<b>FMS Takeoff Data</b>	<ul style="list-style-type: none"> <li>Final Performance Data – Recompute</li> <li>FMS Takeoff Data – Revise</li> </ul>	<ul style="list-style-type: none"> <li>Final Performance Data – Recompute</li> <li>FMS Takeoff Data – Cross Check</li> <li>EFB/MCDU Green Dot – Compare <sup>3</sup></li> </ul>
<b>MCDU</b>	FMS PERF TO Page	FMS F-PLN Page
<b>External Power</b>		Check AVAIL – Disconnection Request <sup>4</sup>
<b>Airconditioning</b>		Disconnection – Request

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. A discrepancy in Green Dot speed computed by FMGS and TAKEOFF application indicates a difference in TOW used in both systems.

4. Disconnection of external power with the EXT PWR pb ON may cause injury to the ground engineer.



# AT PUSHBACK AND START CLEARANCE

	PF	PM
Push / Start Clearance		From ATC & Ground <sup>1</sup>
Beacon	ON	
ATC Transponder		Set as Required
Windows / Doors <sup>2</sup>	Check Closed	Check Closed PA Announcement <sup>3</sup>
Slides <sup>2</sup>	Check Armed	
Thrust Levers	Idle	
ACCU Press. Indicator	Check	
Pushback Required	NWS STRG DISC MEMO – Displayed <sup>4</sup>	
	Before Start Checklist	
	Parking Brake – OFF <sup>5</sup> Announce – OFF Blocks Time	Note – Time Clock – Start
	Pushback Completed – Parking Brake ON Brake Pressure – Check Tow Bar – Disconnect	
Pushback Not Required	Parking Brake – ON Brake Pressure – Check	
	Before Start Checklist	
Checklist	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p><b>BEFORE START</b></p> <p>PARKING BRAKE.....</p> <p>T.O SPEEDS &amp; THRUST..... (BOTH)</p> <p>WINDOWS.....CLOSED (BOTH)</p> <p>BEACON.....ON</p> </div>	

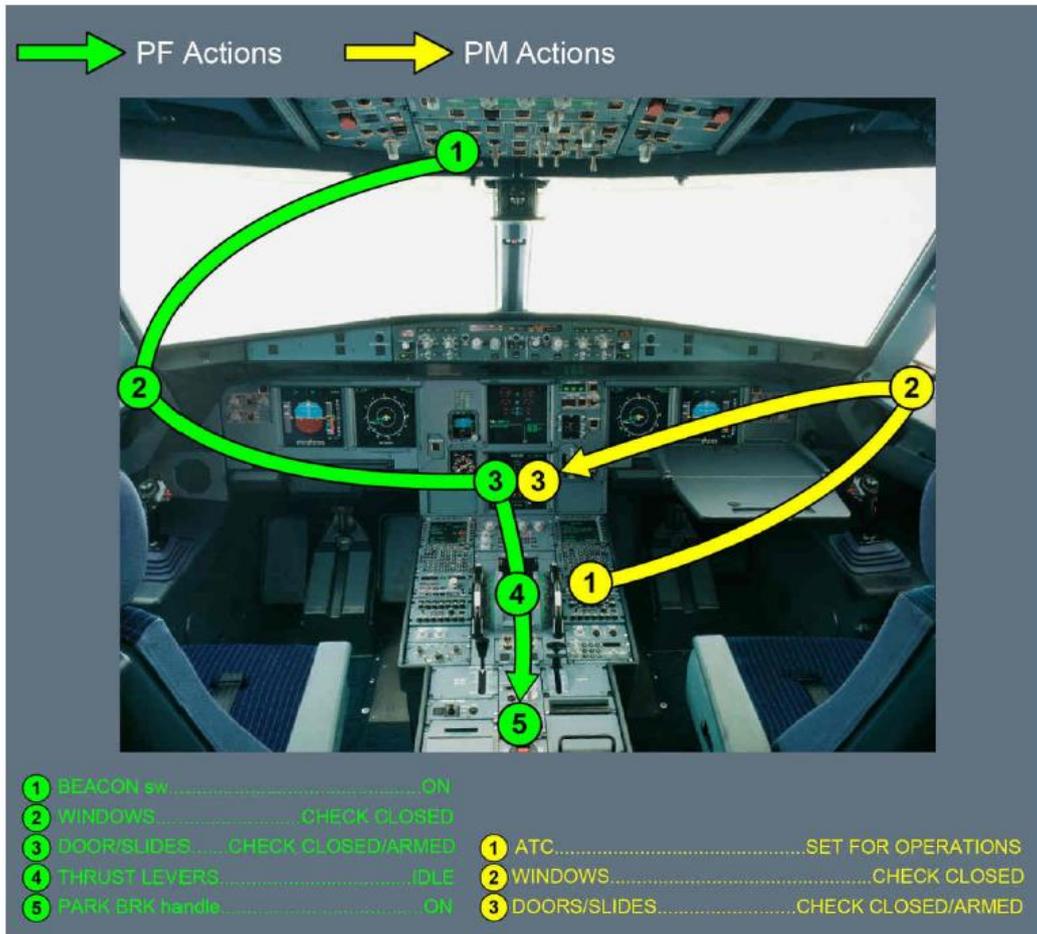
1. Confirm if they are ready and communicate to them start sequence and ATC push back clearance.
2. For sliding window check red indicator on its handle and for doors and slides check lower ECAM display.
3. “Cabin crew prepare for departure, arm the door slides and cross check”
4. If this message is 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.

 Before push and start, a quick look at the memo section of E/WD gives some great clues for do items that can be sometimes missed.

- 1) PARK BRK – Self-explanatory (covered by checklist).
- 2) NW STRG DISC – Refer to footnote no 4 above.
- 3) TCAS – As required at some aerodromes.
- 4) APU – Reminder to disconnect the GPU & AC Van.



## BEFORE START FLOW PATTERN



## ENGINE START – MANUAL

STARTUP COCKTAIL	
MANUAL ENGINE START WITH EXT PNEUMATIC & ELEC POWER FOLLOWED BY CROSS BLEED ENG START IN NORMAL AUTO MODE	
<p><b><u>BEFORE START</u></b></p> <ul style="list-style-type: none"> <li>• PACKS – Both OFF</li> <li>• APU and ENG Bleeds – ALL OFF</li> <li>• X BLEED – OPEN</li> </ul> <p><b><u>ENG 2 START</u></b></p> <ul style="list-style-type: none"> <li>• ENG MAN START Pb – ON</li> <li>• N2 22% (or max motoring, min 20%) – ENG MASTER ON</li> <li>• EGT – Check increasing within 15 seconds</li> <li>• N2 50% – Check start valve closure (between 50-56%)</li> <li>• ENG MAN START Pb – OFF</li> </ul> <p><b><u>AFTER ENG 2 START</u></b></p> <ul style="list-style-type: none"> <li>• EXT POWER – Deselect to AVAIL &amp; Disconnect</li> <li>• EXT Pneumatic – Remove</li> <li>• PACKS – Both ON</li> <li>• ENG Bleed 2 – ON</li> </ul>	<p><b><u>ENG 1 START</u></b></p> <ul style="list-style-type: none"> <li>• Area – Clear</li> <li>• ENG 2 Thrust – Adjust (for 30 psi)</li> <li>• ENG 1 – Start (normal auto mode)</li> </ul> <p><b><u>AFTER ENG 1 START</u></b></p> <ul style="list-style-type: none"> <li>• THRUST – Idle</li> <li>• X BLEED – AUTO</li> <li>• ENG BLEED 1 – ON</li> </ul> <p><i>Note: This is a “Read and Do” Supplementary Procedure in FCOM</i></p>

# ENGINE START – AUTOMATIC<sup>1</sup>

	PF	PM
<b>Thrust Levers</b> <sup>2</sup>	Idle	
<b>Engine Mode Selector</b>	IGN / Start Announce: "Engine 2 Start" <sup>3</sup>	
<b>Engine 2 Master Switch</b>	ON <sup>4</sup>	
<b>Sequence of Events</b>	Monitor: <ul style="list-style-type: none"> <li>• N2 Increases – Start Valve Inline, Bleed Pressure Green, Oil Pressure Rises.</li> <li>• N2 16% – Indication of Active Ignitor A or B.</li> <li>• N2 22% – FF Increases (may cross approx. 200 Kg/h).</li> <li>• EGT &amp; N1 – Increases within 15s (max) after fuel is ON.</li> <li>• N2 50% – Start valve closure starts &amp; Igniter indication Off.</li> </ul>	
<b>Idle Parameters</b>	Approx: <sup>5</sup> <ul style="list-style-type: none"> <li>• N1 – 20%.</li> <li>• N2 – 60%.</li> <li>• EGT – 400°C.</li> <li>• FF – 300 Kg/h.</li> </ul>	
Grey Background on N2 Indication Disappear <sup>6</sup>		
<b>Engine 1 Start</b> <sup>7</sup>	Same as for Engine 2	
<b>Pack Valves</b>	Both reopen with a 30s delay after 2 <sup>nd</sup> engine N2 is >50%	

1. Manual starting (FCOM PRO-NOR-SUP-ENG – CM2 reads & CM1 acts) is recommended in following cases:

- After a Start Abort, due to:
  - 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
- A Dry Crank is performed

2. Engines start regardless of the thrust lever position. However, thrust rapidly increases to the corresponding thrust lever position causing a hazardous situation if thrust levers are not set to IDLE.

3. Engine 2 is usually started first. It powers the yellow hydraulic system, that pressurizes the parking brake.

4. 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.

5. Approximate ISA Sea level values rounded off to memorize easily.

6. 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.

