

ТЕХНОЛОГИЯ

РАБОТЫ ЭКИПАЖА ВС

А-319/320/321

РПП ОАО «АЭРОФЛОТ» часть В,
Приложение В-320-11

Москва
2005г.





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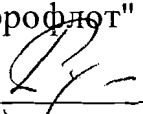
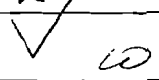
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Москва
2005г.

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ТЕХНОЛОГИЯ РАБОТЫ ЭКИПАЖА ВС А-319/320/321

РПП ОАО «Аэрофлот» часть В, Приложение В-320-11

ИЗМЕНЕНИЕ № 2

Содержание поправки:

- *Дополнение раздела «GO AROUND» новой процедурой ухода на второй круг в случае, когда ВС находится на высоте выше высоты ухода на второй круг.*
- *Дополнение докладов пилотирующего пилота без изменения процедур.*
- *Введение контроля пролета точки входа в глиссаду при заходе по ILS.*
- *Введение приложений 6.7, 6.8, 6.9.*
- *Редакционные поправки.*

Москва
2005г.

СОГЛАСОВАНО:

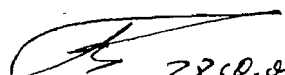
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**МИНИСТЕРСТВО ТРАНСПОРТА
РОССИЙСКОЙ ФЕДЕРАЦИИ**

**ФЕДЕРАЛЬНАЯ СЛУЖБА
ПО НАДЗОРУ В СФЕРЕ ТРАНСПОРТА**

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11.04.2005 № *В.П. 14-502*
На № _____

Заместителю генерального
директора
Директору лётного
комплекса
ОАО «Аэрофлот-РА»
Тульскому С.Г.

Уважаемый Станислав Георгиевич!

Дополнение к РПП ОАО «АЭРОФЛОТ» часть В, Приложение В-320-11
рассмотрено.

Управление надзора за лётной деятельностью считает, что «Технология
работы экипажа воздушных судов А-319/320/321» соответствует
установленным в гражданской авиации требованиям.

Начальник УНЛД

С.Г. Лобачёв

Е.Н.Лобачёв

ОАО АЭРОФЛОТ	
ЛЕТНЫЙ КОМПЛЕКС	
Входящий №	<i>29.24</i>
от <i>11.04.05</i>	на <i>1</i> л.

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0.2 Сокращения

a		CM2	Crewmember 2 (right seat)
A/BRK	Autobrake	COND	Conditioning
ABV	Above	CONF	Configuration
A/C	Aircraft	CONT	Continuous
ACCEL	Acceleration	CO RTE	Company Route
ACCU	Accumulator	CRC	Continuous Repetitive Chime
ACCUR	Accuracy	CSTR	Constraint
ACP	Audio Control Panel	CTL	Control
ADF	Automatic Direction Finder	CTR	Center
ADIRS	Air Data Inertial Reference Sys	CVR	Cockpit Voice Recorder
AFL	Aeroflot	d	
AFS	Auto Flight System	DC	Direct Current
AFT	Rear Part	DDRMI	Digital DIST & RAD Magn Ind
AGL	Above Ground Level	DECEL	Deceleration
ALT	Altitude	DES	Descent
ALTI	Altimeter	DEST	Destination
ALTN	Alternate	DH	Decision Height
ANN	Annunciator	DISC	Disconnect
AOA	Angle Of Attack	DISCH	Discharge
AP	Autopilot	DIST	Distance
APPR	Approach	DME	Distance Measuring EQPT
APU	Auxiliary Power Unit	DU	Display Unit
A/SKID	Anti-skid	e	
ATC	Air Traffic Control	ECON	Economic
A/THR	Auto Thrust Function	EFIS	Electronic FLT INST SYS
ATT	Attitude	EGT	Exhaust Gas Temperature
b		ELEC	Electrics
BARO	Barometric	ELEV	Elevation
BAT	Battery	EMER	Emergency
B/C	Back Course	ENG	Engine
BLW	Below	EO	Engine-Out
BRG	Bearing	EPR	Engine Pressure Ratio
c		EQPT	Equipment
CAB	Cabin	EVAC	Evacuation
CAPT	Captain	EXP	Expedite
CAT	Category	EXT	External / Exterior
C/B	Circuit Breaker	f	
CDU	Control Display Unit	FAF	Final Approach Fix
CFPL	Computerized F-PLN	FCOM	FLT Crew Operating Manual
CIDS	Cabin Intercom Data System	FCU	Flight Control Unit
C/L	Checklist	FD	Flight Director
CLB	Climb	FF	Fuel Flow
CLRD	Cleared	FL	Flight Level
CM1	Crewmember 1 (left seat)	FLT	Flight

