PRELIMINARY COCKPIT PREPARATION

Items marked by (*) are the only steps to be completed during a transit stop.
The following procedure, performed by the PNF, ensures that all required safety checks are performed before the application of electrical power to avoid inadvertent operation of systems and danger to the aircraft and personnel.
Included is APU starting and the establishment of electrical and pneumatic power.

ENG

– **ENG MASTER 1 and 2** . . . . . **OFF**

– **ENG START selector** . . . . . **NORM**

L/G

– **L/G lever** . . . . . **Check DOWN position**

WIPERS

– **WIPERS** . . . . . **OFF**

ELEC

■ **If the aircraft has not been electrically supplied for 6 hours or more, perform the following check :**

– **BAT 1 and 2 and APU BAT** . . . . . **CHECK OFF**

– **BAT 1 and 2 and APU BAT VOLTAGE** . . . . . **CHECK ABOVE 25.5 V**
Battery voltage above 25.5 V ensures a charge above 50 %.
R After, the check, the selector should remain on APU position to avoid discharge of
R BAT 1 or 2.

● **If battery voltage is below 25.5 V :**
a charging cycle of about 20 minutes is required.

– **BAT 1 and 2 and APU BAT** . . . . . **AUTO**

– **EXT PWR** . . . . . **ON**
Check on ECAM ELEC DC page, battery contactors closed and batteries charging.

● **After 20 minutes :**

– **BAT 1 + 2 and APU BAT . . . . . OFF**

– **BAT 1 and 2 and APU BAT VOLTAGE . . . . . CHECK ABOVE 25.5 V :**
After the check, the selector should remain on APU position.

● **If battery voltage is above 25.5 V :**

– **BAT 1 and 2 and APU BAT . . . . . AUTO**

Note : The ground horn will be triggered, associated with the ventilation EXTRACT FAULT illumination and ECAM warning after 5 minutes when the aircraft is supplied with batteries only.

■ **If the aircraft has been electrically supplied during the last 6 hours**

– **BAT 1 and 2 and APU BAT . . . . . AUTO**

Note : In case of APU start on battery only, perform the following check :
– BAT 1 and 2 and APU BAT . . . . . AUTO
– BAT 1 and 2 and APU BAT . . . . . CHECK ABOVE 23.5 V
If one battery voltage is lower than 23.5 V, there is a risk of aborted APU start. A charging cycle of the battery is required.

– **EXT PWR (when AVAIL light is on) . . . . . ON**
AVAIL light goes out.

Note : 1. When only one electrical power is available, it is recommended to connect EXT PWR A since :
– EXT PWR B does not permit GND/FLT buses to be supplied directly, without energizing the total aircraft network.
– EXT PWR B cannot be used simultaneously, with APU GEN.
2. If AVAIL light does not come on (external power connected) or ON/AVAIL lights go out during external power operation, the GPCU protection has tripped. Reset using the EXT PWR pushbutton.

HYD

WARNING
Do not pressurize hydraulic systems without clearance from ground crew.

APU FIRE

– **APU FIRE pushbutton** . . . . . **IN and GUARDED**

– **AGENT light** . . . . . **OUT**

If the APU is already running, ensure that the following check has already been completed. If not, perform it.

– **APU FIRE TEST pushbutton** . . . . . **PRESS**

Check :
· APU FIRE warning on ECAM + CRC + MASTER WARN light.
· APU FIRE pushbutton lighted red.
· SQUIB and DISCH lights on.

APU START

– **APU MASTER switch** . . . . . **ON**

ON light comes on. APU page appears on ECAM.

Note : If only batteries are supplying, press the APU pushbutton on the ECAM control panel during the start sequence (to permit the ECAM upper display to display the APU page).

– **APU START** . . . . . **ON**

FLAP OPEN indication appears on the ECAM APU page. On the ECAM APU page, N and EGT rise. When N = 95 % :
. On ECAM APU page, AVAIL indication appears.
. On APU panel : START ON light goes out.
AVAIL light comes on.
10 seconds later : ECAM DOOR/OXY page replaces the ECAM APU page.

R *Note : A bleed pressure up to 12 psi can be observed on the ECAM APU and BLEED*
R *pages in cold weather conditions (below approx. 10°C), when the APU bleed*
R *valve is indicated closed.*

ELEC

*– **EXT PWR (if ON)** . . . . . **AS RQRD**

External power may be kept on to reduce APU load, especially in hot conditions.

COCKPIT LIGHTS

*– **COCKPIT LIGHTS . . . . . AS RQRD**
· Set STBY COMPASS, DOME, ANN LT switches as required.
· Set FLOOD LT and INTEG LT as required.

PARKING BRAKE

*– **PARKING BRAKE . . . . . ON**
The parking brake must be on during the exterior inspection to allow the flight crew to check brake wear indicators.

*– **ACCU PRESS & BRAKES PRESS indicators . . . . . CHECK**
– Check for normal indications.
– The ACCU PRESS indication must be in the green band. If required use the electric pump on blue hydraulic system to recharge the brake accumulators.

WARNING
Blue hydraulic system is pressurized from blue electric pump. Get ground crew clearance before using the electric pump.

ALTERNATE BRAKING SYSTEM

Note : The purpose of this check is to verify, before the first flight of the day, the efficiency of the alternate braking system (absence of "spongy pedals").

– **CHOCKS . . . . . CHECK IN PLACE**

– **PARKING BRAKE . . . . . OFF**

– **BRAKE PEDALS . . . . . PRESS**
Apply maximum pressure on both pedals.

– **BRAKE PRESSURE (on BRAKE press indicator). . . . . CHECK**
Pressure must build up without delay symmetrically on left and right sides for the same application simultaneously applied on left and right pedals. The maximum pressure (2538 psi ± 145 psi) must be reached with full pedal deflection.

– **BRAKE PEDALS . . . . . RELEASE**

– **PARKING BRAKE . . . . . ON**
The parking brake must be on during the exterior inspection to allow the flight crew to check brake wear indicators.

F/CTL

– **FLAPS . . . . . CHECK POSITION**
Check the upper ECAM display to confirm that the FLAPS position agrees with the handle position.

R *– **SPEEDBRAKE lever . . . . . CHECK RETRACTED and DISARMED**

WARNING
If flight control surface positions do not agree with the control handle positions, check with the maintenance crew before applying hydraulic power.

PROBE/WINDOW HEAT

– **PROBE/WINDOW HEAT . . . . . CHECK AUTO**

AIR COND

– **APU BLEED . . . . . ON**
R Do not use APU BLEED, if ground personnel confirms that ground air unit is connected.
R Pilots should also check the ECAM BLEED page to determine whether an HP ground air
R unit is connected (pressure in the bleed system).

– **ALL WHITE LIGHTS . . . . . OFF**

– **X BLEED . . . . . AUTO**

– **Cabin and cockpit temperature selectors . . . . . AS RQRD**
Full range temperature 24 ± 6°C (75 ± 11°F).
The temperature selection recommended for the cabin is 21.5° C (about 10 o'clock).

CARGO AIR COND ◁

– **SELECTORS . . . . . AS RQRD**
Set temperature selectors, as required.
Set cargo cooling selector to OFF, unless livestock, plants, food, or dry ice are carried.

ELEC

– **Scan and check that there are no amber lights, except GEN FAULT lights.**

VENT

– **Check all lights off.**

*** ECAM**

*– **RECALL** . . . . . **PRESS**
· Press the RECALL pushbutton for at least 3 seconds to recall all warnings that have been cleared or cancelled.
· If applicable, check warnings compatible with MEL, then CLEAR or CANCEL them. If any action is required, call maintenance personnel as soon as possible.

*– **DOOR** . . . . . **PRESS**
If oxygen pressure is below 1500 psi (boxed in amber), check "MIN FLT CREW OXY CHART" to ascertain if it is sufficient for the scheduled flight (Refer to 3.01.35).

*– **HYD** . . . . . **PRESS**
Check that the quantity indexes are in the normal filling range.

*– **ENG** . . . . . **PRESS**
· Set the FADEC GND POWER pushbutton on the overhead panel to ON, to supply the FADEC.
· Check that the oil quantity is at, or above, 12 qt + estimated consumption
R (maximum average estimated consumption = 0.56 qt/h. Engine operation with
R engine oil consumption above 0.56 and up to 0.87 qt/h, is allowed, provided the
R engine oil consumption permits fulfillment of the mission.

EMERGENCY EQUIPMENT

– **Check the following equipment :**
· Life jackets stowed
· Axe stowed
· Smoke hoods ◁ or portable oxygen equipment and full face masks ◁ stowed and serviceable.
· Portable fire extinguisher lockwired and pressure in the green area
· Smoke goggles stowed (smoke hoods if installed)
· Oxygen masks stowed
· Flashlights stowed
· Escape ropes stowed.

RAIN REPELLENT (if installed and operative)

– **Pressure and quantity indicators** . . . . . **CHECK**

CAUTION
Never use rain repellent to wash the windshield, and never use it on a dry windshield.

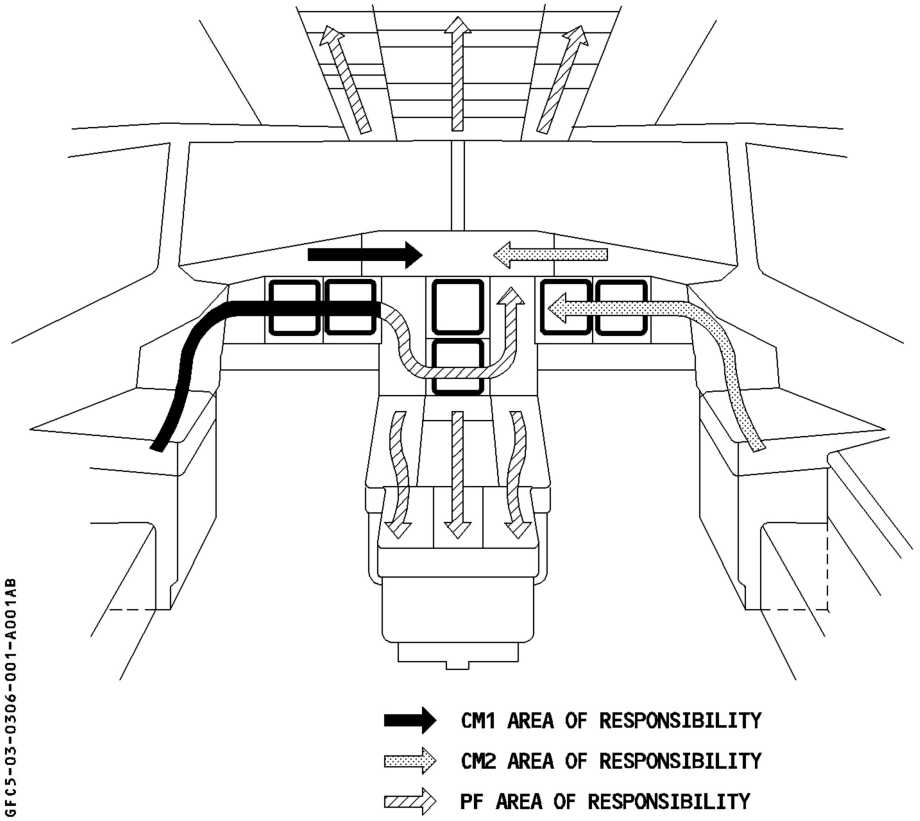
INTRODUCTION

Items marked by (*) are the only steps to be completed during a transit stop.
The PF and PNF should perform the cockpit preparation according to the panel scan sequence, defined below, and the task sharing defined in the Quick Reference Handbook (QRH).

DOCUMENTATION AND MAINTENANCE

On entering the aircraft, obtain the technical (maintenance) log and verify that the certificate of maintenance and daily inspection (or similar) are up to date and signed. Check the deferred or carried-forward defects. If refueling has already been completed, check the uplift.

PANEL SCAN SEQUENCE



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*– **GEAR PINS and COVERS** . . . . . **CHECK**
Check that three are on board and stowed.

OVERHEAD PANEL

IT IS A GENERAL RULE TO TURN OFF ALL WHITE LIGHTS FOR ALL THE SYSTEMS DURING THE SCAN SEQUENCE. THEREFORE, THESE ACTIONS ARE NOT LISTED HERE.

*** RCDR**

*– **RCDR GND CTL** . . . . . **ON**

EVAC ◁

– **CAPT and PURS/CAPT switch** . . . . . **AS RQRD**
The usual position is CAPT.

*** ADIRS**

*– **Mode rotary selectors (3)** . . . . . **NAV**
· The ADIRS outputs are used by many of the aircraft's systems, so it is essential to set the selectors to NAV as early as possible to provide data to the related systems.
· For a complete realignment, select the OFF position for more than 5 seconds (approximately 10 minutes, depending on the latitude).
· IRS IN ALIGN is indicated on the ECAM MEMO.

Note : For flights with long segments on which there are no FMGC position updates with radio navigation, perform a complete alignment. For other flights, a fast alignment is sufficient.

CKPT DOOR LKG SYS

– **ON/OFF CONTROL SWITCH** . . . . . **ON**
This position must be maintained throughout the entire flight.

EXT LT

– **EXTERIOR LIGHTS** . . . . . **AS RQRD**
Set the STROBE switch to AUTO, the BEACON and the WING switches to OFF, and remaining switches as required.
WING lights may be used briefly for wing inspection. However, as this light can cause heat damage to the jetway, it must be switched off, if the jetway is on the aircraft.

*** SIGNS**

*– **SEATBELTS** . . . . . **ON/AUTO**

*– **NO SMOKING** . . . . . **AS RQRD**

*– **EMER EXIT LT** . . . . . **ARM**

CABIN PRESS

– **LDG ELEV** . . . . . **AUTO**

– **VALVE SEL** . . . . . **BOTH**

*** AIR COND**

*– **PACK FLOW** . . . . . **AS RQRD**

Select :

LO : If less than 60 % of the seats in economy class are occupied, but no more than 200 passengers in all classes.

HI : For abnormally hot and humid conditions.

NORM : For all other normal operating cases.

If the APU is supplying, pack controllers automatically select HI flow, irrespective of the selector position.

ELEC

– **ECAM ELEC DC PAGE** . . . . . **CALL**

– **BAT 1 and 2 and APU BAT** . . . . . **OFF then ON**

10 seconds after selecting ON, check on the ECAM ELEC page that the three battery charge currents are below 60 A and decreasing.

FUEL

– **T. TANK** . . . . . **AUTO**

ENG 1 – ENG 2 FIRE

– **ENG 1 and 2 FIRE pushbuttons . . . . . CHECK IN and GUARDED**

– **AGENT 1 and AGENT 2 lights . . . . . CHECK OUT**

– **TEST pushbutton . . . . . PRESS**
Check :
· ENG 1 FIRE warning on the ECAM + CRC + MASTER WARN light
· ENG 2 FIRE indication on the ECAM MEMO
· ENG FIRE pushbutton is red.
· SQUIB and DISCH lights on.
· FIRE light (on ENG panel) on.

DATA LOADER

– **DATA LOADER . . . . . CHECK OFF**

MAINTENANCE PANEL

– **Check that all lights are out. If not, select associated pushbutton to turn off.**

THIRD OCCUPANT AUDIO CONTROL PANEL

– **PA reception knob . . . . . Select reception**
· This allows cabin attendant announcements to be recorded on the CVR.
· For proper recording, set the volume at or above medium range.