7. PTU FAULT is triggered, if the last 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.

## AFTER START

	PF	PM										
Engine Mode Selector	Normal <sup>1</sup>											
APU Bleed	OFF <sup>2</sup>											
Engine Anti-ice	As Required <sup>3</sup>											
Wing Anti-ice <sup>4</sup>	As Required											
APU Master Switch	OFF (if not required)											
Ground Spoilers		Arm										
Rudder Trim		Zero										
Flaps		Takeoff Position <sup>5</sup>										
Pitch Trim Handwheel		Set										
Status Reminder	Check Not Displayed – If displayed then check ECAM status											
N/W STEER DISC MEMO	Check – Not Displayed											
Ground Crew	Announce: “Clear to Disconnect” “Hand Signal on the Left / Right”											
Checklist <sup>6</sup>	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2" style="background-color: black; color: white;">AFTER START</th> </tr> </thead> <tbody> <tr> <td>ANTI ICE.....</td> <td>_____</td> </tr> <tr> <td>ECAM STATUS.....</td> <td>CHECKED</td> </tr> <tr> <td>PITCH TRIM.....</td> <td>_____%</td> </tr> <tr> <td>RUDDER TRIM.....</td> <td>NEUTRAL</td> </tr> </tbody> </table>		AFTER START		ANTI ICE.....	_____	ECAM STATUS.....	CHECKED	PITCH TRIM.....	_____%	RUDDER TRIM.....	NEUTRAL
AFTER START												
ANTI ICE.....	_____											
ECAM STATUS.....	CHECKED											
PITCH TRIM.....	_____%											
RUDDER TRIM.....	NEUTRAL											

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.

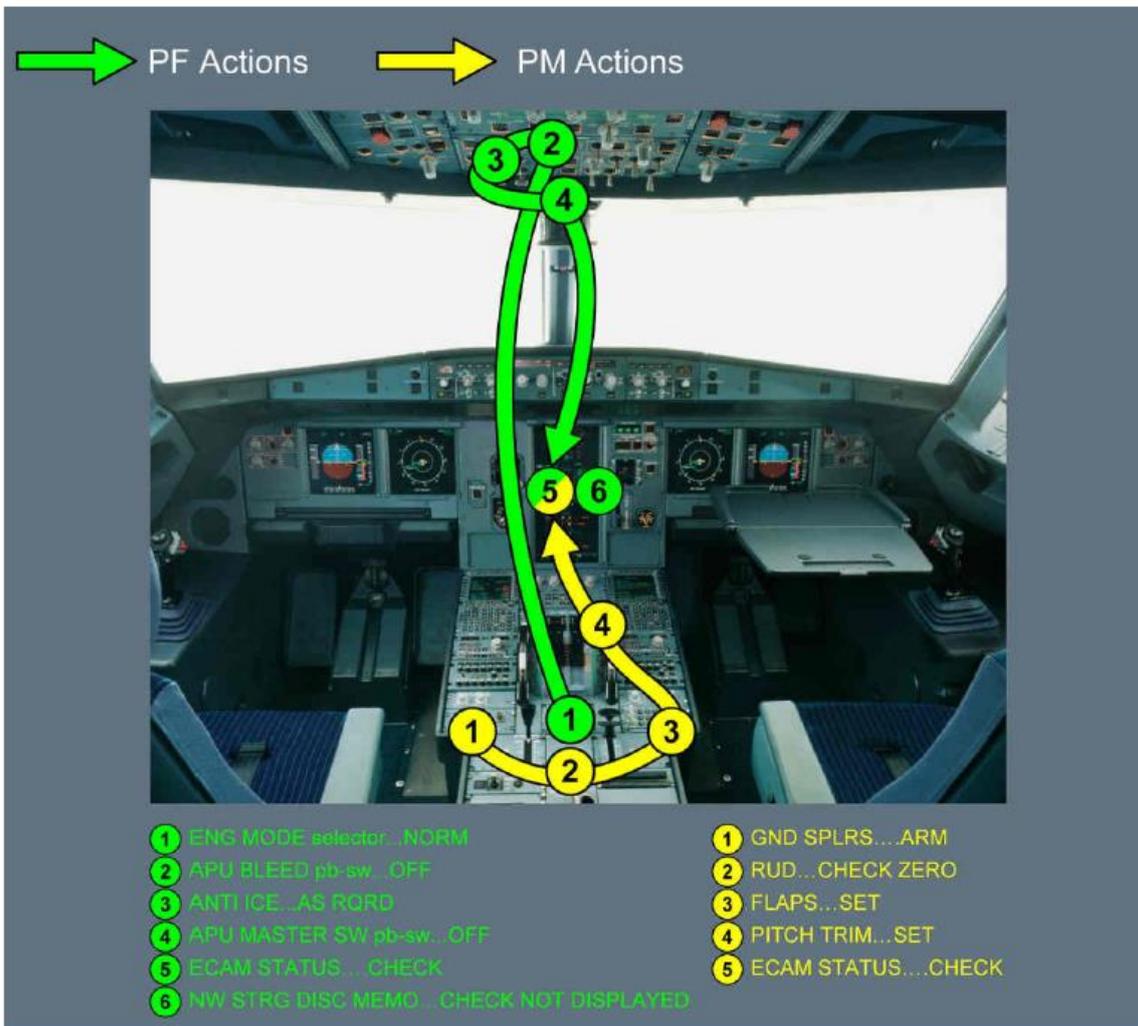
3. Must be ON during all ground operation, when icing conditions (OAT/TAT < 10°C with visible moisture) exist or are anticipated. In case you are anticipating icing conditions enroute, it’s not a bad idea (even in non-icing conditions) to check engine anti-ice serviceability by turning it on momentarily 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 **may be** turned on to prevent ice accretion on the wing leading edge. It **must be** 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".

## AFTER START FLOW PATTERN



After start, to avoid thermal shock, operate the engine at idle or near idle for at least 2 min before advancing the thrust lever to high power. Taxi time at idle may be included in the warm-up period.



# TAXI <sup>1</sup>

	PF	PM	
<b>PRE-REQ</b>	<b>Flight Controls</b>	Check Flight Controls Before or During Taxi	
	<b>Taxi Clearance</b>		Obtain
	<b>Taxi / Turn Off Light</b>	ON <sup>2</sup>	
	<b>Area Clearance</b>	Call: "Clear Left Side"	Call: "Clear Right Side"
	<b>Parking Brake</b>	OFF – Brake Pressure Zero <sup>3</sup>	
	<b>Brake Pedals</b>	Press & Call: "BRAKE CHECK"	Call: "PRESSURE ZERO" <sup>4</sup>
<b>CLEARANCE</b>	<b>ATC Clearance</b>	Confirm	
	<b>AFS / Flight Instruments</b>	<b>FMS</b>	F-PLN (SID, TRANS)
			Initial CLB SPD & SPD Limit
		<b>FCU</b>	Cleared Altitude
			HDG Preset
<b>FD</b>	Both ON		
	PFD / ND – Check (Airspeeds, Altitude, Heading, FMA, SID)		
<b>Departure Briefing</b>	Confirm		
<b>DO ITEMS</b>	<b>Auto Brakes</b>	AUTO BRK MAX ON	
	<b>ATC Code / Mode</b>	Confirm / Set	
	<b>Engine Mode Selector</b>	As Required <sup>5</sup>	
	<b>Weather Radar</b>	Radar – ON / ALL <sup>6</sup> Predictive Windshear – Auto / ON	
	<b>Terrain on ND</b>	As Required – However, consider Radar on PF side & Terrain on PM side	
	<b>Final Check</b>	TO Config – Test TO Memo – Check No Blue	
	"CABIN SECURED FOR TAKEOFF" – Report Receive		
<b>Taxi Checklist</b>	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;"><b>TAXI</b></p> <p>FLIGHT CONTROL.....CHECKED (BOTH)            FLAPS SETTING..... CONF ____ (BOTH)            RADAR &amp; PRED W/S.....ON &amp; AUTO            ENG MODE SEL..... ____            ECAM MEMO..... TO NO BLUE</p> <ul style="list-style-type: none"> <li>- AUTO BRK MAX</li> <li>- SIGNS ON</li> <li>- CABIN READY </li> <li>- SPLRS ARM</li> <li>- FLAPS TO</li> <li>- TO CONFIG NORM</li> </ul> </div>		

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. PF may request PM to set exterior lights.

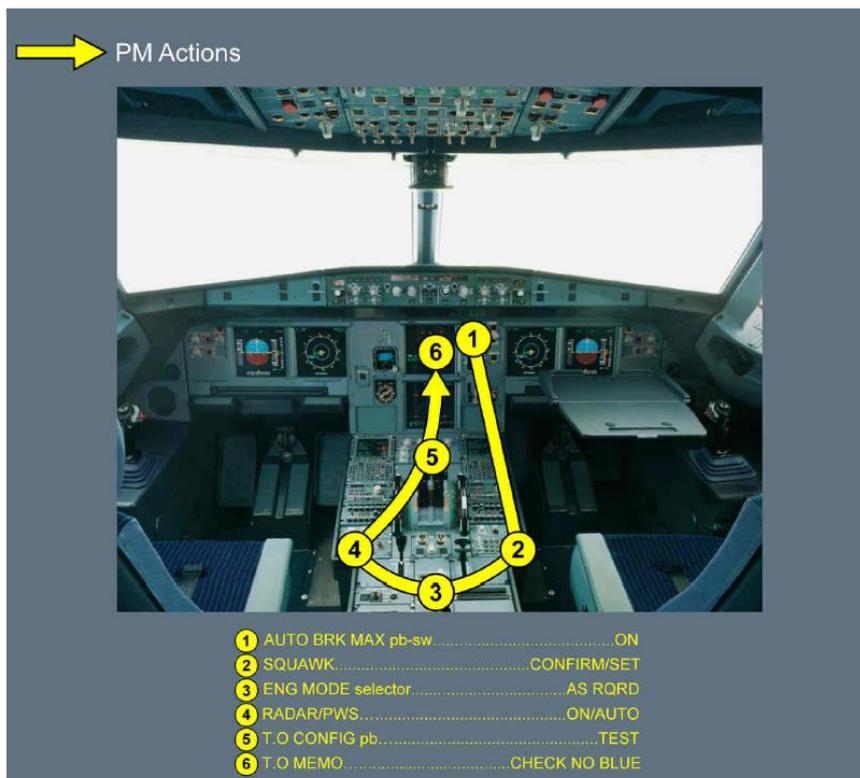
3. There may be slight residual pressure for a short time.

4. After ensuring that there is no brake pressure indication on triple gauge. If a/c was parked in wet conditions for a long time, first brake application at low speed is less effective.

5. Select IGN in heavy rain, standing water on runway or heavy rain or severe turbulence is expected after takeoff.

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.