FLT CTL	Flight Control	L/G	Landing Gear
FLX	Flexible	LH	Left-Hand
FM	Flight management	LIM	Limitation
FMA	Flight Mode Annunciator	LNAV	Lateral Navigation
FMS	Flight Management System	LO	Low
F/O	First Officer	LOC	Localizer
FOB	Fuel On Board	LP	Low Pressure
FOD	Foreign Object Damage	LT	Light
F-PLN	Flight Plan	LVL	Level
FPA	Flight Path Angle	m	
FPV	Flight Path Vector	MAN	Manual
FWD	Forward	MAP	Missed Approach Point
g		MAX	Maximum
GA	Go-Around	MCT	Max Continuous Thrust
GEN	Generator	MCDU	Multipurpose CDU
GND	Ground	MDA	Minimum Descent Altitude
GPS	Global Positioning System	MDH	Minimum Descent Height
GPWS	GND Proximity Warning System	MED	Medium
GRND	Ground	MEL	Minimum Equipment List
GRVTY	Gravity	MET	Meteorological
GS	Ground Speed	MSA	Minimum Safe Altitude
G/S	Glideslope	n	
h		NAV	Navigation
HDG	Heading	NAVAID	Navigation Aids (VOR/DME)
HF	High Frequency	ND	Navigation Display
HI	High	NDB	Non Directional Beacon
HP	High Pressure	NORM	Normal
HYD	Hydraulic	NOTAM	Notice To Airman
i		NM	Nautical Mile
IAS	Indicated Airspeed	NW	Nosewheel
IDENT	Identification	NWS	Nosewheel Steering
IGN	Ignition	o	
ILS	Instrument Landing System	OAT	Outside Air Temperature
INIT	Initialization	OP	Open
INOP	Inoperative	OPT	Optimum
INST	Instrument	OVHD	Overhead
INT	Interphone	OXY	Oxygen
INTEG	Integral	p	
IRS	Inertial Reference System	PA	Passenger Address
ISA	International STD Atmosphere	PB, pb	Pushbutton
k		PERF	Performance
KT	Knot	PF	Pilot Flying
l		PFD	Primary Flight Display
LDG	Landing	PNF	Pilot Not Flying

PNL	Panel	SPD	Speed
POS	Position	SPD LIM	Speed Limit
PRED	Prediction	SPLR	Spoiler
PRESS	Pressure	SRS	Speed Reference System
PROC	Procedure	STAR	STD Terminal Arrival Route
PROC T	Procedure Turn	STBY	Standby
PROG	Progress	STD	Standard
PI-CF		STRG	Steering
PSI, psi	Pounds per Square Inch	STS	Status
PTU	Power Transfer Unit	SW	Switch
PURS	Purser	SYS	System
PWR	Power	t	
PWS	Predictive Windshear System	TAT	Total Air Temperature
q		TEMP	Temperature
QFE	Field ELEV Atmosphere PRESS	TERR	Terrain
QNH	Sea Level Atmosphere PRESS	THR	Thrust
QRH	Quick Reference Book	THS	Trimmable Horizontal Stabilizer
QT	Quart	TK	Tank
QTY	Quantity	TO, T/O	Take off
r		TOC	Top Of Climb
RA	Radio Altitude	TOD	Top Of Descent
RAD	Radio	TOGA	Take off – Go-around
RAIM	Receiver Autonomous Integrity Monitoring	TRANS	Transition
RAT	Ram Air INLET	TRK	Track
RCDR	Recorder	v	
RCL	Recall	VENT	Ventilation
RED	Reduction	VDEV	Vertical Deviation
REF	Reference	VHF	Very High Frequency
RET	Retract	V/S	Vertical Speed
REV	Reverse	VSI	Vertical Speed Indicator
RH	Right-Hand	w	
R/I	Radio/Inertial	WARN	Warning
RMI	Radio Magnetic Indicator	WPT	Waypoint
RMP	Radio Management Panel	x	
RNP	Required NAV Performance	XPNDR	Transponder
RQRD	Required	XTK	Crosstrack Error
RTOW	Regulatory Take off Weight	z	
RUD	Rudder	ZFCG	Zero Fuel Center of Gravity
RWY	Runway	ZFW	Zero Fuel Weight
s			
SAT	Static Air Temperature		
SEC	Secondary		
SEL	Selector		
SID	Standard Instrument Departure		
SOP	Standard Operating Procedures		

0.3 Лист регистрации изменений

№ изменения	Дата введения в действие
1	01.06.05г.
2	15.11.05г.