CVR

– **CVR TEST . . . . . PRESS**
R Check that at least one green LED is illuminated on the test result indicator.

RMP

– **RMP . . . . . ON**

– **Green NAV light . . . . . CHECK OFF**

– **SEL light . . . . . CHECK OFF**

– **COM FREQUENCIES . . . . . TUNE**
Use VHF 1 for ATC (only VHF 1 is available in emergency electrical configuration), VHF 2 for ATIS and company frequencies. VHF 3 is normally devoted to ACARS.

*** AIRFIELD DATA**

Obtain data needed for initializing the system and preparing the cockpit. This should include: RUNWAY IN USE, ALTIMETER SETTING, and WEATHER DATA.

*** ATC CLEARANCE**

Obtain ATC clearance, or use the probable clearance.

*** ACARS**

Initialize ACARS at that point, or after FMGS INITIALIZATION, as per company policy.

***FMGS INITIALIZATION**

At electrical power-up, the FMGSs and FCU run through various internal tests. Allow enough time (3 minutes) for tests' completion, and do not start to press pushbuttons until the tests are over. If the "PLEASE WAIT" appears, do not press any MCDU key until the message clears.

*– **ENGINE & AIRCRAFT TYPE** . . . . . **CHECK**

*– **FM database validity** . . . . . **CHECK**
- Press the DATA key, and display the STATUS page (if not displayed).
- Check DATA BASE validity and stored WPT/NAVAIDS/RWY/ROUTES, if any. If applicable, review the stored data for deletion decision.

*– **NAVAID DESELECTION** . . . . . **AS RQRD**
If NOTAMs warn of any unreliable DME or VOR/DME, display DATA, then POSITION MONITOR. Access the SEL NAVAID page, and deselect the related navaid.

*– **FLIGHT PLAN INITIALIZATION** . . . . . **COMPLETE**
- Press the INIT key.
- Insert CO RTE or city pair, and check FROM/TO.
- Check/modify ALTN/CO RTE.
- Enter flight number.

R For ATC needs, the crew should enter exactly the entire flight number, as shown on
R the ICAO flight plan, without inserting any space, on the MCDU INIT page.

- Enter (and/or check) cost index.
- Enter intended initial CRZ FL, or check it if it was already supplied by the database. Modify it, if necessary, taking into account ATC constraints or expected gross weight.
- Check and modify CRZ FL TEMP and tropopause level to agree with forecast.
- Check latitude/longitude.

*— **ALIGN IRS prompt . . . . . AS APPROPRIATE**

Do not move the aircraft, as long as alignment is not completed. The IRS are automatically initialized using the GPS position. Pilot intervention is not required. If the pilot has entered a CO RTE or FROM/TO, the INIT page displays the departure airport reference point coordinates (as stored in the navigation database), and the ALIGN IRS prompt appears. Do not press the ALIGN IRS prompt key. The ADIRS is initialized to the GPS position at the end of the alignment time. If the GPS position is not available, the pilot manually initializes the ADIRS by pressing the ALIGN IRS prompt key. By doing this, the airport reference point coordinates are sent to the ADIRS. When flying long segments without radio position update, initialize the ADIRS to the gate coordinates (insert/slew in the INIT page). When IRS alignment is completed, the MCDU's RESET IRS TO NAV message may indicate that the INIT page coordinates have been modified and are different from the IRS coordinates.

*— **F-PLN A page . . . . . COMPLETE AND CHECK**

If CO RTE has been inserted, the F-PLN should automatically include the preferential or most probable takeoff runway, approach and landing runway, associated SIDs, STARs, transition and enroute waypoints. However, some databases will only include departure and arrival airport idents and enroute waypoints. The crew must check, modify, or insert (as applicable) the F-PLN in the following order according to the data given by ATIS, ATC or MET :

- Lateral revision at departure airport. Select RWY, then SID, then TRANS.
- Lateral revision at WPT for ROUTE modification, if needed. (Refer to 4.04.10).
- Vertical revision. Check or enter climb speed limit/constraints according to ATC clearance. Enter step altitude, as appropriate.

*— **WINDS . . . . . AS APPROPRIATE**

Choose between using TRIP WIND (INIT B page), or forecast wind, for CLB or CRZ phases (Refer to 4 04.20).

*— **F-PLN . . . . . CHECK**

- Check the F-PLN, either by using the ROUTE SELECTION page versus ATC F-PLN, or F-PLN page, or the ND PLAN mode versus the computer (paper) flight plan or navigation chart.
- Check DIST TO DEST along the F-PLN. Compare it with the total distance computed for the flight with the computer (paper) flight plan.

*— **SECONDARY FLIGHT PLAN . . . . . AS APPROPRIATE**

This is routinely a copy of the active flight plan. However, consideration may be given to the following :

a) Copy the active F-PLN, but modify it at a suitable WPT for an immediate return to the departure airfield in the event of, for example, engine failure.
b) If weather is below landing minimums at the departure airfield, the secondary flight plan should be that required for a diversion immediately after takeoff.
c) If there is a chance of a runway or SID change during taxi, prepare for it by copying the active flight plan and making the necessary modifications.

*– **RADIO NAV** . . . . . **CHECK**
· Check the VOR and ILS tuned by the FMGC.
· Modify them, if required, and check that the correct identifier is displayed on the ND and PFD (ILS). If unsatisfactory, go through the audio check.

*** FMGS DATA INSERTION**

GROSS WEIGHT INSERTION (INIT B page) :

*– **ZFCG/ZFW** . . . . . **INSERT**

*– **BLOCK FUEL** . . . . . **INSERT**
Block fuel may be automatically computed by the FMGC, using the FLIGHT PLANNING function.

CAUTION
Part of characteristic speeds, displayed on the PFD (green dot, F, S, VLS), are computed from the ZFW and ZFCG entered by the crew on the MCDU. Therefore, this data must be carefully checked (Captain's responsibility).

The flight crew should insert the weights after completing all other insertions. This is to avoid cycles of prediction computations at each change in flight plan, constraints, etc...
If ZFCG and ZFW are not available, it is acceptable to enter the expected values in order to obtain predictions. Similarly, the flight crew may enter the expected fuel on board, if refueling has not been completed at that time.
If ZFCG, ZFW, and BLOCK FUEL are inserted, the FM will provide all predictions, as well as the EXTRA fuel, if any.

TAKEOFF DATA INSERTION (PERF TAKEOFF page)

*– **V1, VR, V2** . . . . . **INSERT**

*– **FLEX TO TEMP/DERATE** . . . . . **INSERT**

*– **THR RED/ACC altitude** . . . . . **SET or CHECK**
For noise abatement procedure "A", the crew must set the acceleration altitude at, or above, 3000 feet.

*– **ENG OUT ACC altitude** . . . . . **SET or CHECK**

*– **FLAPS/THS reminder** . . . . . **INSERT**

*– **TO SHIFT** . . . . . **AS RQRD**
Enter takeoff SHIFT distance, if takeoff is to be from an intersection. This is essential for position updating at takeoff and, consequently, for navigation accuracy.

R **CLIMB, CRUISE, DESCENT SPEED PRESELECTION**

*– **PRESET SPEEDS** . . . . . **AS RQRD**

If the flight is cleared for a close-in turn or close-in altitude constraint, the flight crew may preselect green dot speed on the PERF CLB page. Once the CLB phase is active, the preselected speed will be displayed in the FCU speed window and on the PFD as a selected speed (blue symbol). Once the turn is completed or the altitude cleared, the pilot will resume the managed speed profile by pressing the SPD selector on the FCU. Similarly, the pilot may select a CRZ MACH number on the PERF CRZ page (constant CRZ Mach segment, for example). When the CRZ phase is active, the preselected CRZ MACH number will be displayed in the FCU speed window and on the PFD. When ECON MACH number may be resumed, the crew presses the FCU SPD selector.

In either of the above cases, the pilot may cancel the CLB or CRZ preselected SPD/MACH prior to activating the related phase, by selecting ECON on the PERF CLB or CRZ pages

SPD LIM is defaulted to 250 knots below 10000 feet in the managed speed profile. This may either be cleared, or modified, on the VERT REV page at the origin (or a climb waypoint).

*** GLARESHIELD**

– **Glareshield and FCU integral light** . . . . . **AS RQRD**

*– **LOUDSPEAKER** . . . . . **SET**

Approximately at the 1 o'clock position.

*– **BARO REF** . . . . . **SET**

· Set QNH on the EFIS control panel and on the standby altimeter.
· Check barometer settings and altitude indications on the PFD and standby altimeter. (Tolerance limits are given in 3.04.34).

*– **FD** . . . . . **CHECK ON**

*– **LS** . . . . . **AS RQRD**

Note : Do not engage the autothrust on ground, as it may generate the AUTO FLT A/THR OFF warning at engine start.

*** EFIS CONTROL PANEL**

*– **ND mode and range** . . . . . **AS RQRD**
MODE : Display the ARC mode on the ND, if the takeoff direction is approximately the departure direction or the ROSE NAV mode, if the direction change will be more than 70° after takeoff (to allow the ND to display the area behind the aircraft).
RANGE : Set the minimum range to display the first waypoint after departure, or as required for weather radar.

*– **VOR/ADF selector** . . . . . **AS RQRD**
Display VOR and ADF needles, as needed.

*** FCU**

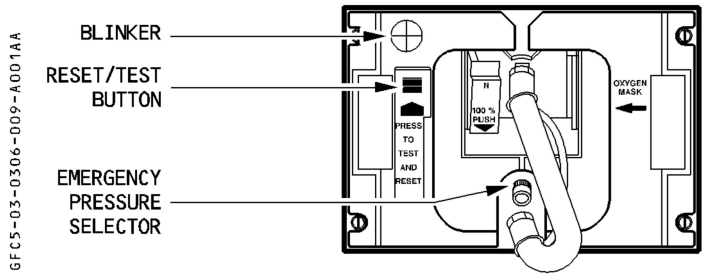
*– **SPD MACH window** . . . . . **DASHED**

*– **HDG V/S-TRK FPA** . . . . . **HDG V/S**

*– **ALT window** . . . . . **INITIAL EXPECTED CLEARANCE ALT**

LATERAL CONSOLES

OXYGEN MASK TEST



On the OXYGEN panel :

– **CREW SUPPLY** . . . . . **CHECK ON**

On the glareshield :

– **LOUDSPEAKERS** . . . . . **ON**

On the audio control panel :

— **INT reception knob . . . . . PRESS OUT - ADJUST**

— **INT/RAD switch . . . . . INT**

On the mask stowage box :

· Press and hold the reset/test button in the direction of the arrow.
  — Check that the blinker turns yellow for a short time, and then goes black.
· Hold the reset/test button down, and press the emergency pressure selector.
  — Check that the blinker turns yellow, and remains yellow as long as the emergency pressure selector is pressed.
  — Listen for oxygen flow through the loudspeakers. Warn any engineer, whose headset may be connected to the nose intercom, that a loud noise may be heard.
· Check that the reset/test button returns to the up position and the N 100 % selector is in the 100 % position.

R · Press the emergency pressure selector again, and check that the blinker does not turn
R yellow. This ensures that the mask is not supplied.

On the ECAM DOOR/OXY page :

— **REGUL LO PR message . . . . . CHECK OFF**
  · The crew must perform this check after having checked all masks. It ensures that the LP valve is open. (Due to residual pressure between the LP valve and the oxygen masks, an LP valve failed closed may not be detected during the oxygen mask test).

CM 1/2 INSTRUMENT PANELS

– **EFIS DMC selector . . . . . CHECK NORM**

– **PFD and ND brightness knob . . . . . AS RQRD**
Check the ND outer ring to maximum range (radar display).

*– **PFD . . . . . CHECK**
– Check that the PFD/ND is not transferred.
– Check for correct display, when ATT and HDG are available.
– Check IAS, FMA, initial target ALT, altimeter readings, VSI, altimeter settings, heading and attitude display.

*– **ND . . . . . CHECK**
– Check for correct display.
– Crosscheck compass indication on the ND and DDRMI.
– Check ground speed less than 5 knots, heading, initial waypoint, VOR/ADF indications.

CTR INSTRUMENT PANEL

*– **ISIS . . . . . CHECK**
– Adjust brightness.
– Check IAS, altimeter readings, altimeter settings and attitude display.
– Check no flags - Reset attitude, if necessary.

Note : Use of ISIS bugs function is not recommended (Refer to FCOM 1.34.25).

*– **NORTH REF . . . . . CHECK**
Check TRUE blue light off.

*** ECAM SWITCHING panel**

– **Check DMC at AUTO, and ECAM/ND at NORM.**

*** CLOCK**

– **Check time, and adjust if necessary ; elapsed time at zero, chrono at zero.**

Note : If the clock is readjusted for a value above ten days, maintenance must perform the Wing Tip Brake engagement test.

LANDING GEAR

– **LDG GEAR GRVTY EXTN** . . . . . **OFF**

*– **A/SKID & N/W STRG** . . . . . **ON**

PEDESTAL

ACP

– **INT knob** . . . . . **PRESS OUT/VOLUME CHECK**
Ensure that INT volume is turned up, to enable contact with the ground crew.

– **VHF** . . . . . **CHECK**
Check transmission and reception.

– **HF** . . . . . **CHECK**
· Check transmission and reception.
· Do not transmit on HF during refueling.

*** WEATHER RADAR**

*– **Power supply switch** . . . . . **CHECK OFF**

*– **WINDSHEAR switch** . . . . . **CHECK OFF**

*– **GAIN** . . . . . **AUTO**

*– **Mode** . . . . . **AS RQRD**

*** PARKING BRK**

*– **PARKING BRK** . . . . . **ON then OFF**
– Check pressure on BRAKE PRESS indicator.
– If chocks are in place, release parking brake to increase brake cooling.

*** SWITCHING panel**

R *– **SWITCHING panel** . . . . . **CHECK**
Check all selectors at NORM.

*** ECAM control panel**

*– **PRESS** . . . . . **PRESS**
Check that the CAB PRESS page displays LDG ELEV AUTO to confirm correct position of the LDG ELEV selector.

*** THRUST LEVERS**

*– **THRUST LEVERS** . . . . . **CHECK IDLE**
Check reverse levers stowed.

ENG

– **ENG MASTER switches** . . . . . **CHECK OFF**

– **ENG START selector** . . . . . **CHECK NORM**

ATC

R – **ATC** . . . . . **SET FOR OPERATION**

– **SYS 1** . . . . . **SELECT**
Only system 1 is available in the emergency electrical configuration.

*** FMGS DATA CONFIRMATION**

*– **AIRFIELD DATA** . . . . . **CONFIRM**

*– **ATC CLEARANCE** . . . . . **OBTAIN**

*– **IRS ALIGN** . . . . . **CHECK**
Confirm coordinates

*– **GROSS WEIGHT INSERTION** . . . . . **CHECK**
The PNF checks FMGS data.

*– **TO DATA** . . . . . **CALCULATE/CHECK**
The PNF calculates and checks takeoff data.

*– **F-PLN A and B pages** . . . . . **CHECK**
· Select EFIS CSTR pushbutton switch on.
· The PNF ensures that the inserted F-PLN agrees with planned routes.
(Refer to 4 05.10)
· If company policy requires it, use the scroll key to check the whole F-PLN thoroughly.
Tracks and distances between waypoints are displayed on the second line from the top of the MCDU.
Compare them with the navigation charts, if necessary.
Check correct stringing, using ND in PLAN mode.
SID and EOSID tracks and distances must be checked from the appropriate navigation charts.