# TAXI FLOW PATTERN



## DEPARTURE CHANGE (By ATC or Weather)

	PF	PM										
Final T/O Performance	Recompute	Recompute										
FMS Takeoff Data	FMS – Cross Check	FMS – Revise										
EFB/MCDU Green Dot	Compare											
Flap Lever		As Appropriate										
F-PLN		SID, TRANS – Check										
Speeds		Initial Climb Speed – Check Speed Limit – Check										
Re-Briefing	Complete											
Departure Change Checklist	<table border="1"> <thead> <tr> <th colspan="2">&lt;&lt; DEPARTURE CHANGE &gt;&gt;</th> </tr> </thead> <tbody> <tr> <td>RWY &amp; SID.....</td> <td>_____</td> </tr> <tr> <td>FLAPS SETTING..... CONF</td> <td>_____ (BOTH)</td> </tr> <tr> <td>T.O SPEEDS &amp; THRUST.....</td> <td>_____ (BOTH)</td> </tr> <tr> <td>FCU ALT.....</td> <td>_____</td> </tr> </tbody> </table>		<< DEPARTURE CHANGE >>		RWY & SID.....	_____	FLAPS SETTING..... CONF	_____ (BOTH)	T.O SPEEDS & THRUST.....	_____ (BOTH)	FCU ALT.....	_____
<< DEPARTURE CHANGE >>												
RWY & SID.....	_____											
FLAPS SETTING..... CONF	_____ (BOTH)											
T.O SPEEDS & THRUST.....	_____ (BOTH)											
FCU ALT.....	_____											

## 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

	PF	PM								
Brake Fans		Check <sup>1</sup>								
Lineup Clearance		Obtain								
TCAS		TA or TA/RA								
Takeoff Runway	Confirm									
Approach Path	Clear of Traffic – Visually and through TCAS									
Exterior Lights	Strobe – ON <sup>2</sup>									
Packs		As Required <sup>3</sup>								
Sliding Table	Stowed									
Cabin Crew		Advise <sup>4</sup>								
Checklist	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">LINE-UP</th> </tr> </thead> <tbody> <tr> <td>T.O RWY.....</td> <td>_____ (BOTH)</td> </tr> <tr> <td>TCAS.....</td> <td>_____</td> </tr> <tr> <td>PACKS 1 &amp; 2.....</td> <td>_____</td> </tr> </tbody> </table>		LINE-UP		T.O RWY.....	_____ (BOTH)	TCAS.....	_____	PACKS 1 & 2.....	_____
LINE-UP										
T.O RWY.....	_____ (BOTH)									
TCAS.....	_____									
PACKS 1 & 2.....	_____									

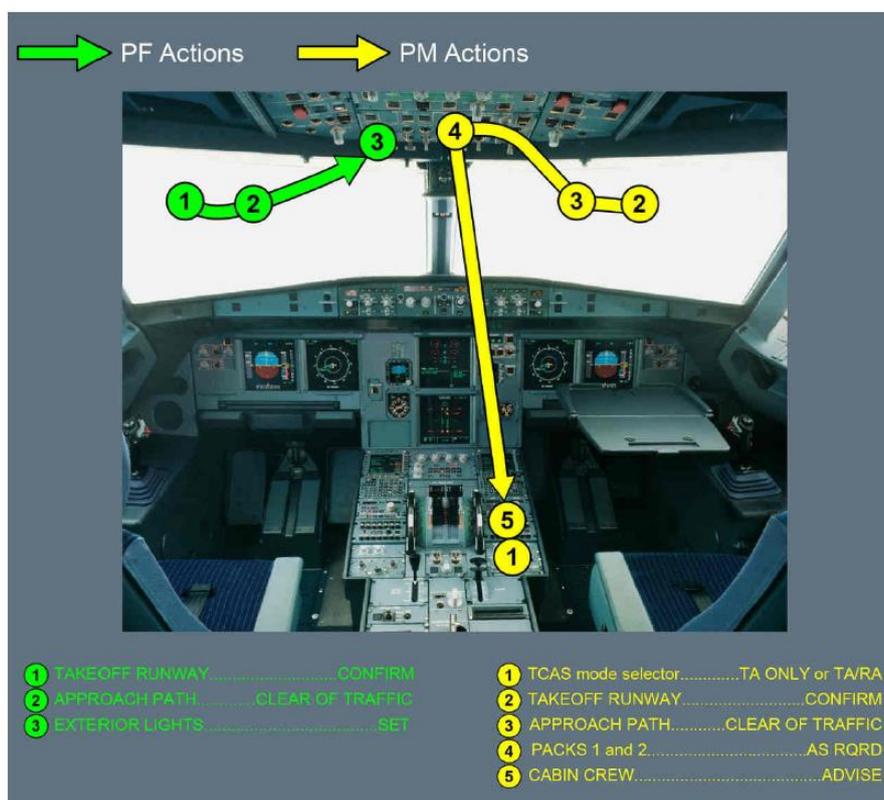
1. If an arc is displayed on WHEEL page above brake temp, set brake fans ON. Fan cools the temp sensor faster than the brakes since the sensor is not located within the brake material itself. Turning the fan OFF will indicate an increase in temp therefore select fans OFF if temp with fans ON is <math><150^{\circ}\text{C}</math>, 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

2. PF can request the PM to set the exterior lights.

3. 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.

4. On PA – “Cabin Crew Take Your Stations for Takeoff”.

## LINE-UP FLOW PATTERN



# TAKEOFF

	PF	PM
<b>Takeoff Clearance</b>		Weather around departure path
		Terrain around departure path
		Fuel check before takeoff
<b>Exterior Lights</b>	NOSE, TURN OFF & LAND – ON	
<b>Thrust Setting <sup>1</sup></b>	Announce – “TAKEOFF”	
<b>Standard Takeoff <sup>2</sup></b> X-wind < 20 & No Tailwind	<ul style="list-style-type: none"> <li>• Thrust – N1 50% (1.05 EPR)</li> <li>• Brakes – Release</li> <li>• Thrust – FLX / TOGA <sup>3</sup></li> <li>• Sidestick – ½ FWD up to 80, Neutral by 100 <sup>4</sup></li> </ul>	Chrono – Start
	<b>Standard Takeoff <sup>2</sup></b> X-wind > 20 or with Tailwind	
<b>PFD / ND</b>	Announce – FMA	<ul style="list-style-type: none"> <li>• FMA – Monitor on PFD <sup>6</sup></li> <li>• FMS Position – Monitor on ND <sup>6</sup></li> </ul>
<b>Below 80 Knots</b>		Check – Takeoff N1(EPR) Announce – “THRUST SET” Monitor – PFD & ENG Indications <sup>7</sup>
<b>100 Knots</b>	Cross Check	Announce – “1 HUNDRED KNOTS”
<b>At V1 &amp; VR</b>		Announce – “V1” & “ROTATE”
<b>Positive Climb</b>	Order – “L/G UP”	Announce – “POSITIVE CLIMB”
<b>Thrust Reduction Altitude <sup>8</sup></b>	Thrust Levers – CL	Packs – On (if applicable) <sup>9</sup>
<b>Acceleration Altitude</b>	Check Target Speed – Monitor FMA <sup>10</sup>	
<b>F Speed <sup>11</sup></b>	Flaps 1 – Order	Flaps 1 – Select
<b>S Speed</b>	Flaps 0 – Order	Flaps 0 – Select Spoilers – Disarm Ext Lights – Set <sup>12</sup>

1. Check engine parameters within limits. 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 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:
- 
11. In CONF 1+F, F speed does not appear.
  12. Nose light and Turnoff OFF, others as required.
- Note: CM1 takeoff in contaminated runway, X-Wind >15 kts, RVR / V < 800m or TOGW > 90% of allowed max TOGW.

# ACCELERATION FLOW PATTERN

→ PM Actions

① FLAPS ZERO.....SELECT  
 ② GND SPLRS .....DISARM  
 ③ L/G.....CHECK UP  
 ④ EXTERIOR LIGHTS.....SET

## AFTER TAKEOFF

	PF	PM
TCAS		TA / RA
Engine Mode		As Required
APU		Bleed & Master Switch – As Req.
Anti-Ice		Engine Anti-ice – As Required <sup>1</sup> Wing Anti-ice – As Required

1. Engine anti-ice must be set to ON when icing conditions exist or are anticipated, except during climb and cruise when the SAT is below -40°C.



## 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

QRH – Abnormal & Emergency Procedures – Miscellaneous – Severe Turbulence.

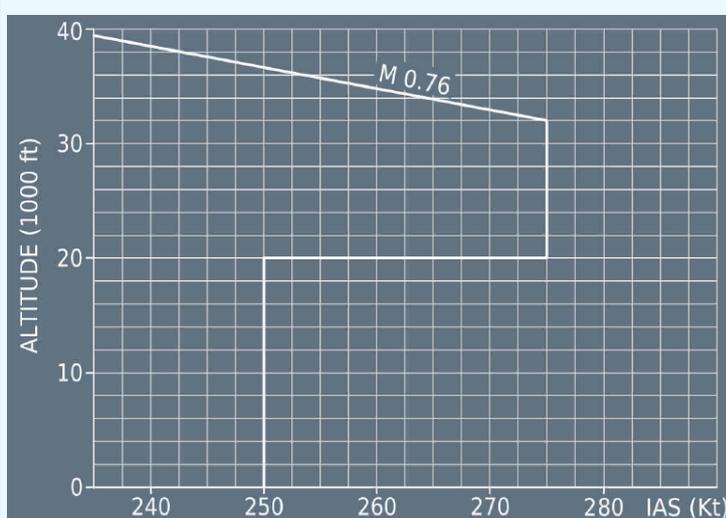
Wait for the target speed +20 knots (limited to VFE-5) before retracting the slats/flaps.

In moderate turbulence AP and A/THR ON with managed speed.

In severe turbulence AP ON with Thrust set to Turbulence N1 (QRH) and A/THR disconnected.

A/THR is, however, recommended during approach, in order to benefit from the GS mini.

CONF FULL provides better handling capability in turbulent conditions, however, CONF 3 provides more energy and less drag.