№ изменения	Дата введения в действие

0.4 Перечень действующих страниц

Стр.	Изменение	Дата
0. Оглавление		
0.1	0	Апрель 2005
0.2	2	Октябрь 2005
0.3	0	Апрель 2005
0.4	0	Апрель 2005
0.5	0	Апрель 2005
0.6	2	Октябрь 2005
0.7	2	Октябрь 2005
0.8	2	Октябрь 2005
0.9	2	Октябрь 2005
0.10	2	Октябрь 2005
1. Общие положения		
1.1	0	Апрель 2005
1.2	0	Апрель 2005
1.3	0	Апрель 2005
1.4	0	Апрель 2005
1.5	0	Апрель 2005
1.6	0	Апрель 2005
1.7	0	Апрель 2005
1.8	2	Октябрь 2005
1.9	0	Апрель 2005
1.10	0	Апрель 2005
1.11	0	Апрель 2005
1.12	0	Апрель 2005
1.13	0	Апрель 2005
1.14	2	Октябрь 2005
1.15	0	Апрель 2005
1.16	0	Апрель 2005
1.17	2	Октябрь 2005
1.18	0	Апрель 2005
1.19	0	Апрель 2005
1.20	0	Апрель 2005
1.21	2	Октябрь 2005
1.22	0	Апрель 2005
1.23	0	Апрель 2005
1.24	0	Апрель 2005
1.25	0	Апрель 2005
1.26	0	Апрель 2005
1.27	0	Апрель 2005
1.28	0	Апрель 2005
1.29	0	Апрель 2005
1.30	0	Апрель 2005
2. Предполетная подготовка		
2.1	0	Апрель 2005

Стр.	Изменение	Дата
2.2	0	Апрель 2005
2.3	0	Апрель 2005
2.4	0	Апрель 2005
2.5	0	Апрель 2005
2.6	0	Апрель 2005
2.7	0	Апрель 2005
2.8	0	Апрель 2005
2.9	0	Апрель 2005
2.10	0	Апрель 2005
2.11	1	Май 2005
2.12	0	Апрель 2005
2.13	1	Май 2005
2.14	2	Октябрь 2005
2.15	0	Апрель 2005
2.16	0	Апрель 2005
2.17	0	Апрель 2005
2.18	0	Апрель 2005
2.19	0	Апрель 2005
2.20	2	Октябрь 2005
2.21	0	Апрель 2005
2.22	1	Май 2005
2.23	2	Октябрь 2005
2.24	2	Октябрь 2005
2.25	1	Май 2005
2.26	0	Апрель 2005
2.27	0	Апрель 2005
2.28	0	Апрель 2005
2.29	2	Октябрь 2005
2.30	2	Октябрь 2005
3. Выполнение полета		
3.1	1	Май 2005
3.2	2	Октябрь 2005
3.3	2	Октябрь 2005
3.4	0	Апрель 2005
3.5	0	Апрель 2005
3.6	0	Апрель 2005
3.7	0	Апрель 2005
3.8	0	Апрель 2005
3.9	0	Апрель 2005
3.10	0	Апрель 2005
3.11	0	Апрель 2005
3.12	0	Апрель 2005
3.13	2	Октябрь 2005
3.14	1	Май 2005