*** ATC**

*– **ATC CODE** . . . . . **SET**

*** FUEL**

*– **FUEL QTY** . . . . . **CHECK**
· Check that ECAM fuel on board corresponds to the F-PLN.
· Check that fuel imbalance is within limits.
· Check that ECAM CG is within operational limits.

***TAKEOFF BRIEFING**

*– **TAKEOFF BRIEFING** . . . . . **PERFORM**
The purpose of the takeoff briefing is for the PF to inform the PNF of the planned cause of action for both normal and abnormal situations during takeoff.
Whenever practical, it is recommended, that as much of the takeoff briefing as possible be completed at the gate.
Prior to the first flight of a trip series the PF should conduct a complete departure briefing. It should include, but not necessarily be limited to, a review of the following areas :
· Adverse weather and runway conditions.
· Crew coordination in the event of a rejected takeoff.
· A discussion of any unusual, non-standard, or abnormal conditions which might affect the safety of the flight.
· SID with 1 engine out, making extensive use of FMGS
R · For airlines having different models of A330, mention if the aircraft is an A330–200
R or an A330–300. Awareness of the aircraft model may prevent tailstrike.
The PF will brief for all subsequent flights, however, the briefing may be substantially reduced when continuing with the same crew.
However, any change or items peculiar to the specific departure should be thoroughly covered.

*** PC DEDICATED TO MAINTENANCE**

Check that the Personal Computer (PC), dedicated to maintenance use and located in front of the 4th occupant console, is stowed.
Check that the light of its manual switch is off. If not, switch it off.
Check that its associated printer, located in the LH rear corner of the cockpit, is stowed.

BEFORE PUSHBACK or START

– **LOADSHEET . . . . . CHECK**

The Captain should thoroughly check the load and trim sheet, particularly for gross errors. Make sure that the loadsheet data is correct : Correct flight, correct aircraft, dry operating index, configuration, fuel on board, etc.

Compare ZFW/ZFCG with the previously-entered data, and adjust if necessary.

· Check loadsheet CG, versus ECAM CG.

In case there is a discrepancy of more than 2 %, check that the ZFW and ZFCG have been correctly inserted in the MCDU, then rely on the ECAM CG.

If the difference is less than 2 %, no further action is required. Rely on the ECAM CG.

– **TAKEOFF DATA . . . . . PREPARE and CHECK/REVISE**

Once the loadsheet is checked :

– The PNF checks or recomputes the takeoff speeds and the flexible temperature, using the RTOW charts.

– The PF independently calculates the takeoff speeds and the flexible temperature, as a crosscheck.

Take particular care in determining the takeoff configuration. (Refer to 2 02.20).

R Confirm any takeoff weight limitation.

– The PF checks (or revises) the takeoff data in the INIT B and PERF pages of the MCDU.

– **SEATS, SEAT BELTS, HARNESSES, RUDDER PEDALS, ARMRESTS . . . ADJUST**

The seat is correctly adjusted when the pilot's eyes are in line with the red and white balls.

– **MCDU . . . . . IN TAKEOFF CONFIGURATION**

It is recommended that the crew displays F-PLN on the PNF side and PERF TAKEOFF on the PF side.

– **EXT PWR . . . . . CHECK OFF**

Request that external power be removed.

– **BEFORE START CHECKLIST down to the line . . . . . COMPLETE**

– **PUSHBACK/START UP CLEARANCE : . . . . . OBTAIN**
Obtain ATC pushback/startup clearance.
Make sure that the ground crew is aware of the 65° limitation, and that they ensure that this value is not exceeded, making use of markings on the nose landing gear doors.
Obtain ground crew clearance.

– **N/WS DISC . . . . . CHECK AS RQRD**
In case of pushback (conventional or towbarless), the nosewheel steering selector bypass pin must be in the tow position. The ECAM N/WS DISC memo indicates this to the flight crew.

CAUTION
If N/WS DISC is not displayed on the ECAM, but the ground crew confirms that the steering selector bypass pin is in the towing position, then the pushback must not be performed. This is to avoid possible nose landing gear damage upon green hydraulic pressurization.
To dispatch the aircraft in such a case, refer to the MMEL.

– **WINDOWS and DOORS . . . . . CHECK CLOSED**
– Check that the cockpit windows are closed and locked (flush, no red).
– Check, on the ECAM lower display, that all the aircraft doors are closed.
– When required by local airworthiness authorities, check that the cockpit door is closed and locked (no cockpit door open/fault indication).
If entry is requested, identify the person requesting entry before unlocking the door. With the cockpit door selector on NORM, the cockpit door is closed and locked. If entry is requested from the cabin, and if no further action is performed by the pilot, the cabin crew will be able to unlock the door by using the emergency access procedure. Except for crew entry/exit, the cockpit door should remain closed until engine shutdown.

Note : Starting one engine, whilst a door is not closed, will result in pack valve closure.

– **BEACON** . . . . . **ON**

– **THR LEVERS** . . . . . **IDLE**

CAUTION

Engine will start, regardless of thrust lever position ; thrust will rapidly increase to the corresponding thrust lever position, causing a hazardous situation, if thrust levers are not at IDLE.

– **PARKING BRAKE ACCU PRESS** . . . . . **CHECK**

The ACCU PRESS indication must be in the green band.

– **PARKING BRAKE** . . . . . **AS RQRD**

– If no pushback is required, check that the PARKING BRK handle is ON, and check the BRAKES PRESS indication.

CAUTION

If, during engine start with the parking brake on, the aircraft starts to move due to a parking brake failure, immediately release the PARKING BRK handle to restore braking by pedals.

– If pushback is required, set the PARKING BRK to OFF.

CAUTION

Do not use brakes during pushback, unless required due to an emergency.

After pushback is completed, set the PARKING BRK to ON, and inform the ground crew to allow the towbar to be disconnected.

– **BEFORE START CHECKLIST below the line** . . . . . **COMPLETE**

AUTOMATIC ENGINE START

– **ENG START selector . . . . . IGN START**
Lower ECAM display shows the ENG page.

– **ANNOUNCE . . . . . "STARTING ENGINE 1"**
Engine 1 is usually started first (It powers the blue hydraulic system, which pressurizes the parking brake.)

– **MASTER switch 1 . . . . . ON**
Do not turn the MASTER switch ON before all amber crosses and messages have
R disappeared on the engine parameters (upper ECAM display). In addition, before setting
R the engine 1 master switch to ON, wait for three seconds after having selected "IGN
R START" in the engine start selector.

ON ECAM UPPER DISPLAY	ON ECAM LOWER DISPLAY
N2 increases	Corresponding start valve in line. Bleed pressure indication green. Oil pressure increases.
At 10 % N2 :	Indication of the active igniter (A or B)
At 15 % N2 : – FF increases 20 seconds (maximum) after fuel is on – EGT increases – N1 increases	
At 50 % N2 :	Start valve crossline.
At 54 % N2 :	Igniter indication off.

Parameter callouts are not mandatory.

● **When idle is reached (AVAIL indication is displayed) :**

– **MAIN AND SECONDARY ENG. IDLE PARAMETERS . . . . . CHECK NORMAL**
At ISA sea level : N1 about 23 %
N2 about 63 %
EGT about 360°C
FF about 550 kg/h (1210 lb/h)

– **ANNOUNCE . . . . . "STARTING ENGINE 2"**

– **MASTER switch 2 . . . . . ON**
Same procedure as for Engine 1.

AFTER START

— **ENG START selector** . . . . . **NORM**
· Turning the ENG START selector to NORM indicates the end of the start sequence ; AFTER START actions may be performed.
· ON ECAM lower display the ENG page is replaced by the WHEEL page.

Note : If the ENG START selector is not switched to NORM, the ENG page is automatically replaced by the WHEEL page 15 seconds after second engine start.

· Leaving the ENG START Sel at START/IGN position would inhibit continuous relight selection on ground (would be supplied at lift off). The selector must be cycled to recover normal control of ignition.
· After start, to avoid thermal shock, the engine should be operated at idle or near idle for at least 3 minutes prior to advancing the thrust lever to high power. Taxi time at idle may be included in the warm-up period.

— **APU BLEED** . . . . . **OFF**
· APU BLEED is selected off just after engine start to avoid engine exhaust gases ingestion.
· APU BLEED valve closes, ENG BLEED valves open.

— **GROUND SPOILERS** . . . . . **ARM**

— **RUD TRIM** . . . . . **ZERO**
If RUD TRIM position indication not at zero, press the RESET pushbutton.

— **FLAP lever** . . . . . **SET**
· Set FLAPS for takeoff
· Check position on ECAM upper display
· If taxiing in slush conditions, keep flaps retracted until reaching the holding point before takeoff.

— **PITCH TRIM** . . . . . **SET**
R Set CG on pitch trim wheel. For this purpose use CG indicated on ECAM.

— **ECAM STATUS** . . . . . **CHECK**
· Check no status reminder on ECAM upper display
· If status reminder displayed, press the STS pushbutton

– **ENG ANTI ICE** . . . . . **AS RQRD**

Note : Icing conditions may be expected when the OAT (on ground and for takeoff), or the TAT (in flight), is 10°C or below, and there is visible moisture in the air (such as clouds, fog with low visibility, rain, snow, sleet, ice crystals), or when standing water, slush, ice or snow is present on the taxiways or runway.

· If icing conditions exceed 30 minutes, or if significant engine vibration occurs, the engine should be accelerated to 60 % N1 minimum for approximately 30 seconds prior to higher thrust operation. (See also parking brake limitation 3.01.32).
· If switched on, the IGNITION memo appears on the ECAM, as continuous ignition is automatically selected.

– **WING ANTI ICE** . . . . . **AS RQRD**
When WING ANTI ICE is switched on, on ground, the anti-ice valves open for about 30 seconds (test sequence), then close as long as the aircraft is on ground.

– **APU MASTER switch (if APU not required)** . . . . . **OFF**
AVAIL light goes off after the APU cooling period.

– **NWS TOWING FAULT light off** . . . . . **CHECK**

– **ECAM DOOR page** . . . . . **CHECK**
· Check all slides armed.
· Deselect DOOR page after slide verification.

– **ANNOUNCE** . . . . . **"CLEAR TO DISCONNECT"**
Request : Chocks removed.
Nosewheel steering bypass pin removed.
Nosewheel steering towing light on the nose landing gear checked off.
Interphone disconnect.
Hand signal on the left/right side

– **AFTER START C/L** . . . . . **COMPLETE**

TAXI

– **TAXI clearance** . . . . . **OBTAIN**

R – **NOSE light** . . . . . **TAXI**
R Turn on nosewheel light to TAXI day and night.
R RWY TURN OFF lights may be switched on, as required.

– **PARKING BRK** . . . . . **OFF**
Check that brake pressure is zero (triple indicator). Slight residual pressure may be indicated for a short period of time.

– **ELAPSED TIME** . . . . . **AS RQRD**
If ACARS is not installed, start ELAPSED TIME to record block time.

– **THRUST LEVERS** . . . . . **AS RQRD**
· In order to get the aircraft moving, little, if any, power above idle thrust will be required (max 40 % N1). Thrust should normally be used symmetrically. Once aircraft is moving, little thrust is required.
· Use of the engine anti-ice increases ground idle thrust so the pilot must take care on slippery surfaces.
· The engines are close to the ground. Avoid positionning them over unconsolidated, or unprepared ground (e.g over the edge of taxiways).
Avoid high thrust settings at low ground speeds, due to the risk of ingestion (FOD).
· "Square wheel effect" may be noticed, if the aircraft was parked for a long time (more than 6 hours) with high tire temperature conditions and with a high weight.

— **BRAKES . . . . . CHECK**

— Once the aircraft starts moving :

· Check the brake efficiency of the normal braking system : The aircraft must slow down when pressing the brake pedals.

CAUTION

R If the aircraft has been parked in wet conditions for a long period, the efficiency of
R the first brake application at low speed will be reduced.

· Also check that green pressure has taken over blue pressure : The blue pressure on the brake pressure triple indicator must be at 0 when pressing the brake pedals. Although green hydraulic power supplies the braking system, if pedals are quickly pressed a brief brake pressure indication appears on the BRAKE PRESS indicator.

· Thereafter, the normal maximum taxi speed should be 30 knots in a straight line on long taxiways, and 10 knots for a sharp turn. The ground speed is difficult to assess, so monitor ground speed on the ND. Do not "ride" the brakes. As 30 knots are exceeded with idle thrust, apply brakes smoothly and decelerate to 10 knots; release the brakes and allow the aircraft to accelerate again.

· If a "spongy" pedal is felt during taxi, this indicates a degraded performance of the alternate braking system.

· If an arc is displayed on the ECAM WHEEL page above the brake temperature, select brake fans on (if installed).

— **NOSEWHEEL STEERING . . . . . AS RQRD**

· Use smooth and progressive handwheel inputs. Avoid the use of large rapid inputs that introduce big variations in demand, which cannot be satisfied by the steering mechanism (maximum rate for nosewheel deflection of about 12°/sec). Be aware that it will take approximately 7 seconds for the nosewheel to return to zero deflection from its full travel. Therefore, some anticipation is needed to reduce the nosewheel steering deflection when exiting a turn.
When exiting a tight turn, roll straight a short distance to take the stress out of the main gears.

· The nosewheel steering angle is limited to 72°.

· No braked pivot turn is allowed (ie. differential braking cannot be used to fully stop one main gear).

· Asymmetric thrust may be used during turns at high NWS angles, in order to initiate the turn and to keep the aircraft moving during the turn. But, it should not be used to tighten the turn.

– **FLIGHT CONTROLS . . . . . CHECK**

R 1. At a convenient stage, prior to or during taxi, and before arming the autobrake, the
R PF silently applies full longitudinal and lateral sidestick deflection.
R On the F/CTL page, the PNF checks full travel of all elevators and all ailerons, and the
R correct deflection and retraction of all spoilers.
R The PNF calls out "full up", "full down", "neutral", "full left", "full right", "neutral", as
R each full travel/neutral position is reached.
R The PF silently checks that the PNF calls are in accordance with the sidestick order.

R *Note : In order to reach full travel, full sidestick must be held for a sufficient period*
R *of time.*

R 2. The PF presses the PEDAL DISC pushbutton on the nosewheel tiller, and silently
R applies full left rudder, full right rudder, and neutral. The PNF calls out "full left", "full
R right", "neutral", as each full travel/neutral position is reached.
R 3. The PNF applies full longitudinal and lateral sidestick deflection, and silently checks
R full travel and the correct sense of all elevators and all ailerons, and the correct
R deflection and retraction of all spoilers, on the ECAM F/CTL page.

R *Note : The F/CTL page is automatically displayed for 20 seconds.*

– **AUTO BRK . . . . . MAX**

· The ON light comes on.
· AUTO BRK may be armed, with the parking brake on.
· The selection of MAX mode prior to takeoff improves safety, in the event of an aborted takeoff.
If the takeoff must be aborted, the autobrake system applies maximum braking (if the ground speed is above 72 knots), as soon as the thrust levers are set to idle, which represents a single action done without delay.

– **ATC clearance . . . . . CONFIRM**

TAKE OFF DATA/CONDITIONS

If the takeoff data has changed, or in the case of a runway change, prepare updated takeoff data and, as appropriate :

– **F-PLN (Runway) . . . . . REVISED**

– **FLAP LEVER . . . . . AS APPROPRIATE**
Select takeoff position.