# CLIMB

	MCDU	PF	PM
		PERF CLB	F-PLN
<b>T</b>	<b>Transition Altitude</b>	Set Standard <sup>1</sup>	
		Call – “Ten Thousand Feet Checks”	Call – “Ten Thousand Feet”
<b>T</b>	<b>Ten Thousand Feet</b>	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 <sup>2</sup>
<b>T</b>	<b>Tilt / Terrain</b>	WX Radar – Adjust Tilt <sup>3</sup>	Terrain OFF & WX Radar on ND At 10000 ft or Highest MSA, whichever is later
<b>T</b>	<b>Twenty Thousand Feet</b>	WX Radar – Adjust Gain <sup>4</sup>	
	<b>Speeds</b>	ECON – Managed Best L/D – Green Dot Best ROC – Turbulence (thumb rule) Turbulence <sup>5</sup> : 250 up till FL200 275/.76 above FL200	

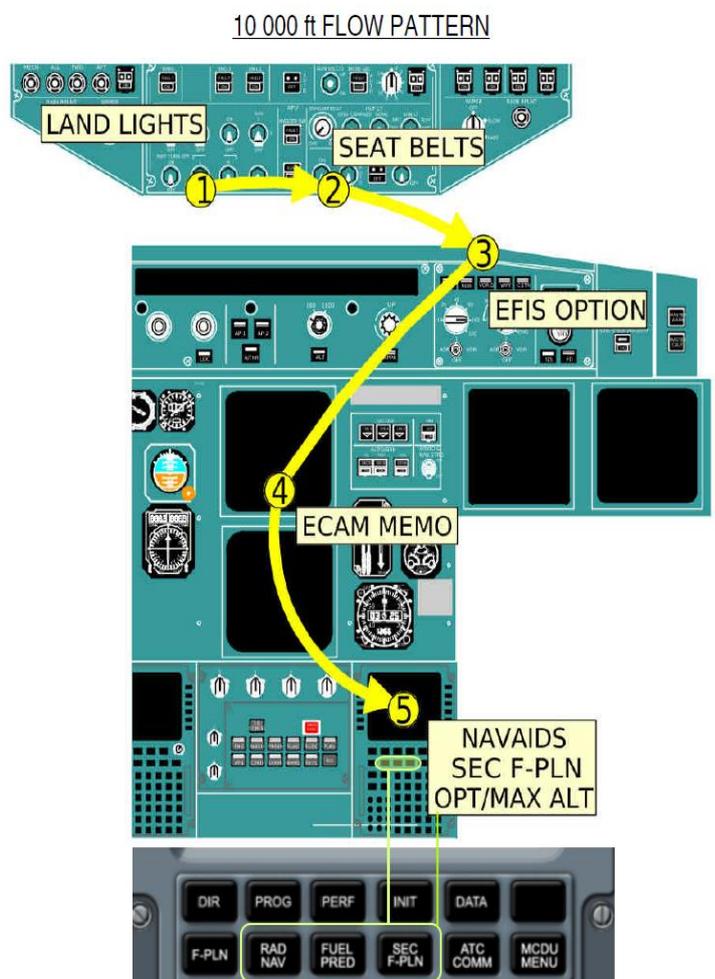
1. Call Outs: PF: “Set Standard”. PM: “Standard Set Cross Checked, Passing FL\_\_”. PF: “Checked”. On STD, transponder does not transmit to ATC the standard barometric reference. Transmission is based on last QNH selected. Upon ATC notification of an incorrect reference, select 1013 manually then set 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.



These keys give a clue of do items to be performed at this stage. Two are self explanatory whereas the FUEL PRED one is a hint to check OPT FL since fuel will be a concern if you dont.

## TOP OF CLIMB

	PF	PM
<b>TOC</b>	Rate of Climb – Adjust	TOC Fuel / Time – Note
<p>ICAO: 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.  <a href="http://www.theairlinepilots.com/forumarchive/quickref/acas.pdf">http://www.theairlinepilots.com/forumarchive/quickref/acas.pdf</a></p> <p>PIA OM Part A – 6.6.3 – Level Off: 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.</p> <p>Jeppesen - Air Traffic Control - UK Rules and Procedures – Maximum Rates of Climb and Descent: 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.</p>		

### 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.

<b>A318/A319/A320/A321</b> FLIGHT CREW OPERATING MANUAL	<b>PROCEDURES</b>
	<b>SPECIAL OPERATIONS</b>
	REDUCED VERTICAL SEPARATION MINIMUM - RVSM

		Comparison of Altitude Indication (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)

# CRUISE

		PF	PM
A	Altimeter		Note hourly readings (RVSM req.)
B	Boundaries	FIR Entry / Exit Time or other Area Procedures	
C	Collision Avoidance		TCAS – Set to ALL
D	Documentation		Flight Plan, Logbook, Debrief – Complete
E	ECAM	Memo and SD Pages – Review	
	Enroute		Enroute Alternates / ETP <sup>1</sup>
F	Fuel		Fuel Score – Every 30 mins
G	Gain & Tilt	WX Radar – Check Gain & Tilt <sup>2</sup>	
H	High Altitude Winds		Wind Data Entries – Check <sup>3</sup>
I	Inflight Performance	Vertical	<b>UP</b> Performance: <ul style="list-style-type: none"> <li>• Step Flight Level</li> </ul>
		Lateral	<b>DOWN</b> Performance (if FMGS fails): <ul style="list-style-type: none"> <li>• Green Dot Speed <sup>4</sup></li> <li>• Single Engine Ceiling</li> </ul>

1. 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.

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

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

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

A) Below 20,000 feet =  $(2 \times \text{weight in tons}) + 85$ .

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  $205 + 5 = 210$ .

5. 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  $\leq 3$ nm then FM position is reliable, if not then use raw data for navigation. In case of significant mismatch between display and real position use raw data navigation (possibly switching to ROSE VOR, so as not to be misled by FM data).



## HOW TO HANDLE FUEL TEMPERATURE

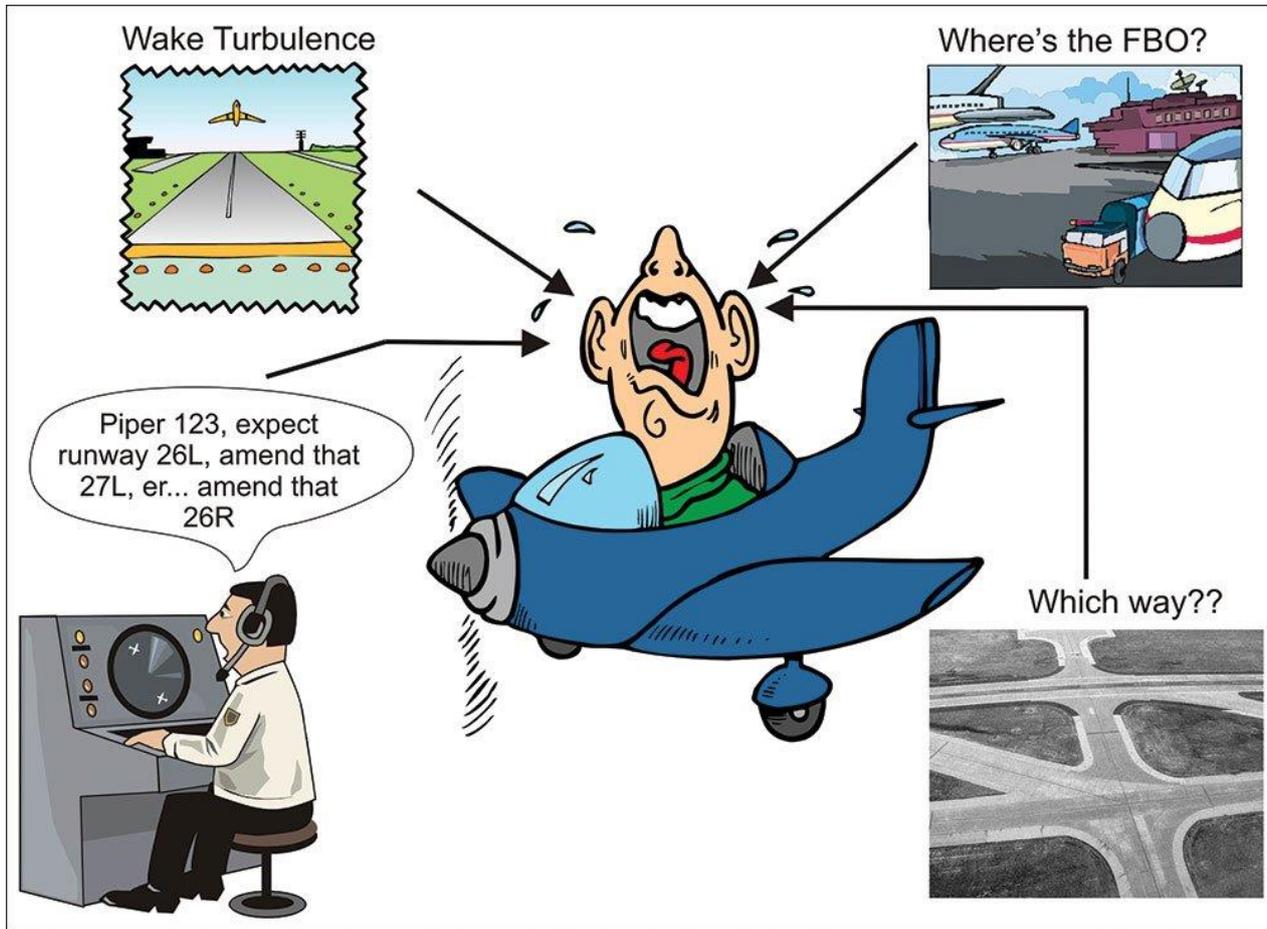
Fuel temperature will slowly reduce towards TAT. The rate of cooling of fuel can be expected to be in the order of 3°C/hour with a maximum of 12°C/hour in the most extreme conditions. If fuel temperature approaches the minimum allowed, the ECAM outputs a caution. Consideration should be given to achieving 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.

# DESCENT PREPARATION

	PF	PM
Planning		Weather & Landing Info <sup>1</sup> – Check ECAM Status – Check
	Nav Charts – Prepare Landing Conditions – Confirm <sup>2</sup> <a href="#">Landing Performance</a> – Compute & Cross Check <sup>3</sup>	
	AUTO BRK – AS REQ <sup>4</sup>	No Full Flaps – Select GPWS LDG FLAP 3
Preparation	 <ul style="list-style-type: none"> <li>• F-PLN A (DES WINDS / ARRIVAL) <sup>5</sup></li> <li>• RAD NAV</li> <li>• PROG (BRG / DIST TO RWY)</li> <li>• PERF: <ul style="list-style-type: none"> <li>○ CRUISE (cabin descent rate)</li> <li>○ DES (Mach / Speed)</li> <li>○ APPR: <ul style="list-style-type: none"> <li>▪ QNH</li> <li>▪ Temperature</li> <li>▪ Destination Wind <sup>6</sup></li> <li>▪ Minimum</li> <li>▪ Landing CONF</li> </ul> </li> <li>○ GO-AROUND: <ul style="list-style-type: none"> <li>▪ Thrust reduction</li> <li>▪ Acceleration altitude</li> </ul> </li> </ul> </li> <li>• FUEL PREDICTION</li> <li>• SEC F-PLN (Alternate Runway etc.)</li> </ul>  <ul style="list-style-type: none"> <li>• Landing Elevation – Mode &amp; Value</li> </ul>	
Arrival Briefing		
Descent Clearance	Cleared Altitude – Set on FCU	Obtain from ATC TCAS – Set to Below <sup>7</sup>

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. Check if landing conditions changed compared with a previous computation or dispatch conditions.
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. 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.
5. 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.
6. Do not insert gust value. Ground Speed Mini function (manage speed mode) takes into account instantaneous gust.
7. Just prior to TOD, cycling fasten seat belt sign twice gives a clue to the cabin crew about descent phase.