Стр.	Изменение	Дата
3.15	2	Октябрь 2005
3.16	0	Апрель 2005
3.17	0	Апрель 2005
3.18	0	Апрель 2005
3.19	0	Апрель 2005
3.20	0	Апрель 2005
3.21	0	Апрель 2005
3.22	1	Май 2005
3.23	0	Апрель 2005
3.24	0	Апрель 2005
3.25	0	Апрель 2005
3.26	0	Апрель 2005
3.27	0	Апрель 2005
3.28	0	Апрель 2005
3.29	0	Апрель 2005
3.30	0	Апрель 2005
3.31	0	Апрель 2005
3.32	0	Апрель 2005
3.33	0	Апрель 2005
3.34	0	Апрель 2005
3.35	0	Апрель 2005
3.36	0	Апрель 2005
3.37	0	Апрель 2005
3.38	0	Апрель 2005
4. Заход на посадку		
4.1	2	Октябрь 2005
4.2	0	Апрель 2005
4.3	2	Октябрь 2005
4.4	0	Апрель 2005
4.5	0	Апрель 2005
4.6	0	Апрель 2005
4.7	0	Апрель 2005
4.8	0	Апрель 2005
4.9	0	Апрель 2005
4.10	0	Апрель 2005
4.11	0	Апрель 2005
4.12	0	Апрель 2005
4.13	0	Апрель 2005
4.14	2	Октябрь 2005
4.15	0	Апрель 2005
4.16	2	Октябрь 2005
4.17	0	Апрель 2005
4.18	2	Октябрь 2005
4.19	0	Апрель 2005
4.20	0	Апрель 2005
4.21	0	Апрель 2005

Стр.	Изменение	Дата
4.22	0	Апрель 2005
4.23	0	Апрель 2005
4.24	0	Апрель 2005
4.25	2	Октябрь 2005
4.26	0	Апрель 2005
4.27	0	Апрель 2005
4.28	2	Октябрь 2005
4.29	2	Октябрь 2005
4.30	2	Октябрь 2005
5. Руление на стоянку и послеполетные работы		
5.1	0	Апрель 2005
5.2	0	Апрель 2005
5.3	0	Апрель 2005
5.4	0	Апрель 2005
5.5	0	Апрель 2005
5.6	0	Апрель 2005
6. Приложения		
6.1	0	Апрель 2005
6.2	0	Апрель 2005
6.3	1	Май 2005
6.4	2	Октябрь 2005
6.5	2	Октябрь 2005
6.6	1	Май 2005
6.7	0	Апрель 2005
6.8	2	Октябрь 2005
6.9	2	Октябрь 2005
6.10	2	Октябрь 2005
6.11	1	Май 2005
6.12	1	Май 2005
6.13	0	Апрель 2005
6.14	0	Апрель 2005
6.15	2	Октябрь 2005
6.16	0	Апрель 2005
6.17	0	Апрель 2005
6.18	0	Апрель 2005
6.19	0	Апрель 2005
6.20	0	Апрель 2005
6.21	0	Апрель 2005
6.22	0	Апрель 2005
6.23	0	Апрель 2005
6.24	0	Апрель 2005
6.25	0	Апрель 2005
6.26	0	Апрель 2005
6.27	0	Апрель 2005
6.28	0	Апрель 2005

Стр.	Изменение	Дата
6.29	2	Октябрь 2005
6.30	2	Октябрь 2005
6.31	2	Октябрь 2005
6.32	2	Октябрь 2005
6.33	2	Октябрь 2005
6.34	2	Октябрь 2005

ЗАРЕЗЕРВИРОВАНО

1 ОБЩИЕ ПОЛОЖЕНИЯ

1.1 GENERAL INFORMATION

FOREWORD

The Standard Operating Procedure is the support documentation for flight crew operations and provides operating crews with the company procedural standards of the A-320 family. Crews are obliged to carry out the requirements of this SOP instead of the requirements, stated in section STANDARD OPERATING PROCEDURES FCOM VOL 3. However, some normal procedures, which are non-routine, will be found in the SUPPLEMENTARY TECHNIQUES Chapter (3.04), and in the SPECIAL OPERATIONS Chapter (2.04) and LOADING Chapter (2.01) of the Airbus FCOM.

All pilots are encouraged to submit their questions and suggestions, regarding this document to the following address: A-320 division, Flight Operation Department, Sheremetyevo Airport, Moscow, 103340, Russia.

PRELIMINARY

The following sections contain expanded information of normal procedures.

Standard Operating Procedures consist of inspections, preparations, and normal procedures. All items of a given procedure are listed in a sequence that follows a standardized scan of the cockpit panels, unless that sequence goes against the action priority logic, to ensure that all actions are performed in the most efficient way.