– **V1, VR, V2 . . . . . REINSERT**

– **FLEX TO temperature . . . . . REINSERT**

FMGS

– **F-PLN (SID,TRANS) . . . . . REVISE or CHECK**
Carefully confirm that the ATC clearance agrees with the FMGS, if NAV mode is to be used.

– **INITIAL CLIMB SPEED AND SPEED LIMIT . . . . . MODIFY or CHECK**
Use VERT REV at departure, or at a CLB waypoint.

– **CLEARED ALTITUDE ON FCU . . . . . SET**

– **HDG ON FCU . . . . . IF REQUIRED PRESET**
R · If an ATC HDG is required after takeoff, in case of a radar vector departure, preset the
R heading on the FCU. NAV mode will be disarmed.
· RWY TRK mode will keep the aircraft on the centerline.

– **FD . . . . . CHECK SELECTED ON**

– **FMA . . . . . CHECK**

– **FLIGHT INSTRUMENTS . . . . . CHECK**

– **RADAR (if required) . . . . . ON**
If the radar is required for the flight, use the following test procedure :
Adjust the tilt downward until ground returns appear, and then slowly adjust it in 1 to 2 degree steps, up to 15 degrees UP, for weather returns.
Select tilt at 4 degrees UP for takeoff.

– **PREDICTIVE WINDSHEAR SYSTEM . . . . . AUTO**

– **ATC code . . . . . CONFIRM/SET**

– **TAKEOFF BRIEFING . . . . . CONFIRM**
This briefing should normally be only a brief confirmation of the thorough takeoff briefing made at the gate. Any changes in the clearance are to be addressed at this time.
Make as extensive use of the displays as possible. For example :
"Takeoff in RWY 07 (Perf page), weight 208 T (lower ECAM) configuration 2, 65 T of fuel, FLEX 50° , 93% N1 (upper ECAM) LMG 2D departure (FPLN page) V1 155 V2 158 (PFD), initial clearance 12 000 feet blue (FMA)").

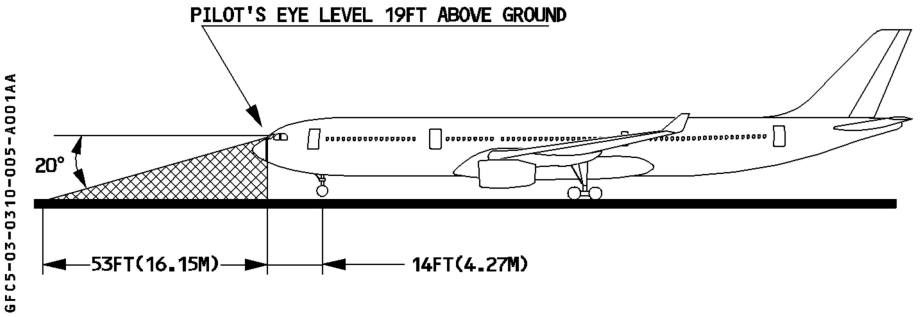
– **CABIN REPORT . . . . . RECEIVED**
Check the CABIN READY message on the ECAM MEMO, or obtain a cabin report from the purser, as a minimum : "CABIN SECURED FOR TO"

– **TO CONFIG pb** . . . . . **PRESS**
Check "TO CONFIG NORMAL" displayed on ECAM upper display.

– **TO MEMO** . . . . . **CHECK NO BLUE LINE**

– **BEFORE TO C/L down to the line** . . . . . **COMPLETE**

VISUAL GROUND GEOMETRY



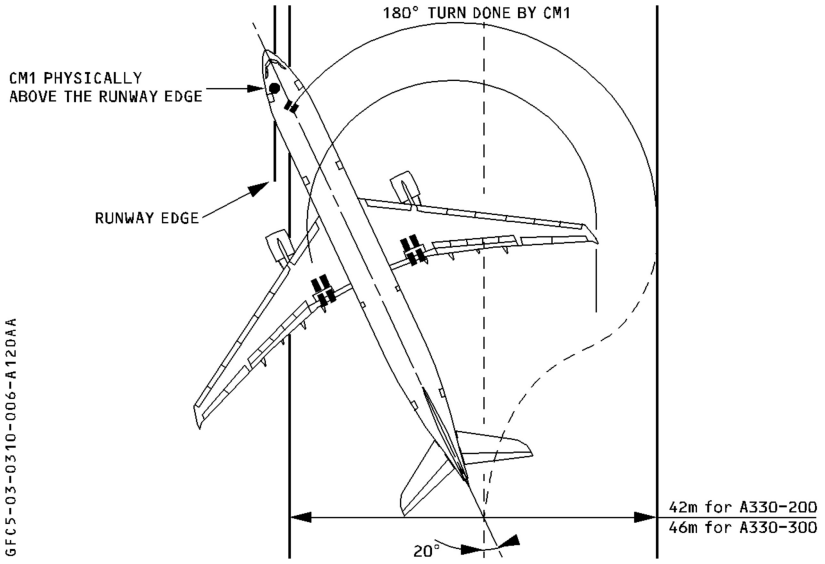
180 ° TURN ON RUNWAY

R A standard runway is 45 meters wide. With the maximum nosewheel steering angle (72°),
R the actual turn width (without margin) is 42 meters for an A330–200 and 46 meters for an
R A330–300. These distances are based on the following procedure :

- **FOR THE CM1**
  - R – Taxi on the right hand side of the runway and turn left, maintaining 20° (check on the R PFD) divergence from the runway axis.
  - R – Asymmetric thrust should be used during the turn, to maintain a continuous speed R (between 5 and 10 knots). Some anticipation is required to ensure that asymmetric R thrust is available at the beginning of the turn.
  - R – When the CM1 is physically over the runway edge, he turns and maintains the R nosewheel 72° right.
  - R – No braking pivot is allowed (ie. differential braking cannot be used to fully stop one R main gear).
- R **FOR THE CM2**

  The procedure is symmetrical. (Taxi on the left hand side of the runway).

R



BEFORE TAKE OFF

- **If the brake fans are running ◁:**

  – **BRAKE TEMP . . . . . CHECK**

  - **If BRAKE TEMP above 150°C :**

    – **Delay takeoff**

  - **If BRAKE TEMP below 150°C :**

    – **BRAKE FANS . . . . . OFF**

– **TAKEOFF OR LINE UP CLEARANCE . . . . . OBTAIN**

– **APPROACH PATH CLEAR OF TRAFFIC . . . . . CHECK**

– **CABIN CREW . . . . . ADVISE**

– **ENG START selector . . . . . AS RQRD**
Select IGN/START if :
· Runway with standing water, or in case of heavy rain
· Heavy rain, or severe turbulence is expected after takeoff.

Note : Continuous ignition is automatically selected, if the ENG ANTI ICE pushbutton is ON.

– **TCAS (◁) Mode selector . . . . . TA or TA/RA**
FAA recommends selecting TA only mode :
– In case of known nearby traffic, which is in visual contact ;
– At particular airports, and during particular procedures identified by an operator as having a significant potential for unwanted, or inappropriate RAs. (Closely-spaced parallel or converging runways...)

R – **PACK 1 and 2 . . . . . AS RQRD**
R Consider selecting packs OFF or APU bleed ON.
R This will improve performance when using TOGA thrust.
R In the case of a FLEX takeoff, selecting packs OFF or APU bleed ON will reduce takeoff
R EGT, and thus reduce maintenance costs.
R The use of APU bleed is not authorized if wing anti-ice is to be used.
R Select APU bleed on, at least 20 seconds before takeoff power application. This will
R prevent triggering the ENG THRUST LOST ECAM warning due to incorrect valve
R positions.

– **EXTERIOR LIGHTS . . . . . SET**
Set the RWY TURN OFF, LAND, and NOSE switches to ON/TO, in order to minimize bird strike hazard during takeoff.

R Set the STROBE lights to ON, before entering the runway.

– **SLIDING TABLE ◁ . . . . . STOWED**

– **ATC . . . . . When cleared for takeoff : ON (or XPDR or XPNDR ◁)**
It is not applicable to ATC panels equipped with an AUTO position, if AUTO is selected.

– **BEFORE TO C/L below the line . . . . . COMPLETE**
Read the checklist below the line, when line up or takeoff clearance is received.

TAKEOFF

— **ANNOUNCE** . . . . . **"TAKEOFF"**

— **BRAKES** . . . . . **RELEASE**

R Rolling takeoff is recommended, when possible.

● **If the crosswind is at, or below, 20 knots and there is no tailwind :**

— **THRUST LEVERS** . . . . . **FLX or TOGA**

· To counter the nose-up effect of setting engine takeoff thrust, apply half forward stick until the airspeed reaches 80 knots. Gradually release the stick to reach neutral at 100 knots.

· For crosswind takeoffs, routine use of into-wind aileron is not recommended. In strong crosswind conditions, small amounts of lateral control may be used to maintain wings level, but the pilot should avoid using excessive amounts. This causes excessive spoiler deployment, which increases the aircraft's tendency to turn into wind.

· PF progressively adjusts engine thrust in two steps :

— From idle to about 50 % N1 (1.1 EPR).

— From engines at similar N1 to takeoff thrust.

· Once the thrust is set, the Captain maintains his hand on the thrust levers until the aircraft reaches V1.

● **In case of tailwind, or if crosswind is greater than 20 knots :**

— **THRUST LEVERS** . . . . . **FLX or TOGA**

· PF applies full forward stick.

R · For crosswind takeoffs, routine use of into-wind aileron is not recommended. In
R strong crosswind conditions, small amounts of lateral control may be used to
R maintain wings level, but the pilot should avoid using excessive amounts. This
R causes excessive spoiler deployment, which increases the aircraft's tendency to
R turn into wind.

· PF sets 50 % N1 (1.1 EPR) on both engines, then rapidly increases thrust to about 70 % N1 (1.3 EPR), then progressively to reach takeoff thrust at 40 knots ground speed, while maintaining stick full forward up to 80 knots. Gradually release the stick to reach neutral at 100 knots.

· Once the thrust is set, the Captain maintains his hand on the thrust levers until the aircraft reaches V1.

Note : The ENG page replaces the WHEEL page on the ECAM's lower display.

— **DIRECTIONAL CONTROL** . . . . . **USE RUDDER**

– **CHRONO** . . . . . **START**

– **PFD/ND** . . . . . **SCAN**
· Check the flight mode annunciator on the PFD. MAN TOGA (MAN FLX xx), SRS, RWY (or blank) 1FD2.
· Check the FMGS position update (aircraft on runway centerline).

● **Reaching 80 knots :**

– **TAKEOFF N1** . . . . . **CHECK**
Check that the actual N1 of individual engines has reached the N1 rating limit before the aircraft reaches 80 knots. Check EGT.

Note : If there is a discrepancy of more than 1 % of N1 between the engines, it should be entered in the logbook after flight.

– **ANNOUNCE** . . . . . **"POWER SET"**

– **PFD and ENG indications** . . . . . **SCAN**
· Scan airspeed, N1, and EGT throughout the takeoff.

– **ANNOUNCE** . . . . . **"ONE HUNDRED KNOTS"**
· The PF crosschecks the speed indicated on the PFD and announces "checked".
· Below 100 knots, the Captain may decide to abort the takeoff, depending on the circumstances. Above 100 knots, rejecting the takeoff is a more serious matter.

– **ANNOUNCE** . . . . . **"V1"**
V1 synthetic voice is triggered.

– **ANNOUNCE** . . . . . **"ROTATE"**

– **ROTATION** . . . . . **PERFORM**
· At VR, initiate the rotation with a positive sidestick input to achieve a continuous rotation rate of about 3°/sec, towards a pitch attitude of 15° (12.5° if one engine is failed).
· Minimize lateral inputs on ground and during the rotation, to avoid spoiler extension.
· After lift-off, follow the SRS pitch command bar.

CAUTION
If a tailstrike occurs, avoid flying at an altitude requiring a pressurized cabin, and return to the originating airport for damage assessment.

– **ANNOUNCE** . . . . . **"POSITIVE CLIMB"**
Announce positive climb, when the vertical speed indication is positive and the radio altitude has increased.

– **ORDER** . . . . . **«GEAR UP»**

– **LDG GEAR** . . . . . **SELECT UP**

– **GRND SPLRS** . . . . . **DISARM**

– **EXTERIOR LIGHTS** . . . . . **SET**

R · Set NOSE and RWY TURN OFF light switches to OFF.

R · LAND lights may be left ON, according to the airline policy/regulatory recommendation.

– **AP** . . . . . **AS RQRD**

Above 100 feet, AP 1 or 2 may be engaged.

– **ANNOUNCE** . . . . . **FMA**

– **ANNOUNCE** . . . . . **"GEAR UP"**

● **At thrust reduction altitude (LVR CLB flashing on FMA).**

– **THRUST LEVERS** . . . . . **CL**

The thrust levers should be moved to the CL detent, when the flashing LVR CLB prompt annunciates on the FMA. Autothrust is now active.
In manual flight, the pitch attitude change must be anticipated, to prevent a speed decay at thrust reduction.

– **PACK 1 and 2 (if applicable)** . . . . . **ON**

· Select PACK 1 ON, after CLB thrust reduction
· Select PACK 2 ON, after FLAP retraction

Note : 1. Selecting both packs ON simultaneously may affect passenger comfort.
2. If packs are not switched ON after takeoff phase, an ECAM caution will be triggered.

R ● **At acceleration altitude :**

R – **ANNOUNCE FMA . . . . . "THR CLB/OP CLB" or "THR CLB/CLB"**
R Check target speed change from V2 + 10 to the first CLB speed (either preselected
R or managed).

R *Note : 1. For most normal operations, thrust reduction and acceleration altitudes will*
R *be the same. So the FMA will change from MAN FLX/SRS/RWY to THR*
R *CLB/CLB/NAV (or THR CLB/OP CLB/NAV).*
R *2. If the FCU-selected altitude is equal or close to acceleration altitude, the*
R *FMA will switch from SRS to ALT*.*

● **Above acceleration altitude (or once in CLB phase) :**
The following procedure ensures that the aircraft is effectively accelerating toward CLB speed.

• **At F speed**

Note : For takeoff in CONF 1+F, the "F" speed is not displayed.

– **ORDER . . . . . "FLAPS 1"**

– **FLAPS 1 . . . . . SELECT**

– **CONFIRM/ANNOUNCE . . . . . "FLAPS 1"**

• **At S speed**

– **ORDER . . . . . "FLAPS ZERO"**

– **FLAPS ZERO . . . . . SELECT**

– **CONFIRM/ANNOUNCE . . . . . "FLAPS ZERO"**

Note : The CRUISE page replaces the ECAM ENG page, when reaching 1500 feet.

AFTER TAKE OFF

– **APU BLEED . . . . . AS RQRD**
If the APU has been used to supply air conditioning during takeoff, set the APU BLEED to OFF. For use of the APU BLEED, refer to the APU LIMITATION Chapter (3.01.49).

– **APU MASTER switch . . . . . AS RQRD**

– **ENG START selector . . . . . AS RQRD**
Select IGN/START, if severe turbulence or heavy rain is encountered.

– **TCAS (◁) Mode selector . . . . . TA/RA**
Select TA/RA, if the takeoff has been performed with TA only.

– **ANTI ICE PROTECTION . . . . . AS RQRD**
R ENG ANTI ICE should be ON, when icing conditions are expected with a TAT at, or
R below, 10°C.