# ARRIVAL BRIEFING <sup>1</sup>



<b>AIRCRAFT</b>	Technical Status
<b>AIRFIELD (DEST &amp; ALT)</b>	Weather Terminal information – NOTAMS etc. Fuel – Extra Holding
<b>STAR</b>	<ul style="list-style-type: none"> <li>• NAV Frequencies</li> <li>• Routing and Constraints</li> <li>• Transition Level</li> <li>• MSA</li> </ul>
<b>APPROACH</b>	<ul style="list-style-type: none"> <li>• NAV Frequencies</li> <li>• Approach and Minima</li> <li>• Transition Level</li> <li>• MSA</li> <li>• Obstacles</li> <li>• Restricted / Prohibited areas</li> </ul>
<b>GOAROUND</b>	<ul style="list-style-type: none"> <li>• ATC Procedure</li> <li>• Aircraft Procedure</li> </ul>
<b>RUNWAY</b>	Dimensions (Length, Width, Distance beyond G/S) Surface Condition Lighting
<b>TAXI</b>	Routing and Parking
<b>SPECIAL PROCEDURES</b>	Weather (Circumnavigation etc.) Terrain Failures (Communication, MEL etc.)

1. For philosophy of briefing please refer to footnotes of departure briefing.

# DESCENT <sup>1</sup>

		PF	PM												
	<b>MCDU</b>	PROG / PERF DES	F-PLN												
	<b>Speeds</b>	Managed – If Not then: <ul style="list-style-type: none"> <li>○ 0.78 / 300 till FL100</li> <li>○ 250 below FL100</li> </ul>													
<b>T</b>	<b>Twenty Thousand Feet</b>	WX Radar – Adjust Gain <sup>2</sup>													
<b>T</b>	<b>Tilt / Terrain</b>	Tilt – Adjust WX Radar	Terrain ON ND <sup>3</sup>												
		Call – “Ten Thousand Ft Checks”	Call – “Ten Thousand Feet”												
<b>T</b>	<b>Ten Thousand Feet</b>	EFIS – CSTR LS <sup>4</sup> – As Required NAV Accuracy – Check <sup>5</sup>	Landing Lights – Set Seat Belts – ON EFIS – CSTR LS – As Required RAD NAV – Selected / Identified ENG MODE – As Req												
<b>T</b>	<b>Transition Level</b>	Set QNH													
	<b>Checklist</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: black; color: white; text-align: center;">APPROACH</th> </tr> </thead> <tbody> <tr> <td>BARO REF.....</td> <td>.....(BOTH)</td> </tr> <tr> <td>SEAT BELTS.....</td> <td>.....ON</td> </tr> <tr> <td>MINIMUM.....</td> <td>.....</td> </tr> <tr> <td>AUTO BRAKE.....</td> <td>.....</td> </tr> <tr> <td>ENG MODE SEL.....</td> <td>.....</td> </tr> </tbody> </table>		APPROACH		BARO REF.....	.....(BOTH)	SEAT BELTS.....	.....ON	MINIMUM.....	.....	AUTO BRAKE.....	.....	ENG MODE SEL.....	.....
APPROACH															
BARO REF.....	.....(BOTH)														
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MINIMUM.....	.....														
AUTO BRAKE.....	.....														
ENG MODE SEL.....	.....														

## 10 000 ft FLOW PATTERN

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. Select at 10,000 feet or MSA whichever is higher. If NAV ACCURACY LOW – Do not use TERR ON ND.

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

5. 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).

**PF ACTIONS** (Green arrows)

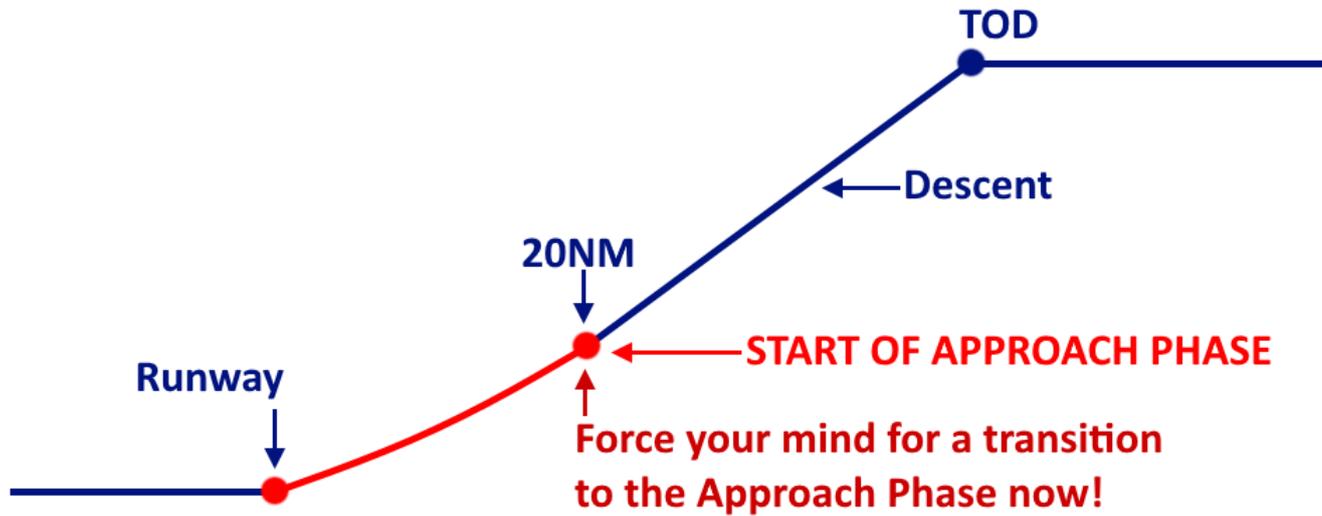
**PM ACTIONS** (Yellow arrows)

When GPS Primary is not available

- ① LAND LIGHTS sw.....SET
- ② SEAT BELTS sw.....ON
- ① EFIS option pb.....CSTR
- ② EFIS option pb.....CSTR
- ② LS pb.....AS RQRD
- ④ LS pb.....AS RQRD
- ⑤ RADIO NAV.....SELECT/IDENT
- ⑥ ENG MODE selector....AS RQRD
- ③ NAV ACCY.....CHECK

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

## APPROACH



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<sup>\*</sup>
  - Announce “CANCEL APPROACH”
  - Disarm AP/FD Approach Mode – APPR / LOC Pb
  - Select Lateral Mode – 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 APPROACH <sup>1</sup>

	PF	PM
F-PLN Sequencing	Adjust <sup>2</sup>	
Approach Phase <sup>3</sup>	Activate or Set Green Dot Speed	NAV Accuracy – Check <sup>4</sup>
Intercept Heading	APPR – Press AP – Engage Both	Cabin Crew – Advise “Cabin Crew at your Stations for Landing”
LOC / GS	Check Armed / Captured <sup>5</sup>	
3NM from FDP	FLAPS 1 – S SPEED <sup>6</sup>	
GS *	GO AROUND ALTITUDE – SET	
At 2000 Ft AGL (min)	FLAPS 2 – F SPEED <sup>7</sup>	
When Flaps 2	L/G DOWN – Order	<ul style="list-style-type: none"> <li>L/G Down – Select</li> <li>Auto Brake – Confirm / Change Mode</li> <li>Lights: <ul style="list-style-type: none"> <li>Nose – TO</li> <li>Turnoff – ON</li> </ul> </li> <li>Ground Spoilers – Arm</li> </ul>
When L/G Down	FLAPS 3 – Order	Flaps 3 – Select ECAM – Check Wheel Page <sup>8</sup> Triple Indicator – Check Residual Pressure <sup>9</sup>
When Flaps 3	FLAPS FULL <sup>10</sup> – TARGET SPEED	
		<ul style="list-style-type: none"> <li>Landing Memo – Check No Blue</li> <li>Cabin Report – Receive</li> <li>A/THR – Speed Mode or OFF</li> <li>Wing Anti-Ice – OFF <sup>11</sup></li> </ul>
Checklist <sup>12</sup>	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; margin: 0;"><b>LANDING</b></p> <p>ECAM MEMO.....LDG NO BLUE</p> <ul style="list-style-type: none"> <li>- LDG GEAR DN</li> <li>- SIGNS ON</li> <li>- CABIN READY </li> <li>- SPLRS ARM</li> <li>- FLAPS SET</li> </ul> </div>	
At 1000 Ft	Call – Checked <sup>13</sup>	One Thousand – Monitor / Announce
At Minimum + 100		One Hundred Above – Monitor / Announce
At Minimum	Continue / Go Around – Announce	MINIMUM – Monitor / Announce

- For CAT1, set DA/DH into MDA field on PERF APPR page (altitude reference will be taken from pressure altimeter).
- TO Waypoint (upper right on ND) should be meaningful. In HDG/TRK mode auto sequencing will only be done if aircraft flies close to the F-PLN route.
- 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 is more comfortable).
- If GPS Primary is lost. If NAV accuracy is low, at least one ND must be in ROSE LS / VOR depending on the approach.
- 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.
- For DECEL approaches, select FLAPS 1 at least 3nm before FDP. Establish on final descent with FLAPS 1 & S speed at or above 2000 ft AGL. If tailwind > 20 kts or GS angle is > 3.5° then an early stabilized approach is recommended.
- If Intercepting < 2000 ft AGL, Flaps 2 at one dot below flight path. SPD brakes not recommended below 2000 feet.
- One green triangle (and also “LDG GEAR DN” MEMO message) is sufficient to indicate gear down-locked.
- Alternate braking test at lowering gear may leave residual pressure. Apply residual braking procedure in that case.
- Retract speed brakes before selecting full flaps. To minimize flaps wear, extend flaps at VFE-15 when possible.
- “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.
- LDG Memo appears at < 2000 ft. On GA if climb < 2200 ft, then on subsequent approach it will appear at < 800 ft.
- By 1000 feet approach must be stabilized. SPEED: +10 / -5 Knots (if predicted tailwind at landing > 10kts, decelerated approach not permitted) – PITCH: +10° / -2.5° – BANK: 7° – SINK RATE: 1000 fpm – LOC / GLIDE: ½ dot. Hands on thrust levers & sidestick with THRUST NOT BELOW the required minimum. All briefings & CHECKLISTS COMPLETED.