Standard Operating Procedures are divided into flight phases, and are performed by memory.

These procedures assume that they performed by the trained and certificated crew, all systems are operating normally, and that all automatic functions are used normally.

STANDARD MEANINGS

- **Procedure**

A procedure defines what the task is, when the task is conducted, by whom it is conducted, how the task is done, what the sequence of actions is and what type of feedback is required.

- When used in the Operations Manual, the following terms shall have the following meaning:
 - “**Shall**”, “**will**”, “**must**” or an action verb in the imperative sense means that the application of a rule or procedure or provision **is mandatory**.
 - “**Should**” means that the application of a procedure or provision **is recommended**.

- “**May**” means that the application of a procedure or provision **is optional**.
- “**No person may ...**” or “**a person may not ...**” mean that **no person is required, authorized, or permitted** to do the act concerned.
- “**Approved**” means the Authority has reviewed the method, procedure or policy in question and issued a formal written approval.
- “**Acceptable**” means the Authority or the airline has reviewed the method, procedure or policy and has neither objected to nor approved its proposed use or implementation.
- “**Prescribed**” means the Authority or the airline has issued a written policy or methodology which imposes either a mandatory requirement, if it states “shall”, “will”, “must” or an action verb in the imperative sense, a recommended requirement if it states “should” or a discretionary requirement if it states “may”.
- “**Note**” is used when an operating procedure, technique, etc, is considered essential to be emphasized.
- “**Caution**” is used when an operating procedure, technique, etc, may result in damage to equipment if not carefully followed.
- “**Warning**” is used when an operating procedure, technique, etc, may result in personnel injury or loss of life if not carefully followed.

GOLDEN RULES

1. The aircraft can be flown like any other aircraft.
2. Fly, navigate, communicate – in that order.
3. One head up at all times.
4. Cross check the accuracy of the FMS.
5. Know your FMA at all times.
6. When things don’t go as expected – TAKE OVER.
7. Use the proper level of automation for the task.
8. Practice task sharing and back-up each other.

NORMAL CHECKLIST

After completing a given procedure, the flight crew uses the related normal checklist to ascertain that they have checked the safety points.

The crewmember that reads the checklist should announce completion of the checklist (Example: “**LANDING CHECKLIST COMPLETED**”).

The normal checklist takes advantage of the ECAM system and includes the items that may directly impact safety and efficiency if done incorrectly.

All normal checklists are requested by the PF/CM1, and read by the PNF/CM2. They are of the challenge/response type. The responding crewmember only responds to the challenge after having checked the configuration. If the configuration does not agree with the checklist response, he must take corrective action before answering.

If corrective action is not possible, the pilot modifies the response to reflect the actual situation (specific answer). Whenever necessary, the other crewmember crosschecks the validity of the response. The challenger waits for the response, before proceeding any further.

For checklist item identified «AS RQRD», the response states the actual configuration of the system (for example: EXT. LIGHTS – OFF, NAV&LOGO – ON).

“AFTER TAKE OFF / CLIMB” checklist may be divided for “AFTER TAKE OFF” checklist and “CLIMB” checklist. “AFTER TAKE OFF” checklist may be accomplished after flaps retracted and “CLIMB” checklist shall be completed after setting all altimeters to standard QNE 1013,25 hPa.

Notes: Normal checklists are not "TO DO" lists. The flight crew should have performed the actions, or checks, prior to going through the checklist.

Obviously, the flight crew must take corrective action on any item that is not in the proper condition, when it reads the list.

For the checklist items identified “**BOTH**” the PF/CM1 replays first.

ECAM MEMO should always be checked by both pilots after checklist response, when applicable.

If checklist was interrupted while challenging or responding, it should be started again.

COMMUNICATION

CROSS-COCKPIT COMMUNICATIONS:

Cross-cockpit communication is vital for any crew. Whenever a crewmember makes any adjustments or changes to any information or equipment on the flight deck, he must advise the other crewmember and obtain an acknowledgement. This includes but not limited to such items as: FMGS alterations, changes in speed or Mach, the tuning of navigation aids, flight plan modifications, and the selection of such systems as anti-ice, pack flow, etc.