Note : With ENG ANTI ICE ON, the FADEC automatically selects continuous ignition. The IGNITION memo appears on ECAM.

– **AFTER TAKEOFF/CLIMB CHECKLIST down to the line . . . . . COMPLETE**

CLIMB

– **Normal vertical climb mode is CLB or OP CLB with managed speed active.**

– **PF MCDU . . . . . PERF CLB**
· PF MCDU should be preferably set on PERF CLB page (allowing to monitor when the FCU selected altitude is reached) but other pages as F-PLN may be selected as tactically necessary.
With the AP engaged, the PF will make any required F-PLN revisions.
· OPT FL and MAX REC FL are displayed on MCDU PROG page. It is worth noting that OPT FL displayed is function of the CI.
· The displayed MAX REC FL gives at least 0.3 g buffet margin. A cruise flight level entry may be made above this level in the MCDU and will be accepted by the FMGS, provided it does not exceed the level at which the margin is reduced to 0.2 g.

– **PNF MCDU . . . . . F-PLN**
PNF MCDU should be preferably set on F-PLN page (allowing to be carried out any ATC long term lateral or vertical revisions).

– **CLIMB SPEED MODIFICATIONS :**

● **If a speed change is required by ATC, or for turbulence or operational considerations (e.g. increase CLB rate) :**
Select new speed with FCU SPD selection knob and pull.
Speed target is now selected.

● **To resume to MANAGED SPD profile :**
Push FCU SPD selection knob. Speed target is now managed.

Note : The best rate of climb speed for long term situations lies between green dot and ECON speed. Acceleration from green dot to ECON speed at high altitude can take a long time.

– **BARO REF . . . . . SET**
· At transition altitude (baro setting flashing on PFD) set STD on EFIS control panels and on standby altimeter.
· Cross check baro settings and altitude readings.

– **CRZ FL** . . . . . **SET AS RQRD**
· If ATC clears the aircraft to intended CRZ FL or above, there is no need to modify the CRZ FL inserted in INIT A page during cockpit prep. Higher CRZ FL will be taken automatically into account by FCU ALT knob selection.
· If ATC limits CRZ FL to a lower level than the one inserted in the INIT A page (or present on PROG page) it is necessary to insert this lower CRZ FL in the PROG page. Otherwise there is no transition into CRZ phase : consequently the managed speed targets and Mach are not modified and SOFT N1 mode is not available.
In that case FMA will display ALT instead of ALT CRZ in the 2nd column.

– **AFTER TAKE OFF/CLIMB C/L below the line** . . . . . **COMPLETE**

– **ENG ANTI ICE** . . . . . **AS RQRD**
ENG ANTI ICE should be ON when the aircraft encounters icing conditions, unless the SAT is below – 40°C.

– **RADAR TILT** . . . . . **ADJUST**
The tilt angle depends on aircraft altitude and on the selected range on ND. A slightly negative tilt is required to avoid overscanning and to provide some ground returns at the top edge of the ND.

R ● **At 10000 ft :**

R – **LAND light** . . . . . **OFF**

R – **SEAT BELTS** . . . . . **AS RQRD**

R – **EFIS option** . . . . . **ARPT**

R – **ECAM MEMO** . . . . . **REVIEW**

– **RAD NAV** . . . . . **CHECK**
Clear manually tuned VORs from MCDU RAD/NAV page.

– **SEC F-PLN** . . . . . **AS RQRD**
Recopy the active flight plan in the secondary if an immediate return flight plan has previously been constructed.

– **OPT/MAX ALT** . . . . . **CHECK**

CRUISE

– **ECAM MEMO** . . . . . **REVIEW**

– **ECAM SYS PAGES** . . . . . **REVIEW**

Periodically review the system display pages and, in particular :

ENG : Oil press and temperature
BLEED : BLEED parameters
ELEC : Parameters, GEN loads
HYD : Fluid quantity. Green system is lower than on ground, following landing gear retraction.
COND : Duct temperature, compared with zone temperature.
Avoid large differences for passenger comfort.
FLT CTL : Note any unusual control surface position.
FUEL : Fuel distribution, trim tank quantity, and CG.

– **FLIGHT PROGRESS** . . . . . **CHECK**

Note : VLS shown on the PFD ensures a 0.3g buffet margin and therefore, no additional margin is necessary in cruise.

Monitor flight progress in the conventional way.
When overflying a waypoint :
· Check track and distance to the next waypoint.

R When overflying a waypoint, or every 30 minutes :
· Check fuel : Check FOB (ECAM), and fuel prediction (FMGC), and compare with the computer flight plan or the in-cruise quick-check table (Refer to 3.06.20).(3.06.20).
· Check that the sum of the fuel on board and the fuel used is consistent with the fuel on board at departure. If the sum is either unusually smaller than the fuel on board at
R departure, or if it decreases, suspect a fuel leak.

CAUTION

This check must also be performed each time a FUEL IMBALANCE procedure is necessary. Perform the check before applying the FUEL IMBALANCE procedure. If a fuel leak is confirmed, apply the FUEL LEAK procedure.

– **STEP FLIGHT LEVEL** . . . . . **AS APPROPRIATE**

– **NAVIGATION ACCURACY . . . . . CHECK**

On aircraft equipped with GPS PRIMARY, the navigation accuracy check is not required, as long as GPS PRIMARY is available.

Otherwise, navigation accuracy must be monitored, particularly when any of the following occurs :

· IRS only navigation
· The PROG page displays LOW accuracy, or
· "NAV ACCUR DOWNGRAD" message appears.

Methods for checking accuracy :

· Manually tune VOR (VOR/DME or ADF) that is within range on RAD NAV page and select associated needles on ND.
Check that the needle (raw data) overlies the corresponding blue navaid symbol (FM computed) and that the DME distance is equal to the distance in between the aircraft symbol and the navaid symbol on the ND, or
· Insert a VOR/DME ident in the BRG/DIST TO field of the PROG page, and compare the computed BRG (DIST) with the raw data on the ND. This last method allows the FM error to be quantified.

If the check is positive (error ≤ 3NM EN ROUTE) : FM position is reliable.
– ND ARC or NAV and managed lateral guidance may be used.

If the check is negative (error > 3NM EN ROUTE) : FM position is not reliable.
– Use raw data for navigation and monitor it.
– If there is a significant mismatch between the display and the real position : Disengage MANAGED NAV mode and use raw data navigation (possibly switch to ROSE VOR so as not to be misled by FM data).

– **RADAR TILT . . . . . ADJUST**

Below 20000 feet : A near zero degree tilt setting should be adjusted. Should two different ranges be selected on both NDs it is recommended to set a down tilt with the shorter ND range (in order to monitor and detect weather activity) and a near zero tilt with the longer ND range (in order to monitor course changes).

Above 20000 feet : A slight downward tilt is recommended.

– **CABIN TEMP . . . . . MONITOR**

Pay regular attention to the ECAM CRUISE page in order to monitor passenger cabin temperatures and adjust them, as necessary.

R ● **If the oxygen mask has been used :**

R – **OXYGEN MASK . . . . . CHECK**
R Check that the oxygen mask has been properly stowed, as indicated in the FCOM
R 1.35.20.

DESCENT PREPARATION

Descent preparation and approach briefing can take approximately 10 minutes, so they should be initiated approximately at 80 NM before Top of Descent.

– **LDG ELEV** . . . . . **CHECK**
Check on ECAM CRUISE page that LDG ELEV AUTO is displayed.

– **WEATHER AND LANDING INFORMATION** . . . . . **OBTAIN**
Check weather reports at ALTERNATE and DESTINATION airports. Airfield data if any should give RWY in use for arrival.

FMGS

– **ARRIVAL page** . . . . . **COMPLETE/CHECK**
Insert APPR, STAR, TRANS and APPR VIA if applicable (access by LAT REV at destination.)

– **PERF DES page** . . . . . **CHECK**
Prior to descent, access PERF DES page and check ECON MACH/SPD.
If a different speed from ECON is required, insert that MACH or SPD into the ECON field. This new MACH and/or SPD is the one applicable for the descent path and TOD computation, and will be used for the managed speed descent profile (instead of ECON).
Below 10 000 ft a 250 kt SPD limit is defaulted in the managed speed descent profile: it may be deleted or modified if necessary on VERT REV at DEST.

– **PERF APPR page . . . . . COMPLETE/CHECK**
– Enter the QNH, temperature, and wind at destination.

Note : The entered wind should be the average wind given by the ATC or ATIS. Do not enter gust values, for example, if the wind is 150/20-25, insert the lower speed 150/20 (ground speed mini-function will cope with the gusts).

– Insert the MDA (MDH if QFE used) or DH, whichever applies.

R *Note : To avoid undershooting the MDA (MDH) during go-around, due to the aircraft*
R *inertia during pull-up, the flight crew should add an additional number of feet*
R *(defined by the operator) to the published MDA (MDH).*

WARNING
If QNH altimeter setting is used with an aircraft with QFE option, refer to 3.04.34.

Note : Changing the RWY or type of arrival (VOR, ILS) automatically erases the previous MDA/MDH or DH.

– Check or modify the landing configuration. Always select the landing configuration on the PERF APP page :
· The pilot may choose FLAP 3, rather than FLAP FULL for landing, depending on the available runway length and go-around performance, or if windshear/severe turbulence is considered possible on the approach.
· The ECAM may require a specific landing configuration, in case of a system failure:
* First read the VLS CONF FULL value on the PERF APP page to determine the VAPP (or use QRH 2.40).
* Then, keep CONF FULL on the PERF APP page, for landing in CONF 2 or FULL, or
* Select CONF 3 on the PERF APP page, for landing in CONF 3.
As a general rule, managed speed can be used if the landing configuration and the configuration selected on the PERF APP page are the same. (If they are not the same, the managed speed will not drop down to the approach speed).
– Check VAPP.
VAPP is computed as follows :
VAPP = VLS + 1/3 of headwind component. The wind correction is limited to a minimum of 5 knots and a maximum of 15 knots, and is derived from the wind entered on the PERF APPR page.
When using selected speed to compute VAPP, it is recommended that the same method be used to compute VAPP, as when in managed speed. The pilot can modify VAPP.
The new value will be taken into account for the ground speed mini-function.

– **PERF GO-AROUND page . . . . . CHECK/MODIFY**
Check THR RED ALT and ACC ALT, and modify if necessary.

– **RADIO NAV page** . . . . . **CHECK**
Set navaids, as required, and check idents on the NDs (VOR-ADF) and PFDs (ILS).
For an ILS approach, check the frequency and course of the selected ILS.
If a VOR/DME exists close to the airfield, select it and enter its ident in the BRG/DIST field of the PROG page, for NAV ACCY monitoring during descent.

– **SEC F PLN page** . . . . . **AS RQRD**
The SEC F-PLN should be set before the top of descent, either to an alternate runway for destination, or to the landing runway in case of circling. In all cases, the routing to the alternate should be available. If there is a last-minute runway change, then the flight crew only needs to activate the secondary F-PLN, without forgetting to set new MDA/DH and navaids.

– **APPROACH BRIEFING** . . . . . **PERFORM**
It is recommended to use FMGS pages as a guide for descent and approach briefing
· PERF page : Safe altitude is... Transition altitude is...
· RAD NAV page ILS, VOR, ADF + associated crossing altitudes.
· F PLN page to check STAR - APPR - missed approach.
· FMA MDA/DH.
· Go-around (Standard call/task sharing, Diversion decision).
· Terminal area topography to ensure a proper terrain awareness.
· Weather at destination.
· Fuel needed for diversion. Holding fuel avaibility (FUEL page).
· Landing configuration including ground spoilers, reverser application and autobrake selection.
· Runway condition, lighting, and dimensions
· For airlines having different A330 models, mention whether the aircraft is an A330-200, or an A330-300.
Awareness of the aircraft model may prevent tailstrike.

– **DESCENT CLEARANCE** . . . . . **OBTAIN**
When clearance is obtained, set the ATC-cleared altitude (FL) on FCU (considering also what is the safe altitude).
If the lowest safe altitude is higher than the ATC-cleared altitude, check with the ATC that this constraint applies.
If it is confirmed, set the FCU altitude to the safe altitude, until it is safe to go to the ATC-cleared altitude.

– **ANTI ICE PROTECTION** . . . . . **AS RQRD**
· During descent ENG ANTI ICE must be ON, when icing conditions are encountered.
· With engine ANTI ICE ON, the FADEC automatically controls continuous ignition and selects a higher idle thrust, which gives better protection against engine flame-out.
· IGNITION memo appears on ECAM.
· ANTI ICE ON reduces the descent path angle when at idle. The pilot can compensate for this by increasing descent speed, or by extending up to half speedbrakes.

DESCENT INITIATION

– **DESCENT . . . . . INITIATE**
The normal method of initiating the descent is to select DES mode at the FMGS calculated TOD.

■ **If ATC requires an early descent :**
DES mode is used and will guide the aircraft down with a reduced V/S in order to converge with the required descent path. (V/S - 1000 ft/min may also be used).

■ **If the descent is delayed by ATC :**
Beyond TOD, a DECELERATE message comes up on PFD and MCDU. This suggests to the crew to reduce the speed towards green dot speed (with ATC permission).
When cleared down for descent, select DES mode with managed speed active.

DESCENT MONITORING

– **PF MCDU . . . . . PROG/PERF DES**

R PF MCDU should be preferably set to PROG or PERF DES page :
· PROG page in order to get VDEV information
· PERF DES in order to get predictions down to any inserted altitude in DES/OP DES modes.

– **PNF MCDU . . . . . F-PLN**
With AP engaged the PF will usually make any required F-PLN revisions.

Note : On NDs a level off symbol ↘ is provided along F-PLN assuming current active AP/FD and A/THR modes.

– **DESCENT . . . . . MONITOR**
(Refer to FCOM 4 05.60)
– When flying in NAV mode, DES mode is normally used.

R The aircraft descends along the descent flight path : VDEV is provided on PFD and on PROG page, and may be thus monitored. All constraints of the FPLN will be taken into account for the guidance.

– When flying in HDG (TRK) modes, thus out of the lateral F-PLN, DES mode is not available.

R However VDEV is still provided on the PFD, and is useful whenever XTK is small (up to 5 NM)
The level ↘ symbols, as well as Energy Circle on ND may be used to monitor the descent.

R Predictions on MCDU assume a return to lateral FPLN and descent flight path.
Note that whenever the lateral mode is changed from NAV to HDG/TRK the vertical mode reverts to V/S at the value pertaining at the time of the mode change.

– From time to time, during stabilized descent FPA may be selected to check that the remaining distance to destination is approximately the FL change required divided by FPA in degrees.

FPA (°) = △ FL/DIST (NM)

DESCENT ADJUSTMENT

If RATE INCREASE is desired :
– PREFERABLY increase descent SPD (by use of selected speed) if comfort and ATC permit. It is economically better (Time/Fuel).
– Maintain high SPD as long as possible (SPD LIM may be cleared, subject to ATC clearance).
– If aircraft is high with high SPD, it is more efficient to keep high speed until ALT* and THEN decelerate rather than to mix descent and deceleration.
– If A/C goes below the desired profile, use SPEED V/S mode to adjust rate of descent.