## 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
<b>Initial Actions</b> Simultaneously	Thrust Levers – TOGA <sup>1</sup> Rotation – Perform <sup>2</sup> Announce – Go Around   Flaps	Verify if safely established in a Go-Around  “Pitch and Power”
<b>FMA</b>	Announce <sup>3</sup>	Flaps 1 notch up (if full then 3, if 3 then 2)
<b>Positive Climb</b>	L/G UP	
<b>FCU</b>	NAV / HDG – As Required <sup>4</sup> AP – As Required <sup>5</sup>	Go Around Altitude – Check
<b>Thrust Reduction ALT</b>	Thrust Levers – CL	
<b>Acceleration ALT</b>	<ul style="list-style-type: none"> <li>• Target Speed – Green Dot <sup>6</sup></li> <li>• F Speed – Flaps 1 Order</li> <li>• S Speed – Flaps 0 Order</li> </ul>	<ul style="list-style-type: none"> <li>• F Speed – Flaps 1 Select <i>No Stopping at Flaps 2</i></li> <li>• S Speed – Flaps 0 Select</li> <li>• Ground Spoilers – Disarm</li> <li>• Lights – Nose/Turnoff OFF <sup>7</sup></li> </ul>
<b>Plan of Action</b>	<ul style="list-style-type: none"> <li>• Divert – Enable Alternate</li> <li>• Second Approach – Activate Approach Phase</li> </ul>	

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.

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

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.

# RNAV (GNSS) APPROACH <sup>1</sup> – FINAL APP GUIDANCE <sup>2</sup>

	PF	PM
<b>Descent Prep</b>	<ul style="list-style-type: none"> <li>Aircraft Equipment – Check <sup>3</sup></li> <li>GPS Primary Availability – Check for RNAV(GNSS) Approach</li> <li>F-PLN A – Set and Compare MCDU &amp; Charted Paths <sup>4</sup></li> </ul>	
	Go Around Strategy – Review <sup>5</sup>	Weather – Check OAT and QNH <sup>6</sup>
<b>10,000 Feet</b>	<ul style="list-style-type: none"> <li>GPS Primary – Check Availability <sup>7</sup></li> <li>NAV Accuracy – Check <sup>8</sup></li> <li>BARO Ref – Set <sup>9</sup></li> </ul>	
<b>Cleared for Approach<sup>10</sup></b>	<ul style="list-style-type: none"> <li>APPR – Press <sup>11</sup> <ul style="list-style-type: none"> <li>APP NAV – Check armed / engaged</li> <li>FINAL – Check armed <sup>12</sup></li> </ul> </li> <li>Configuration:                             <ul style="list-style-type: none"> <li>Intercept/base leg – Flaps 1</li> <li>5nm from FDP – Flaps 2</li> <li>4nm from FDP – L/G Down</li> <li>3nm from FDP – Flaps 3</li> <li>2nm from FDP – Flaps Full</li> </ul> </li> </ul>	
<b>Final Descent Point (FDP)</b>		<ul style="list-style-type: none"> <li>FINAL APP – Check Engaged</li> <li>Go Around Altitude – Set</li> <li>Flight Parameters – Monitor <sup>13</sup></li> </ul>
<b>Minimum + 100</b>		ONE HUNDRED ABOVE – Monitor / Announce
<b>Minimum</b>	Announce: <ul style="list-style-type: none"> <li>Continue: AP/FD – As Required <sup>14</sup></li> <li>Go Around</li> </ul>	MINIMUM – Monitor / Announce

- ICAO PBN Equivalence: RNP APCH = RNAV (GNSS) & RNP AR APCH = RNAV (RNP).
- For RNAV/GNSS approaches with LNAV & LNAV/VNAV minima & for conventional VOR/NDB approaches.
- PRO-SPO-51 RNP APCH.
- Set VAPP at FDP. For “Too Steep Path” message 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.
- 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.
- 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.
- On at least 1 FMS for RNAV(GNSS).
- In case of low accuracy use TRK FPA mode.
- Maximum discrepancy between altimeters is 100ft.
- Set FDP altitude constraint on FCU and engage managed descent.
- 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.
- At FDP, a blue arrow on ND indicates that FINAL APP engagement conditions are met.
- 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.
- If MAP not at RWY threshold, final segment not aligned with RWY track, strong offset between final segment & RWY threshold then AP/FD OFF at minima otherwise AP/FD can be kept engaged below minima. Minimum use height for the AP in approach with FINAL APP, V/S or FPA mode is 250 ft AGL. After MAP disregard FD as it reverts to HDG/VS.

# RNAV (GNSS) APPROACH – FPA GUIDANCE <sup>1</sup>

	PF	PM
<b>Descent Prep</b>	<ul style="list-style-type: none"> <li>Aircraft Equipment – Check <sup>2</sup></li> <li>GPS Primary Availability – Check for RNAV(GNSS) Approach</li> <li>F-PLN A – Compare MCDU &amp; Charted Paths <sup>3</sup></li> </ul>	
	Go Around Strategy – Review <sup>4</sup>	
<b>10,000 Feet</b>	<ul style="list-style-type: none"> <li>GPS Primary – Check Availability <sup>5</sup></li> <li>NAV Accuracy – Check <sup>6</sup></li> </ul>	
<b>On Final Intercept HDG</b>	<ul style="list-style-type: none"> <li>Lateral Guidance – Set (NAV / LOC)</li> <li>Call for Flaps 1</li> <li>TRK/FPA – Select</li> <li>Lateral Path – Intercept</li> </ul>	
<b>Before Final Descent Point <sup>7</sup></b>	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)	
<b>After Final Descent Point</b>	<ul style="list-style-type: none"> <li>Position / Flightpath – Adjust</li> <li>Flight Parameters – Monitor <sup>8</sup></li> </ul>	
<b>Minimum + 100</b>		One Hundred Above – Monitor / Announce
<b>Minimum <sup>9</sup></b>	Announce: <ul style="list-style-type: none"> <li>Continue:               <ul style="list-style-type: none"> <li>➢ AP, FD – OFF</li> <li>➢ Runway Track – Check Set (if req.)</li> </ul> </li> <li>Go Around:</li> </ul>	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).

## COMPARISON OF AN RNAV (GNSS) APPROACH WITH FINAL APP OR FPA GUIDANCE

Setting aside an overwhelming number of steps, a simplified common procedure to highlight and understand the basic difference between an RNAV GNSS approach flown with an FPA guidance and an RNAV GNSS approach flown with the 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:
  - TRK/FPA
  - Rose VOR (PF), NAV (PM)
  - Flaps 1

*Note: Make the "V" for VOR*
- On Final Inbound Leg before FDP:
  - 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 (below GA altitude)
- On Final Inbound Leg after FDP:
  - Flight Parameters – Monitor (distance vs altitude and raw data)
  - Position / Flightpath – Adjust
- At Minimums (if landing):
  - AP – OFF
  - FD – OFF
  - RWY TRK – Check Set



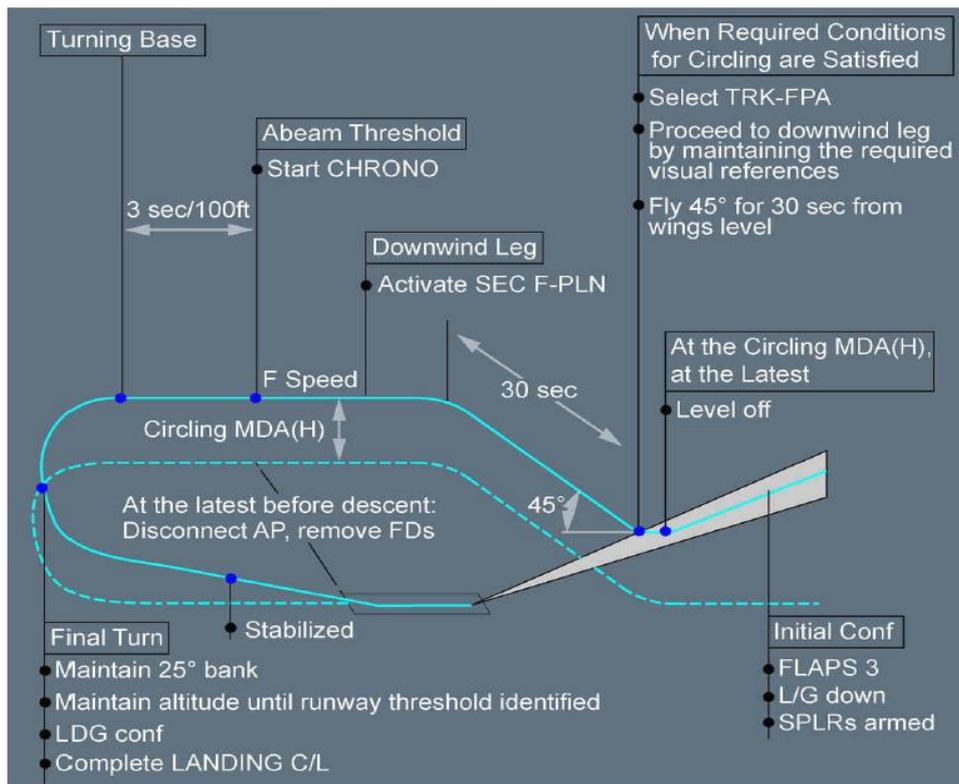
### Overhead VOR:

- 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 full-scale deflection for VOR and  $\pm 5^\circ$  for NDB).