– **SPEEDBRAKES** . . . . . **AS RQRD**
In OPEN DES : Use speedbrakes to increase the rate of descent. The pilot may use up to half speedbrake extension to maintain the required rate of descent, when engine anti-ice is used. In DES mode : If the aircraft is on, or below, the flight path and the ATC requires a higher rate of descent, do not use speedbrakes because the rate of descent is dictated by the planned flight path. Thus, the A/THR may increase thrust to compensate for the increase in drag. In this case, use OPEN DES with speedbrakes.

– **RADAR TILT** . . . . . **ADJUST**
Every 10000 feet of the planned descent, and down to about 15000 feet, adjust tilt upwards to eliminate ground clutter on the upper part of the ND. Every 5000 feet below 15000 feet, adjust tilt angle one degree upwards, to keep the ND relatively free of ground clutter.

– **BARO REF** . . . . . **SET**
R · Set QNH on the EFIS control panel and on the standby altimeter, when approaching the transition level and when cleared for an altitude.
· Crosscheck baro settings and altitude readings.

Note : When operating in low OAT, altitude corrections, as defined in 3.05.05 page 6, should be considered.

● **If EGPWS available :**

R – **TERR ON ND** . . . . . **ON**
R If the use of radar is required, consider selecting radar display on PF side, and TERR
R ON ND on PNF side only.

– **ECAM STATUS** . . . . . **CHECK**
· ECAM STATUS page automatically appears, if not empty, when the BARO setting is selected.
· Check ECAM status page before completing approach checks. Take particular note of any degradation in landing capability, or any other aspect affecting approach and landing.

● **At 10000 feet :**

– **LAND LIGHTS** . . . . . **ON**

– **SEATBELTS** . . . . . **AS RQRD**

– **EFIS option** . . . . . **CSTR**

– **LS pushbutton** . . . . . **AS RQRD**
Select LS, if an ILS or LOC approach is intended. PFD displays the LOC and glide scales and deviation symbol, if there is a valid ILS signal.

– **RAD NAVAIDS . . . . . SELECTED/IDENTFIED**
Ensure that appropriate radio navaids are tuned and identified.

– **NAV ACCURACY . . . . . CHECK**
On aircraft equipped with GPS primary, no navigation accuracy check is required as long as GPS PRIMARY function is available.
Otherwise, crosscheck NAV ACCURACY using the PROG page (BRG/DIST computed data) and the ND (VOR/DME raw data).
The navigation accuracy check determines which autopilot mode the flight crew should use for the approach, and the type of displays to be shown on the ND.

GENERAL

For precision approaches and more information on how to use the FMGS, see FMGS pilot's guide (Refer to 4 05.70) . The described approach procedures assume the use of managed speed guidance which is recommended.

INITIAL APPROACH

– **ENG START selector** . . . . . **AS RQRD**
Select IGN if runway covered with standing water, heavy rain or severe turbulence is expected in approach or go around area.

– **SEAT BELTS** . . . . . **ON/AUTO**

R – **APPROACH PHASE** . . . . . **CHECK/ACTIVATE**
· If in NAV, when overflying DECEL pseudo waypoint, the APPR phase will activate automatically.
· If in HDG/TRK mode, at approximately 15 NM from touchdown activate and confirm
R APPROACH phase on MCDU. (PERF DES page).

– **POSITIONING** . . . . . **MONITOR**
· In NAV mode, use V DEV information on PFD and PROG page.
· In HDG or TRK mode, use the energy circle on ND representing the required distance to land.

– **MANAGED SPEED** . . . . . **CHECK**
If ATC requires a particular speed to be flown then use selected speed. When the ATC speed constraint (e.g. "maintain 170 knots to the outer marker") no longer applies, return to managed speed.

– **SPEED BRAKES** . . . . . **AS RQRD**

– **NAV ACCURACY** . . . . . **MONITOR**

· When GPS PRIMARY is available, no NAV ACCURACY monitoring is required.

· When GPS PRIMARY is lost, check the PROG page to verify that the required navigation accuracy is appropriate to the flight phase. Monitor NAV accuracy, and be prepared to change ILS interception strategy. If NAV ACCUR DOWNGRAD occurs, use raw data to crosscheck navigation accuracy.

Navigation accuracy determines which autopilot mode the flight crew should use, the type of displays to be shown on the ND, and the use of EGPWS.

R

NAVIGATION ACCURACY	ND		AP/FD mode	TERR pushbutton
	PF	PNF		
GPS PRIMARY	ARC or ROSE NAV with navaid raw data		NAV	ON
NAV ACCUR HIGH				
NAV ACCUR LOW and NAV ACCURACY check ≤ 1 NM				
GPS PRIMARY LOST and NAV ACCUR LOW and NAV ACCURACY check > 1 NM	ROSE ILS	ARC or ROSE NAV or ROSE ILS with navaid raw data	HDG or TRK	OFF
GPS PRIMARY LOST and Aircraft flying within unreliable radio navaid area				

– **RADAR TILT** . . . . . **ADJUST**

Increase tilt, as required (+ 3° to + 4°).

– **APPROACH CHECKLIST** . . . . . **COMPLETE**

INTERMEDIATE/FINAL APPROACH (ILS approach entered in the flight plan)

The objective is to be stabilized on the final descent path at VAPP, thrust above idle, with landing configuration at 1000 feet after continuous deceleration on the glideslope.

R To be stabilized, all of the following conditions must be achieved prior to, or upon, reaching
R this stabilization height :
R – The aircraft is on the correct lateral flight plan,
R – The aircraft is in the desired landing configuration,
R – The thrust is stabilized above idle, to maintain the target speed on the desired glide path,
R – No excessive flight parameter deviation.

The advantages are :
· Lower fuel consumption ; lower noise levels ; time saving
· Flexibility and ability to vary speed to suit ATC.

If the aircraft is not stabilized on the approach and in landing configuration, at 1000 feet in instrument conditions, or 500 feet in visual conditions, or as restricted by airline
R policy/regulations, a go-around must be initiated.

– **APPR pushbutton on FCU . . . . . PRESS**
· APPR pushbutton is to be pressed only when ATC clears the aircraft for the approach. This arms LOC and G/S modes.
· LOC and/or G/S capture modes will engage, at the earliest, 3 sec. after arming them.

Note : ICAO defines the envelope where the quality of the G/S signal ensures a normal capture. This envelope is within 10 NM, +/– 8 deg of the centerline of the ILS glide path and up to 1.75 Θ and down to 0.3 Θ (Θ = nominal glide path angle). When arming the approach well outside of the normal G/S capture envelope, a spurious G/S engagement may occur due to a wrong G/S deviation signal. This spurious G/S capture will order a pitch up, if the aircraft is below the glide beam, and a pitch down attitude, if the aircraft is above the glide beam. Whenever the pilot notices the pitch movement, or the spurious G/S*, or the trajectory deviation, he will immediately disconnect the AP, if engaged, to re-establish a normal attitude and will disengage APPR mode. It is then recommended to arm/rearm APP (ILS) mode within the normal capture zone.*

– **Both AP . . . . . ENGAGE**
When APPR mode is selected, both autopilots should be engaged.

AT GREEN DOT SPEED

– **ORDER . . . . . "FLAPS 1"**

– **FLAPS 1 . . . . . SELECT**

– **CONFIRM/ANNOUNCE** . . . . . **"FLAPS 1"**
· FLAPS 1 should be selected no later than 3 NM prior to FAF (Final Approach Fix).
· Check deceleration towards "S" speed.
· The aircraft will reach, or be established on, the glideslope with FLAPS 1 and S speed at or above 2000 feet AGL.
· In the event that aircraft speed is significantly higher than S on the G/S, or the aircraft does not decelerate on the G/S, extend the landing gear to slow down the aircraft. Use of speedbrakes is not recommended, as it will cause an undesired VLS increase.

R – **TCAS Mode selector** . . . . . **TA or TA/RA**
FAA recommends selecting TA only mode :
· In case of known nearby traffic, which is in visual contact ;
· At particular airports, and during particular procedures identified by an operator as having a significant potential for unwanted, or inappropriate RAs (Closely-spaced, parallel runways, converging runways, low terrain along the final approach...).

– **FMA** . . . . . **CHECK**

– **LOC CAPTURE** . . . . . **MONITOR**

– **ANNOUNCE** . . . . . **« LOC* »**

– **G/S CAPTURE** . . . . . **MONITOR**

● **If above the glideslope :**

– **V/S mode** . . . . . **SELECT**

– **FCU ALTITUDE** . . . . . **SET ABOVE A/C ALTITUDE**

– **ANNOUNCE** . . . . . **« G/S* »**

– **GO AROUND ALTITUDE** . . . . . **SET**
Set GA altitude on FCU.

Note : · If the aircraft intercepts the ILS above radio altimeter validity range (no radio altitude indication available on the PFD), CAT 1 is displayed on FMA. Check that the FMA displays the correct capability for the intended approach when the aircraft is below 5000 feet.

AT 2000 FT AGL MINIMUM

– **ORDER** . . . . . **"FLAPS 2"**

– **FLAPS 2** . . . . . **SELECT**

– **CONFIRM/ANNOUNCE . . . . . "FLAPS 2"**
· Check deceleration towards F speed.
· If the ILS glideslope is intercepted from below 2000 feet AGL, select FLAPS 2 at one dot below the glideslope.
· In the event that the aircraft speed is significantly higher than S on the G/S, or the aircraft does not decelerate on the G/S, extend landing gear in order to slow down the aircraft. Speed brake use is not recommended.

WHEN FLAPS ARE AT 2

– **ORDER . . . . . "GEAR DOWN"**

– **L/G DOWN . . . . . SELECT**

– **GROUND SPOILERS . . . . . ARM**

– **AUTO BRK . . . . . AS RQRD**
The Use of the autobrake is recommended.
Use of MAX mode is not recommended at landing.
On short or contaminated runways, use MED mode.
On long and dry runways, LO mode is recommended.

Note : If, on very long runways, the pilot anticipates that braking will not be needed, use of the autobrake is unnecessary.

Press the appropriate pushbutton, according to runway length and condition, and check that the related ON light comes on.

– **CONFIRM/ANNOUNCE . . . . . "GEAR DOWN"**

WHEN LANDING GEAR IS DOWN

– **ORDER** . . . . . **"FLAPS 3"**

– **FLAPS 3** . . . . . **SELECT**
· Select FLAPS 3 below VFE.

– **CONFIRM/ANNOUNCE** . . . . . **"FLAPS 3"**

– **ECAM WHEEL page** . . . . . **CHECK**
· The ECAM WHEEL page appears below 800 feet, or at landing gear extension.
· Check for three landing gear green indications.

– **ORDER** . . . . . **"FLAPS FULL"**

– **FLAPS FULL** . . . . . **SELECT**
· Select FLAPS FULL below VFE.
· It is recommended to retract the speedbrakes before selecting FLAPS FULL.

– **CONFIRM/ANNOUNCE** . . . . . **"FLAPS FULL"**
Check deceleration towards VAPP.

– **A/THR** . . . . . **CHECK IN SPEED MODE OR OFF**

– **WING ANTI ICE** . . . . . **OFF**
Switch WING ANTI ICE ON, only if severe icing conditions exist.

– **EXTERIOR LIGHTS** . . . . . **SET**
Set NOSE switch to TAXI
RWY TURN OFF switch to ON, and
LAND switch to ON

– **SLIDING TABLE** ◁ . . . . . **STOWED**

– **LDG MEMO** . . . . . **CHECK NO BLUE LINE**

– **CABIN REPORT** . . . . . **OBTAIN**

– **CABIN CREW** . . . . . **ADVISE**

– **LANDING C/L** . . . . . **COMPLETE**

– **FLIGHT PARAMETERS** . . . . . **CHECK**
PF announces any FMA modification (LAND green at 350 feet and any other change).
PNF calls out if :
· the speed, becomes lower than speed target – 5 knots or greater than speed target + 10 knots.
· the pitch attitude becomes lower than 0° or greater than 10° nose up.
· the bank angle becomes greater than 7°.
· the descent rate becomes greater than 1000 ft/min.
· excessive LOC or GLIDE deviation occurs.

AT DH + 100 FT (or MDA/MDH + 100 FT) :

– **MONITOR or ANNOUNCE** . . . . . **« ONE HUNDRED ABOVE »**

AT DH (or MDA/MDH)

– **MONITOR or ANNOUNCE** . . . . . **« MINIMUM »**

– **ANNOUNCE** . . . . . **« LANDING » or « GO AROUND/FLAPS »**
Maintain a stabilized flight path down to flare.
At 50 feet, one dot below the glideslope is 14 feet below the glideslope.
Do not duck under the glideslope.

INITIAL APPROACH

– **ENG START selector** . . . . . **AS RQRD**
Select IGN if the runway is covered with standing water, or heavy rain, or if severe turbulence is expected in the approach or go-around area.

– **SEATBELTS** . . . . . **ON/AUTO**

– **APPROACH PHASE** . . . . . **ACTIVATE**
· In NAV mode, the APPR phase automatically activates at the DECEL pseudo waypoint.
· In HDG or TRK mode, manually activate the APPR phase on the PERF APPR page, when the distance to land is approximately 15 NM.

– **POSITIONING** . . . . . **MONITOR**
· In NAV mode, use VDEV information on the PFD and PROG page.
· In HDG or TRK mode, use the energy circle displayed on ND, representing the required distance to land.

– **MANAGED SPEED** . . . . . **CHECK**
If the ATC requires a particular speed, use selected speed. When the ATC speed constraint no longer applies, return to managed speed.

– **SPEEDBRAKES** . . . . . **AS RQRD**

– **NAVIGATION ACCURACY . . . . . MONITOR**

· When GPS PRIMARY is available, no accuracy is required.

· When GPS PRIMARY is lost, check the PROG page to ensure that the required navigation accuracy is appropriate to the phase of flight. Perform a navigation accuracy check (as described in 3.03.15).

If the approach is stored in the navigation database, determine the strategy to be used for the final approach, according to the table below :

R

NAVIGATION ACCURACY	Approach guidance	ND		AP/FD mode	TERR pushbutton
		PF	PNF		
GPS PRIMARY	Managed***	ARC or ROSE NAV * With navaid raw data		NAV-FPA or APP-NAV/ FINAL ***	ON
NAV ACCUR HIGH					
NAV ACCUR LOW and NAV ACCURACY check ≤ 1NM					
GPS PRIMARY LOST and NAV ACCUR LOW and NAV ACCURACY check > 1 NM	Selected	ROSE VOR **	ARC or ROSE NAV or ROSE VOR ** With navaid raw data	TRK-PFA	OFF
GPS PRIMARY LOST and aircraft flying within unreliable radio navaid area					

(*) For VOR approaches, one pilot may select ROSE VOR.
(**) For LOC approaches, select ROSE ILS.
(***) Managed vertical guidance can be used, provided the approach coding in the navigation database has been validated.

R *Note : 1. During approach in overlay to a conventional radio navaid procedure, monitor raw*
R *data. If raw data indicates unsatisfactory managed guidance, revert to selected*
R *guidance.*
2. The pilot can continue to fly a managed approach, after receiving a NAV ACCUR DOWNGRADED message, if raw data indicates that the guidance is satisfactory.

– **RADAR TILT . . . . . ADJUST**

Increase tilt, as required (+ 3° to + 4°).

– **APPROACH CHECKLIST . . . . . PERFORM**

INTERMEDIATE/FINAL APPROACH

R ● **For RNAV approach :**

R – **GPS 1+2 on GPS MONITOR page . . . . . CHECK BOTH IN NAV**

R – **GPS PRIMARY on PROG page . . . . . CHECK AVAILABLE**

R ● **If GPS PRIMARY is not available**

R – **RNP for approach . . . . . CHECK/ENTER**

R – **HIGH accuracy . . . . . CHECK**

R *Note : RNAV approach without GPS is subject to a specific operational approval.*

● **For approach in managed vertical guidance :**

– **APPR pushbutton on FCU . . . . . PRESS**
Once cleared for the approach, press the pushbutton when flying towards the FAF. Check that APPR NAV is engaged, FINAL is armed, and the VDEV scale is on the PFD.

Note : For instructions for switching from a non ILS to an ILS approach, see the FMGS pilot's guide. (Refer to 4.05.70)

AT GREEN DOT SPEED

– **ORDER . . . . . "FLAPS 1"**

– **FLAPS 1 . . . . . SELECT**

– **CONFIRM/ANNOUNCE . . . . . "FLAPS 1"**

– **TCAS Mode Selector . . . . . TA OR TA/RA**
· See ILS approach (Refer to 3.03.18)

– **ND DISPLAY . . . . . SELECT RANGE/MODE**

AT S SPEED

– **ORDER . . . . . "FLAPS 2"**

– **FLAPS 2 . . . . . SELECT**

– **CONFIRM/ANNOUNCE . . . . . "FLAPS 2"**

WHEN FLAPS ARE AT 2

– **ORDER** . . . . . **"GEAR DOWN"**

– **L/G DOWN** . . . . . **SELECT**

– **GROUND SPOILERS** . . . . . **ARM**

– **AUTO BRK** . . . . . **AS RQRD**
Use of the autobrake is recommended.
The use of MAX mode is not recommended at landing.
On short or contaminated runways, use MED mode.
On long and dry runways, LO mode is recommended.

Note : If, on very long runways, the pilot anticipates that braking will not be needed, autobrake use is unnecessary.

Firmly press the appropriate pushbutton, depending on the runway length and condition, and check that the related ON light comes on.

– **CONFIRM/ANNOUNCE** . . . . . **"GEAR DOWN"**

WHEN LANDING GEAR IS DOWN

– **ORDER** . . . . . **"FLAPS 3"**

– **FLAPS 3** . . . . . **SELECT**
· Select FLAPS 3 below VFE.

– **CONFIRM/ANNOUNCE** . . . . . **"FLAPS 3"**

– **ECAM WHEEL page** . . . . . **CHECK**
· The ECAM WHEEL page appears below 800 feet, or at landing gear extension.
· Check for three landing gear green indications.

– **ORDER** . . . . . **"FLAPS FULL"**

– **FLAPS FULL** . . . . . **SELECT**
· Select FLAPS FULL below VFE. VFE – 15 knots is recommended to minimize flaps wear.
· Retract the speedbrakes before selecting FLAPS FULL to avoid an unexpected pitch down when the speedbrakes automatically retract.

– **CONFIRM/ANNOUNCE** . . . . . **"FLAPS FULL"**
· Check deceleration towards VAPP.
R · Check correct TO waypoint on the ND.

MANAGED VERTICAL GUIDANCE	SELECTED VERTICAL OR SELECTED LATERAL AND VERTICAL GUIDANCE
. **After the FAF :** **– FINAL APP . . . . . CHECK** Check FINAL APP green on the FMA. **– GO AROUND ALTITUDE . . . . . SET** Set, when below the go-around altitude.	. **At FAF :** **– FPA for final approach . . . . . SET** . **After the FAF :** **– GO AROUND ALTITUDE . . . . . SET** Set, when below the go-around altitude.
– POSITION/FLIGHT PATH . . . . MONITOR · **For approach in overlay to a conventional radio navaid procedure :** Use radio navaid raw data and altitude to monitor the lateral and vertical navigation. If the navigation is unsatisfactory, revert to selected guidance. In particular, monitor the vertical guidance, using altitude indication versus radio navaid position, and be prepared to revert to NAV-FPA, if the vertical guidance is unsatisfactory. · **For RNAV approach :** Monitor VDEV and FPV (on the PFD) and XTK error (on the ND). Use altitude indication versus distance to the runway to monitor the vertical navigation. If the vertical guidance is unsatisfactory, revert to NAV/FPA or consider the go-around. If the lateral guidance is unsatisfactory, perform a go-around.	**– POSITION/FLIGHT PATH . . MONITOR/ADJUST** · **For approach in overlay to a conventional radio navaid procedure :** Use radio navaid raw data to monitor the lateral navigation. Using altitude indication versus radio navaid position, adjust the FPA, as necessary, to follow the published descent profile, taking into account the minimum altitudes. Do not use the FMGC VDEV on the PFD. If the lateral navigation is unsatisfactory, revert to TRK/FPA. · **For RNAV approach :** Monitor XTK error on ND. Using altitude indication versus distance to the runway, adjust the FPA as necessary to follow the published descent profile, taking into account the minimum altitudes. If the lateral guidance is unsatisfactory, perform a go-around.

– **A/THR** . . . . . **CHECK IN SPEED MODE OR OFF**

– **WING ANTI ICE** . . . . . **OFF**
Switch WING ANTI ICE ON, only in severe icing conditions.

– **EXTERIORS LIGHTS** . . . . . **SET**
Set NOSE switch to TAXI, RWY TURN OFF switch to ON, and LAND switch to ON.

– **SLIDING TABLE** . . . . . **STOW**

– **LDG MEMO** . . . . . **CHECK NO BLUE LINE**

– **CABIN REPORT** . . . . . **OBTAIN**

– **CABIN CREW** . . . . . **ADVISE**

– **LANDING CHECKLIST** . . . . . **COMPLETE**

– **FLIGHT PARAMETERS** . . . . . **CHECK**
PF announces any FMA modification.
PNF calls out :

R – "SPEED", when the speed goes below Vapp – 5 knots, or goes above the speed target + 10 knots.
R – "SINK RATE", when V/S is greater than – 1000 feet/minute.
R – "BANK", when the bank angle goes above 7 degrees.
R – "PITCH", when the pitch attitude goes below 0 degrees, or goes above + 10 degrees.
R – "COURSE", when greater than 1/2 dot (VOR) or 5 degrees (ADF).
R – "_ FT HIGH (LOW)" at altitude checkpoints.

R ● **AT ENTERED MDA/MDH + 100 FT :**

– **MONITOR or ANNOUNCE . . . . . "ONE HUNDRED ABOVE"**

R ● **AT ENTERED MDA/MDH**

– **MONITOR or ANNOUNCE . . . . . "MINIMUM"**

● **If ground references are visible :**

– **ANNOUNCE . . . . . "LANDING"**

– **AP . . . . . OFF**
Continue, as with a visual approach (Refer to 3.03.20).

● **If ground references are not visible :**

– **ANNOUNCE . . . . . "GO AROUND/FLAPS"**
Begin a go-around.

Note : 1. In managed guidance (FINAL APP mode engaged), when the aircraft reaches MDA (MDH) – 50 feet or MAP (whichever occurs first), the autopilot automatically disengages.

2. In selected guidance, if ground references are not visible when the aircraft reaches MDA, the pilot should make an immediate go-around. However, if the distance to the runway is not properly assessed, a step descent approach may be considered, and a level-off at MDA may be performed while searching for visual references. If the pilot has no visual reference at MAP, at the latest, he must begin a go-around.

CIRCLING APPROACH

For a circling approach, the flight crew should prepare the flight plan as follows :
Primary flight plan : Introduce the instrument approach
Secondary flight plan : – Copy the ACTIVE F-PLN
– Revise the landing runway
The aircraft should circle in CONF 3 at F speed.
Upon reaching MDA/MDH :
– Push the ALT pushbutton.
– Search for visual references.

- **If the flight crew finds no visual reference :**

  – **AT MAP : Initiate go-around**

- **If the flight crew finds sufficient visual references :**

  – **Select TRK for downwind**

  – **Early on downwind : Activate SEC F-PLN**

  CAUTION
  The PNF should activate the SEC F-PLN.
  The PF should maintain visual contact during all the circling.

  – **Disengage autopilot before reaching the base leg.**

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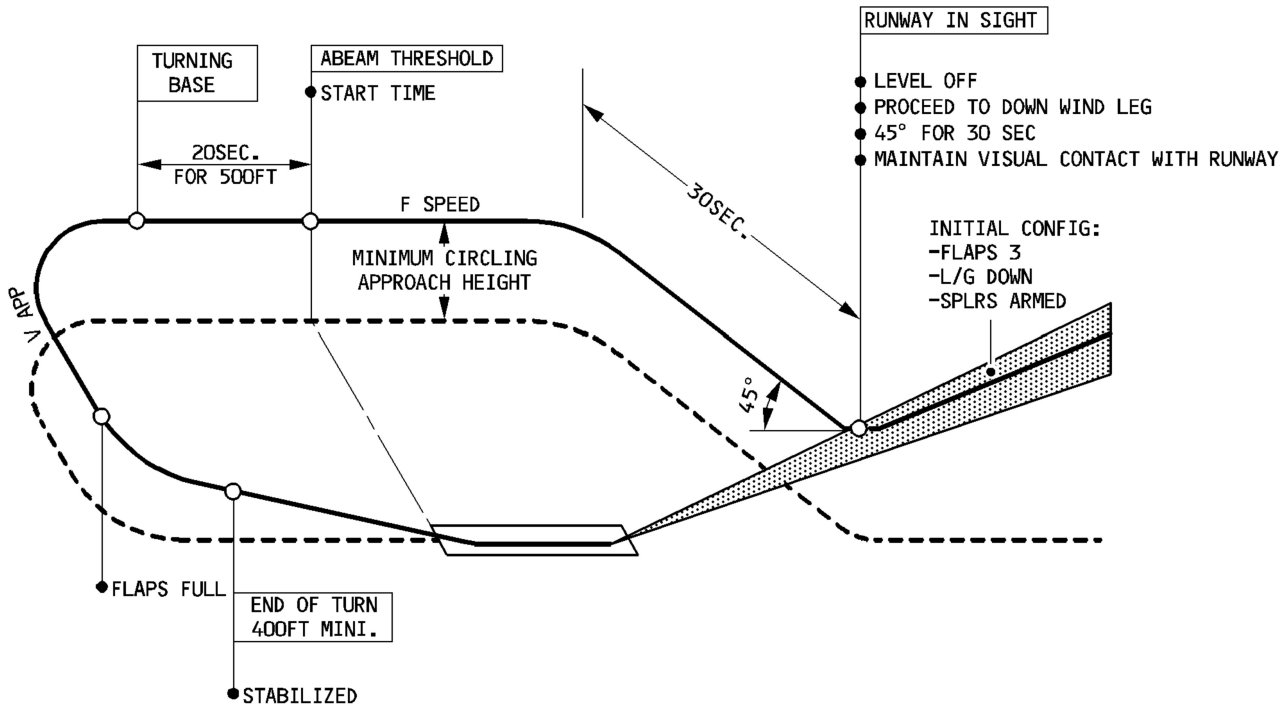
LOW VISIBILITY CIRCLING APPROACH



OBJECTIVE

Perform the approach on a nominal 3 degree glideslope using visual references. Approach to be stabilized by 500 feet AGL on the correct approach path, in the landing configuration, at VAPP.
Method :
- The autopilot is not used.
- Both FDs are off.
- FPV use is recommended.
- A/THR use is recommended with managed speed.

R Bear in mind the possible risk of optical illusions due to hindered night vision.

VISUAL CIRCUIT

INITIAL/INTERMEDIATE APPROACH

The flight plan selected on the MCDU should include the selection of the landing runway. The downwind leg might also be part of the Flight plan. This may be a useful indication of the aircraft position in the circuit on the ND.
However, visual references must be used.
Therefore, at the beginning of the downwind leg :

- **Manually ACTIVATE APPR.**
- **Select FDs to OFF.**
- **Select TRK-FPA to display FPV.**
- **Check A/THR active in speed mode.**
  Downwind leg extension 45 seconds (± wind correction)
  Turn into base leg with a maximum of 30° bank. Descent with appropriate FPA, in FLAPS 2, at F speed.

FINAL APPROACH

- The speed trend arrow and FPV help the flight crew make timely and correct thrust settings (if in manual thrust), and approach path corrections. Avoid descending through the correct approach path with idle thrust. (Late recognition of this situation without a prompt thrust increase may lead to considerable speed decay and altitude loss).
- Have the aircraft "stabilized" by 500 feet AGL, on the correct approach path at VAPP (or ground speed mini) with the appropriate thrust applied. If not stabilized, a go-around should be considered.
- Avoid any tendency to "duck under" in the late stages of the approach.
- Avoid destabilizing the approach in the last 100 feet, in order to have the best chance of performing a good touchdown at the desired position.

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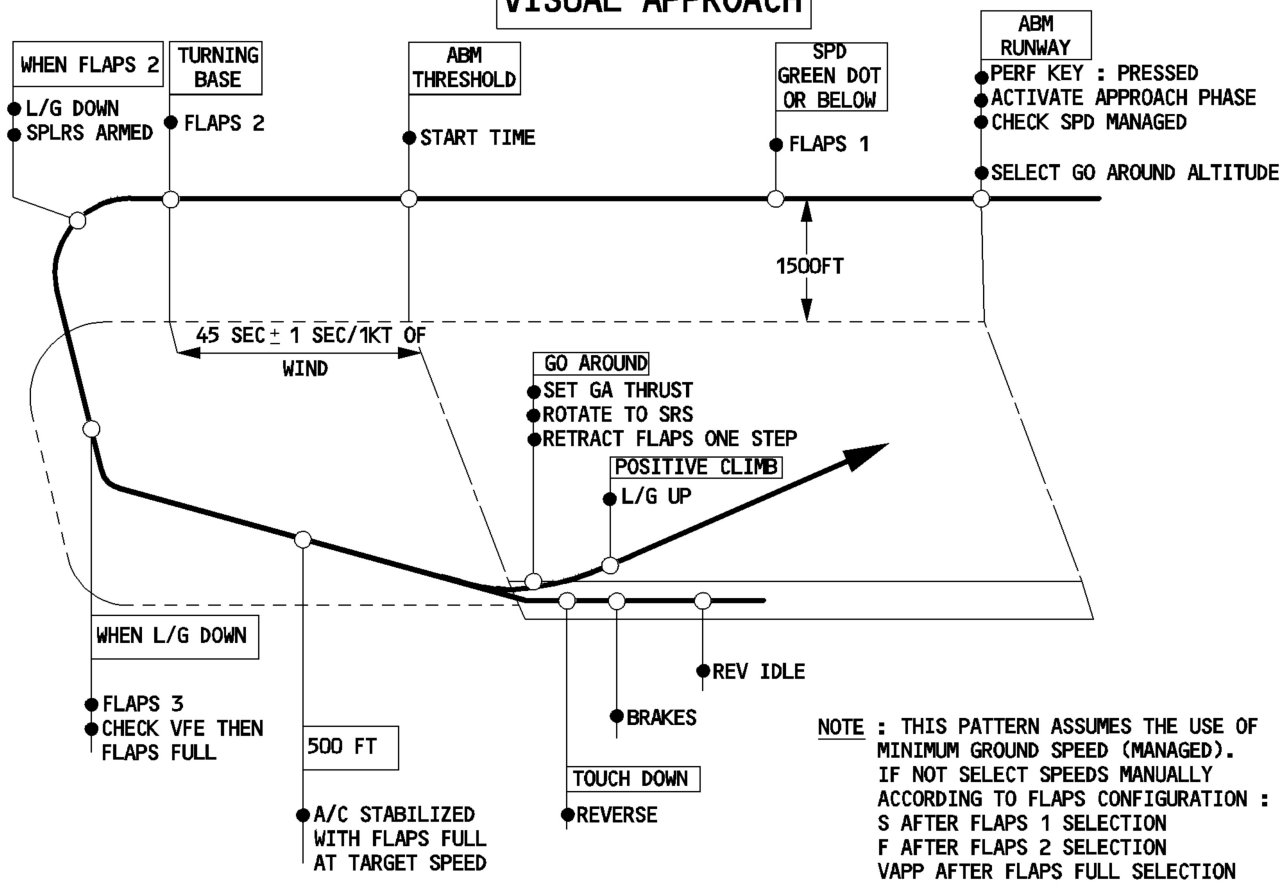
VISUAL APPROACH



NOTE : THIS PATTERN ASSUMES THE USE OF MINIMUM GROUND SPEED (MANAGED).
IF NOT SELECT SPEEDS MANUALLY ACCORDING TO FLAPS CONFIGURATION :
S AFTER FLAPS 1 SELECTION
F AFTER FLAPS 2 SELECTION
VAPP AFTER FLAPS FULL SELECTION

LANDING

The cockpit cut-off angle is 20 degrees.