# CIRCLING APPROACH

<b>Prerequisites</b>	<ul style="list-style-type: none"> <li>• Higher of the following:             <ul style="list-style-type: none"> <li>○ Published minima on charts.</li> <li>○ MDH 600 ft AGL, Visibility 2400 meters.</li> </ul> </li> <li>• F-PLN – Approach &amp; Missed Approach Procedure</li> <li>• SEC F-PLN – Copy Active F-PLN &amp; Revise Runway <sup>1</sup></li> </ul>
<b>Approach</b>	<ul style="list-style-type: none"> <li>• Speed – F Speed (also insert it as a constraint at FDP)</li> <li>• Configuration – L/G Down, CONF 3 &amp; Spoilers Armed</li> </ul>
<b>Circling</b>	<ul style="list-style-type: none"> <li>• MDA             <ul style="list-style-type: none"> <li>○ Level off and set G/A altitude</li> <li>○ Select TRK FPA and proceed to downwind (45° for 30s)</li> </ul> </li> <li>• Downwind – Activate SEC F-PLN</li> <li>• Abeam Threshold – Check time 3 sec/100 feet</li> <li>• Before Descending to Runway – AP/FD OFF</li> <li>• Landing Configuration – As appropriate (ensuring early stabilization)</li> <li>• Landing Checklist – Complete</li> </ul>

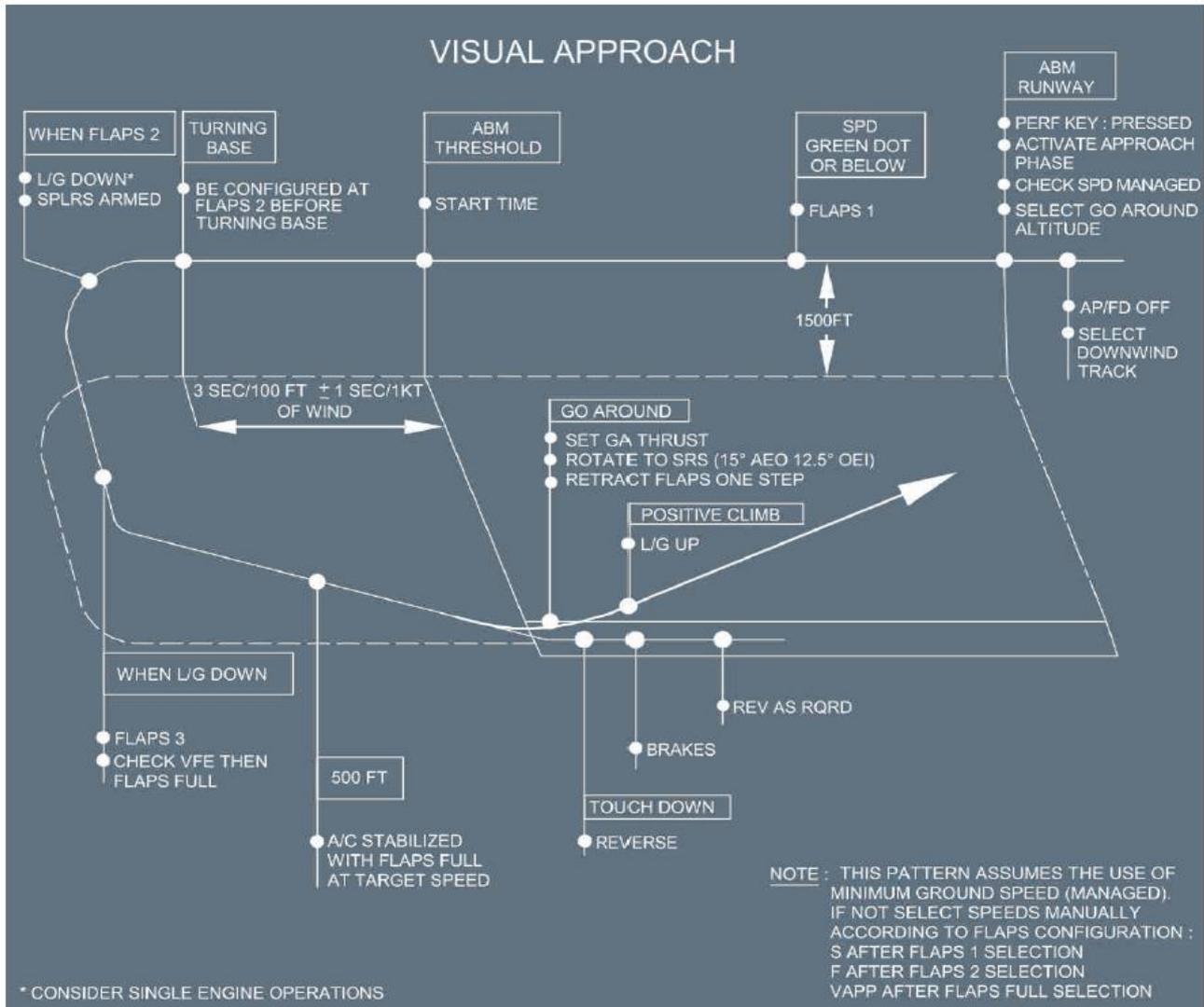
1. When SEC F-PLN is activated, the G/A procedure in the FMS is associated with landing runway and not with instrument approach, therefore if visual references are lost, initiate a go around using selected guidance, following the missed approach of the initial instrument approach (unless otherwise specified). The transition from the visual (circling) maneuver to the missed approach should be initiated by a climbing turn, within the circling area, towards the landing runway, to return to the circling altitude or higher, immediately followed by interception and execution of the missed approach procedure.



## VISUAL APPROACH

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

- Visibility is more than 5 km.
- Positive contact with the ground.
- 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.
- FDs OFF – Bird ON – Set Downwind Track.
- 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 turning for base – Gears down and then Flaps 3
- On base leg descend at about 300-400 fpm and Flaps Full
- Landing checklist
- Stabilize by 500 feet.

# LANDING <sup>1</sup>

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

1. Line Captain to perform landing if (1) crosswind > 15 knots (2) contaminated or slippery runway (3) any abnormality (4) cloud base less than 1000 ft above runway threshold for a non-precision approach and 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

	PF	PM
<b>Ground Spoilers</b>	Disarm	Cue to start the procedure
	Exterior Lights – Set <sup>1</sup>	<ul style="list-style-type: none"> <li>• Radar – OFF</li> <li>• PWS – OFF</li> <li>• Engine Mode Selector – Norm</li> <li>• Flaps – Retract <sup>2</sup></li> <li>• TCAS – Standby</li> <li>• ATC – AS required</li> <li>• APU – Start <sup>3</sup></li> <li>• Anti-ice – As required <sup>4</sup></li> <li>• Brake Temperature – Check <sup>5</sup></li> </ul>
<b>Checklist <sup>6</sup></b>	<div style="border: 1px solid black; padding: 5px; background-color: #f0f0f0;"> <p style="text-align: center; margin: 0;"><b>AFTER LANDING</b></p> <p style="margin: 0;">RADAR &amp; PRED W/S.....OFF</p> </div>	

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

2. a) Cold Weather Check: 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) Hot Weather Check: 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.

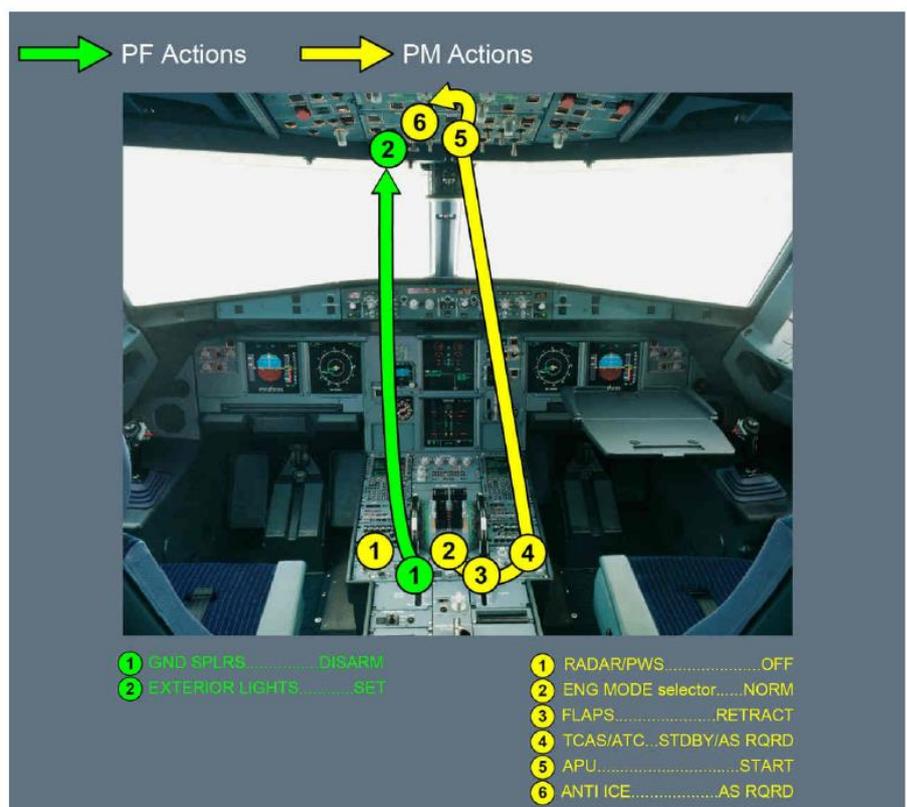
3. Delay as long as possible. Use 1 Pack if possible and change packs between flights to avoid wear on 1 pack.

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. Maintenance action is due if (1) One brake temp exceeds 900°C. (2) Temperature difference between two brakes of a gear is more than 150°C with one brake equal to or more than 600°C OR equal to or below 60°C. (3) Average temperature difference of left and right gear brakes is equal to or above 200°C.