● **At about 30 feet :**

– **FLARE** . . . . . **PERFORM**

R – **ATTITUDE** . . . . . **MONITOR**
R The PNF should monitor the attitude, and call out :
R – "PITCH, PITCH", if the pitch angle reaches 7.5°.
R – "BANK, BANK", if the bank angle reaches 7°.

– **THRUST levers** . . . . . **IDLE**
In manual landing conditions, the "RETARD" callout is generated at 20 feet RA, as a reminder. Start a gentle progressive flare, and allow the aircraft to touch down without prolonged float.

Crosswind landings

· The preferred technique is to use the rudder to align the aircraft with the runway heading, during the flare, whilst using lateral control to maintain the aircraft on the runway centerline.

· For a crosswind landing, routine use of into wind aileron is not recommended, because sidestick deflection commands the roll rate until touchdown.
In strong crosswind conditions, small amounts of lateral control may be used to maintain the wings level. This lateral stick input must be reduced to zero at first main landing gear touchdown.

Ground clearance

– Avoid flaring high.
R – A tailstrike occurs, if the pitch attitude exceeds : 11° (landing gear compressed) ; 16°
R (landing gear extended).
– A wingtip, or engine scrape occurs, if the roll angle exceeds 16.5°.

Derotation

Derotation should be started, as soon as the main wheels have touched down. In flare law, the aircraft will tend to nose down naturally, as the aft stick applied for flare is relaxed towards neutral. A comfortable nosewheel touchdown will be achieved, if the stick is maintained just aft of neutral during derotation. If brakes are applied with the nose high, the pilot must be prepared to use up to full backstick to restrain the nose down pitching moment.

– **REV** . . . . . **PULL**
· Pull to reverse idle at main landing gear touchdown (not before).
· When REV green indicated on ECAM select MAX REV.
· In case of engine failure, the use of the remaining reverser is recommended.
· If the airport regulations restrict the use of reversers, maintain reverse idle until taxi speed is reached.
· Lower the nose wheel without undue delay if MED is selected.
· Braking may be commenced before nose wheel is down if required for performance reasons, but when comfort is the priority it should be delayed until the nose wheel has touched down.
· During roll-out, sidestick inputs (either lateral or longitudinal) should be avoided. If directional control problems are encountered, reduce thrust to reverse idle until directional control is satisfactory.
· After reverse thrust is initiated, a full stop landing must be made.

– **GROUND SPOILERS** . . . . . **CHECK**
Check ground spoilers deployed after touch down on ECAM WHEEL page. Announce
R "Ground spoilers" then "Reverse green".

– **DIRECTIONAL CONTROL** . . . . . **ENSURE**
· Use rudder pedals for directional control
· Do not use nose wheel steering control handle before taxi speed is reached.

– **BRAKES** . . . . . **AS RQRD**
Monitor autobrake if on. If required use pedal braking.

● **At 70 knots :**

– **REVERSE levers** . . . . . **IDLE**

CAUTION

The use of high levels of reverse thrust at low airspeed should be avoided since the distortion of the air flow caused by gases re-entering the compressor can cause engine stalls which may result in excessive EGT.

● **At taxi speed :**

– **REVERSE levers . . . . . STOW**
Stow the reversers when taxi speed is reached and before leaving the runway.

CAUTION

On taxiways, the use of reversers, even restricted to idle thrust, may have the following effects :
– Fine sand and debris may be ingested which might be detrimental to both the engine and airframe systems.
– On snow covered areas, snow will be recirculated into the air inlet, which may result in engine flame out or roll back.Except in an emergency, reverse thrust should not be used to control aircraft speed while taxiing.

R ● **Before 20 kt :**
R
R – **AUTO BRK . . . . . DISENGAGE**
R Disengage the autobrake to avoid some brake jerks at low speed.

GO AROUND

Apply the following three actions simultaneously :

– **THRUST LEVERS** . . . . . **TOGA**

– **ANNOUNCE** . . . . . **"GO AROUND – FLAPS"**

– **ROTATION** . . . . . **PERFORM**
· Rotate the aircraft to achieve a positive rate of climb, and establish the required pitch attitude, as directed by SRS pitch command bar.
· Check and announce FMA : TOGA, SRS, GA TRK.

Note : The MCDU PERF page automatically switches to the GO AROUND phase.

– **FLAPS** . . . . . **RETRACT ONE STEP**

– **ANNOUNCE** . . . . . **"POSITIVE CLIMB"**

– **ORDER** . . . . . **"GEAR UP"**

– **L/G UP** . . . . . **SELECT**

– **CONFIRM/ANNOUNCE** . . . . . **"GEAR UP–FLAPS"**

Note : Consider retarding to CL detent, if TOGA thrust is not required.

– **NAV or HDG mode** . . . . . **SELECT**

Note : Go-around may be achieved with both AP engaged. Whenever any other mode engages AP 2 disengages.

● **At go-around thrust reduction altitude (LVR CLB flashing on FMA) :**

R – **THRUST LEVERS** . . . . . **CL**

- **At go-around acceleration altitude :**
  - **Monitor target speed increases to green dot.**
  - **If target speed does not increase to green dot :**
    - **FCU ALT . . . . . CHECK and PULL**
  - **Retract flaps on schedule.**

    Note : Consider the next step :
    - *Engage NAV mode, to follow the published missed approach procedure, or*
    - *Prepare for a second approach by selecting the ACTIVATE APP PHASE, and CONFIRM on the PERF page.*

AFTER LANDING

– **LAND LIGHTS** . . . . . **OFF**
Retract landing lights, unless they are needed.

R Set the STROBE lights to AUTO, when leaving the runway.

– **GROUND SPOILERS** . . . . . **DISARM**

– **FLAPS** . . . . . **RETRACT**
· Set the FLAP lever to position 0.
· If the approach was made in icing conditions, or if the runway was contaminated with slush or snow, do not retract the flaps until after engine shutdown, and after the ground crew has confirmed that flaps and slats are clear of obstructing ice.
· On ground, hot weather conditions may cause overheating to be detected around the bleed ducts in the wings, resulting in "AIR L(R) WING LEAK" warnings. Such warnings may be avoided during transit by keeping the Slats in Configuration 1, when the OAT is above 30°C.

– **ENG START selector** . . . . . **NORM**

– **ATC** . . . . . **STBY/OFF**
This is not applicable to transponder panels equipped with an AUTO position, if AUTO is selected.

– **TCAS Mode selector** ◁ . . . . . **STBY**
This is only applicable to transponder panels equipped with an AUTO position, if AUTO is selected.

– **ANTI ICE** . . . . . **AS RQRD**
If engine anti-ice is used, take care to control taxi speed, especially on wet or slippery surfaces (ground idle is increased).

– **APU** . . . . . **START**
APU START may be delayed until just prior to engine shutdown.

– **RADAR** . . . . . **OFF/STBY**

– **PREDICTIVE WINDSHEAR SYSTEM** ◁ . . . . . **OFF**
Switching the radar and predictive windshear system OFF after landing avoids risk of radiating persons at the gate area.

– **BRAKE TEMPERATURE . . . . . CHECK**

· Check brake temperature on the ECAM WHEEL page for discrepancies and high temperature.

· If brake fans are installed (◁) :

R Brake fans selection should be delayed for a minimum of about 5 minutes, or done just before stopping at the gate (whichever occurs first), to allow thermal equalization and stabilization, and thus avoid oxidation of brake surface hot spots.
However, when turnaround times are short, or brake temperatures are likely to exceed 500°C, use the brake fans, disregarding possible oxidation phenomenon.

· Refer to 3.04.32 for the brake temperature limitations requiring maintenance actions.

– **AFTER LANDING CHECKLIST . . . . . COMPLETE**

Ensure that the after landing checks are completed, once the aircraft has cleared the runway.

PARKING

– **PARKING BRAKE ACCU PRESS . . . . . CHECK**
The ACCU PRESS indication must be in the green band. In case of low accumulator pressure, chocks are required before engines shutdown.

– **PARKING BRK . . . . . ON**
· Above 500°C, parking brake application should be avoided, unless operationally necessary.

R – **ANTI-ICE . . . . . OFF**

– **APU BLEED . . . . . ON**
Select APU bleed ON just before engine shutdown to prevent engine exhaust fumes from entering the air conditioning.

– **ENG MASTER switch 1 and 2 . . . . . OFF**
· It is suggested that the engine be operated at, or near, idle for a 3–minute cooling period after landing, to minimize the potential for oil coking in the main engine-bearing compartment.
· A cooling period, between 90 seconds and three minutes, may be utilized at the airline's discretion, based on its experience.
· If APU is not available, set EXT PWR at ON before setting the ENG MASTER OFF.
· Check that engine parameters decrease.
· The DOOR/OXY page is displayed on the lower ECAM display.

– **GROUND CONTACT . . . . . ESTABLISH**
Establish ground communication
Check chocks in place.

– **SLIDE DISARMED . . . . . CHECK**
Check slides disarmed on the ECAM DOOR/OXY page. Warn the cabin crew, if any slide is not disarmed.

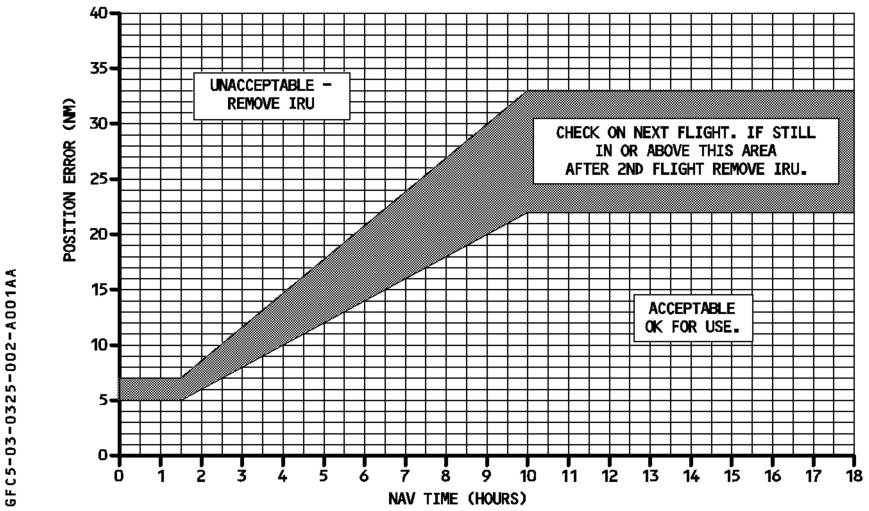
– **EXTERIOR LIGHTS . . . . . AS RQRD**
Switch off the BEACON switch, once both engines have obviously spooled down.

– **SEAT BELTS . . . . . OFF**

– **ELAPSED TIME (if applicable) . . . . . STOP**

– **FUEL PUMPS . . . . . OFF**

– **IRS PERFORMANCE . . . . . CHECK**
· Drift check
– Access the POSITION MONITOR page. Check that the drift does not exceed the following :



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· Residual ground speed check :
– Access the IRS page via the IRS MONITOR page :
* If the ground speed is above 15 knots : Report (The excessive deviation must be confirmed after two consecutive flights).
* If the ground speed is above 21 knots : Report (The IRU must be removed).

Note : On aircraft equipped with LITTON IRS, the ground speed check must be performed within the 2 minutes following aircraft stop. (Ground speed reset to 0 after 2 minutes).

R — **FUEL QUANTITY** . . . . . **CHECK**
R Check that the sum of the Fuel On Board and the Fuel Used is consistent with the Fuel
R On Board at departure. If an unusual discrepancy is found, maintenance action is due.

— **STATUS (ECAM Control panel)** . . . . . **DEPRESS**
— Check the STATUS page.
If MAINTENANCE status messages are displayed :
· At transit : Disregard.
· At main base, or at an airport where repairs can easily be made (at the end of the last flight of the day) : Report for maintenance analysis.

— **BRAKE FAN (◁)** . . . . . **OFF**
· Switch off, when not required.

— **PARKING BRAKE** . . . . . **AS RQRD**
· If the "BRAKES HOT" ECAM caution is displayed, the parking brake should be released after the chocks are in place.
Releasing the parking brake prevents the critical structures from being exposed to high temperature levels for an extended time. However, if operational conditions dictate (e.g. slippery tarmac), the parking brake may remain applied.

— **DUs** . . . . . **DIM**
Dim EFIS, ECAM and MCDU display units.

— **PARKING CHECKLIST** . . . . . **COMPLETE**

SECURING THE AIRCRAFT

Prior to performing this check, consideration should be given to COLD weather (Refer to 3.04.91)

– **PARKING BRAKE** . . . . . **CHECK ON**
Keep the parking brake on to reduce hydraulic leak rate in the brake accumulator.

– **OXYGEN CREW SUPPLY** . . . . . **OFF**

– **ADIRS (1 + 2 + 3)** . . . . . **OFF**
ADIRS should not be switched off during transits at latitudes above 70°N in order to avoid excessive alignment time.
After having switching off the ADIRS, wait at least 10 seconds before switching off the electrical supply to ensure that the ADIRS memorize the last data.

– **EXTERIOR LIGHTS** . . . . . **OFF**

– **GND SELECT CTL switch** . . . . . **AS RQRD**
· Should electrical power be required for crew or servicing personal, consider selecting the GND SELECT CTL switch in the forward cabin to the ON position prior to selecting aircraft power off.

– **APU BLEED** . . . . . **OFF**

– **EXT PWR** . . . . . **AS RQRD**

– **APU MASTER switch** . . . . . **OFF**
Switch off the APU after the passengers have disembarked.

– **EMER EXIT LT** . . . . . **OFF**

– **NO SMOKING** . . . . . **OFF**
Switching off the NO SMOKING signs permits the emergency batteries to be charged (provided external power is supplying the aircraft network).

– **BAT 1 and 2 and APU BAT** . . . . . **OFF**
R Wait until the APU flap is fully closed (about 2 minutes after the APU AVAIL light goes
R out) before switching off the APU battery. Switching the batteries off before the APU flap is closed may cause smoke in the cabin during the next flight.

– **SECURING THE AIRCRAFT CHECKLIST** . . . . . **COMPLETE**