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

## AFTER LANDING FLOW PATTERN

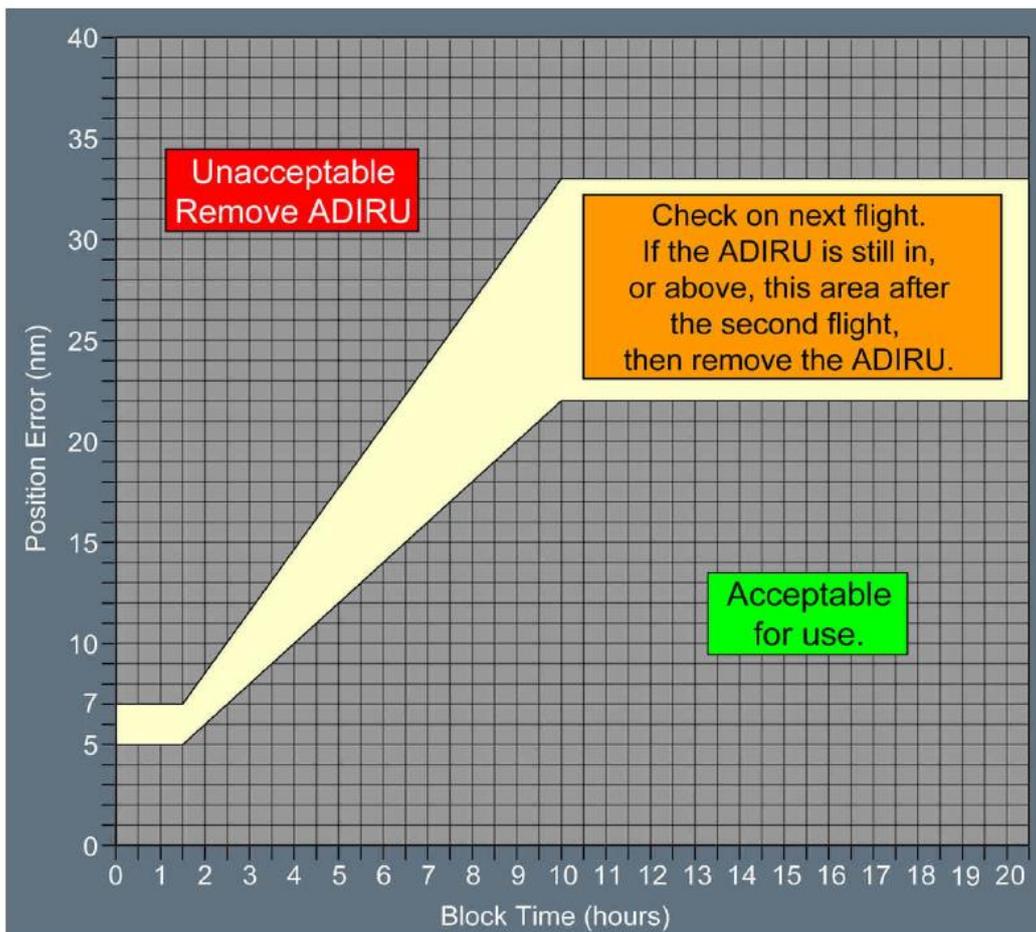
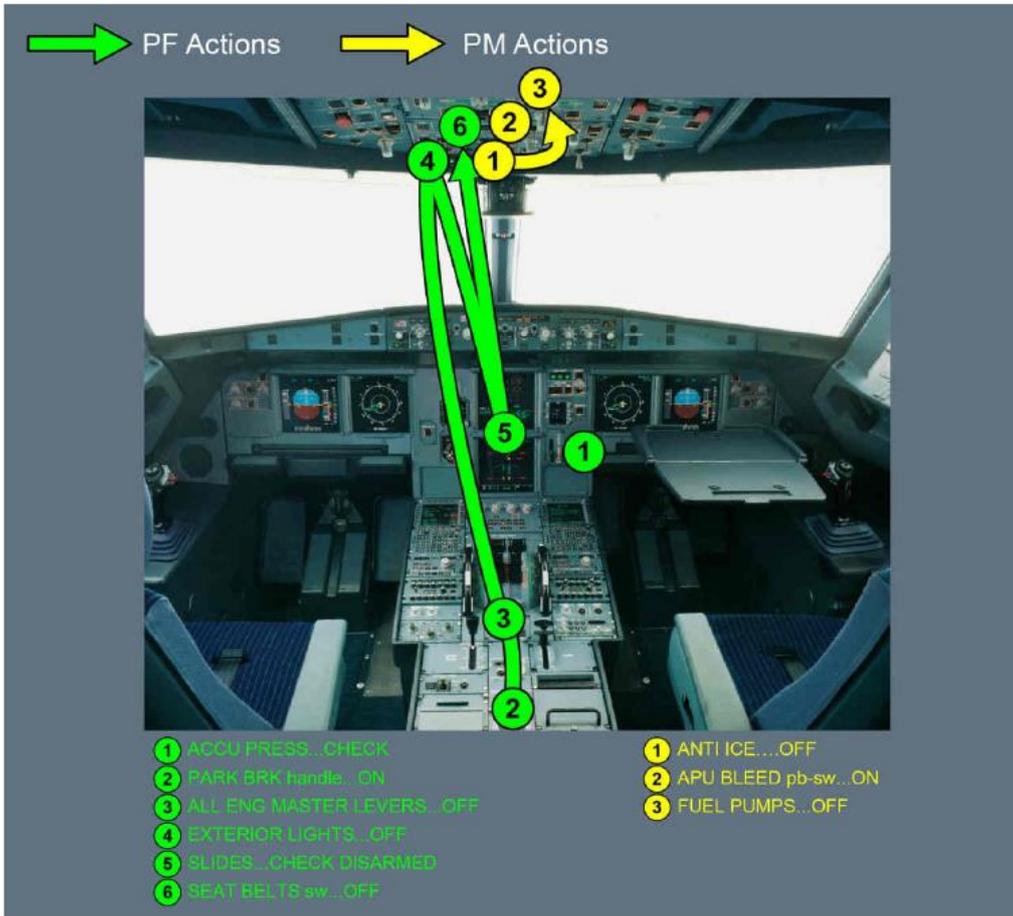


# PARKING <sup>1</sup>

	PF	PM										
<b>Parked at Gate <sup>2</sup></b>	ACCU Pressure – Check <sup>3</sup> Parking Brakes – ON <sup>4</sup> Brake Pressure Indicator – Check	Anti-Ice – OFF APU: ○ Available – APU Bleed ON <sup>5</sup> ○ Not Available – EXT PWR ON										
<b>Engines</b>	Engine Master Switch – Both OFF <sup>6</sup>	Engine Parameters – Monitor										
<b>Misc. Do Items</b>	Wing & Beacon – OFF <sup>7</sup> Other EXT Lights – As Req.	Cabin Crew – Advise on PA <sup>8</sup>										
	Slides – Check Disarmed											
	Seat Belts – OFF	Fuel Pumps – OFF ATC – Standby Brake Fan – OFF when not required										
<b>Ground Contact</b>	Confirm – Chocks in Place Parking Brake – As Required <sup>9</sup>											
<b>Checklist</b>	<table border="1"> <thead> <tr> <th colspan="2">PARKING</th> </tr> </thead> <tbody> <tr> <td>PARK BRK OR CHOCKS.....</td> <td>SET</td> </tr> <tr> <td>ENGINES.....</td> <td>OFF</td> </tr> <tr> <td>WING LIGHTS.....</td> <td>OFF</td> </tr> <tr> <td>FUEL PUMPS.....</td> <td>OFF</td> </tr> </tbody> </table>		PARKING		PARK BRK OR CHOCKS.....	SET	ENGINES.....	OFF	WING LIGHTS.....	OFF	FUEL PUMPS.....	OFF
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<b>Performance Monitoring</b>	<b>I</b>	IRS – Check Performance <sup>10</sup>										
	<b>F</b>	Fuel Quantity – Check <sup>11</sup>										
	<b>E</b>	ECAM – Check Status										
<b>Display Units</b>	Dim											
<b>Report <sup>12</sup></b>	Severe Icing Conditions											
<b>EFB</b>	As Req											

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. After confirming that all engines have spooled down.
8. "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.
9. 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.
10. 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).
11. 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).
12. Report severe icing conditions in logbook, requiring inspections of "engines fan acoustic panels" during walkaround. In icing conditions with OAT < +3°C, record "Taxi in Time" in logbook for determining remaining allowed taxi-out time for next flight.

## PARKING FLOW PATTERN



# SECURING THE AIRCRAFT <sup>1</sup>

	CM1	CM2										
<b>Do Items</b>	Parking Brake – Check ON <sup>2</sup> ADIRS – All IR Mode Selectors OFF <sup>3</sup>	Oxygen Crew Supply – OFF Exterior Lights – OFF Maintenance Bus – As required <sup>4</sup> APU – Bleed and Master switch OFF <sup>5</sup> Emergency Exit Lights and Signs – OFF External Power – As Required Battery – 1 & 2 OFF <sup>6</sup>										
<b>Checklist <sup>7</sup></b>	<table border="1"> <thead> <tr> <th colspan="2">SECURING THE AIRCRAFT</th> </tr> </thead> <tbody> <tr> <td>OXYGEN.....</td> <td>OFF</td> </tr> <tr> <td>EMER EXIT LT.....</td> <td>OFF</td> </tr> <tr> <td>EFBs.....</td> <td>OFF</td> </tr> <tr> <td>BATTERIES.....</td> <td>OFF</td> </tr> </tbody> </table>		SECURING THE AIRCRAFT		OXYGEN.....	OFF	EMER EXIT LT.....	OFF	EFBs.....	OFF	BATTERIES.....	OFF
SECURING THE AIRCRAFT												
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BATTERIES.....	OFF											
<b>EFB</b>	Application Close and EFB OFF											

1. Prior to this, adverse weather supplementary procedures (PRO-NOR-SUP-ADVWXR) should be taken into account. Apply this procedure when last passenger has left and securing of aircraft is intended (aircraft unattended: i.e. no qualified flight or ground crew in the cockpit to supervise and monitor).

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.

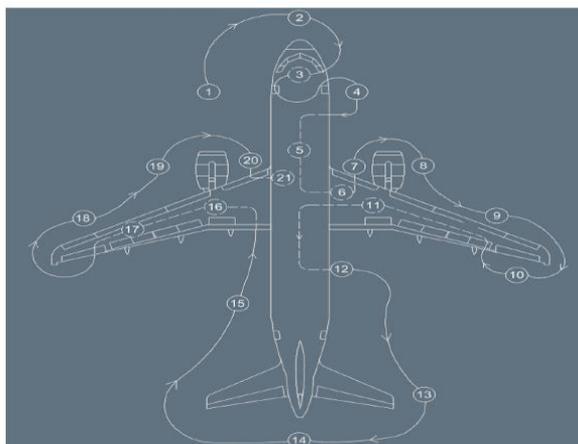
4. If ELEC power is required for servicing, set overhead MAINT BUS sw (FWD Cabin) ON, before setting a/c power off.

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



**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.