The flight crew must use headsets and INT/RAD switch on ACP in INT position from engine startup or push back to top of climb, and from top of descent until the aircraft is parked. Headsets shall be always worn during pre-departure or descent and approach briefings or when one pilot carries out ATC communication and A/C control. Intercom shall be used for communication when headsets are being worn.

During passenger announcement both loudspeakers volume should be reduced to minimum.

Selection of VHF frequencies shall be preferably done through one's own RMP. After selecting and activating a non-dedicated VHF frequency (SEL LT ON), the radio communication selection key shall be returned to the dedicated VHF frequency (SEL LT OFF).

Be careful: when PNF uses the side stick transmit switch it is imperative that no side stick input is made.

VHF 1 will normally be used for all ATC communications; VHF 2: for ATIS information, emergency frequency monitoring, dispatch or airline service frequency; VHF 3: for ACARS communication.

When voice communication can't be established and push back using hand signals is required, engines must not be started during push back.

STERILE COCKPIT RULE:

Below 10 000 feet, any non-essential conversation within the cockpit and between the cabin and cockpit crew should be avoided. The period of sterile cockpit shall be from block off to FL100 during climb and from FL100 during descent to block on. Adherence to this policy facilitates effective crew communication, as well as communication of emergency or safety-related information by cabin crew.

When "SEAT BELT" sign is illuminated in the cabin during climb and descent, the cabin crew will not enter the flight deck except in emergency conditions: fuel leak, fire, smoke, etc.

USE OF THE FLIGHT MANAGEMENT AND GUIDANCE SYSTEM

The FMGC has 3 functions:

- The two FG (Flight Guidance) functions:
 - Autopilot (AP) and Flight Director (FD)
 - Autothrust (A/THR)
- The FM (Flight Management) function.

AUTOPILOT AND FLIGHT DIRECTOR

AP and FD provide assistance to the crew throughout the flight:

- By freeing up the Pilot Flying from routine handling tasks, and thus providing time and resources to assess the overall operational situation.
- By providing the Pilot Flying with adequate attitude or flight path orders, with the flight director symbol on the Primary Flight Display, so as to facilitate accurate handling of the aircraft.

The FCU is the short-term interface between the pilot and the FMGC, used to select guidance targets and arm/engage guidance modes.

There are 2 types of modes and associated targets:

- Managed modes and targets: The aircraft is guided along the FMS lateral and vertical flight plan and speed profile. These modes and targets are armed or engaged by pressing the FCU knobs.
- Selected modes and targets: The aircraft is guided by selected targets according to the modes selected on the FCU. These modes and targets are armed or engaged by the pilot by turning and pulling the FCU knobs.

All FCU actions and selections should normally be done by PF, when A/P engaged. PNF operates on FCU panel on request of PF when aircraft is being flown manually.

Autopilot may be engaged by PF or by PNF on PF request.

The PF's task is to set the desired modes and targets to fly the aircraft where he wants to go.

The armed and engaged modes are indicated on the Flight Mode Annunciator (FMA) on top of the PFD; the targets (SPD, ALT, HDG...) are indicated on the associated scales on the PFD.

- The crew must check the FCU-selected targets on the PFD.
- The crew must monitor the engaged/armed modes on the FMA

If the autopilot and/or flight director do not guide the aircraft where the crew is expecting:

- The PF should disengage the autopilot using the instinctive disconnect pushbutton on the sidestick, or both pilots should delete the flight director symbols from the PFD with the flight director pushbuttons located on the EFIS control panel, and fly the aircraft manually.
- The PF should not disengage the autopilot by sidestick override, except if instinctive reaction.

The autopilot may be used from after take off down to a late stage of the approach (including autoland when permitted).

AP can be set ON when the aircraft is within flight envelope (attitude, speed). AP automatically goes OFF when normal flight envelope significantly exceeded. Do not try to engage AP when aircraft is out of the flight envelope. It is recommended to engage AP during stabilized flight.

- Note:
- *in normal law AP is available and may be used within normal flight envelope 5 sec (100 ft) after lift off;*
 - *in alternate law AP may be available only depending on the causes and types of failures;*
 - *in direct law AP is not available.*

When the autopilot is engaged, there is no backdriven feedback system to the sidestick, since this is no longer necessary with fly-by-wire controls.

When the PF handflies the aircraft using the flight director, he must obey the flight director orders; in other words, the crossbars must be centered, to fly according to the selected modes and targets.

- If the PF does not wish to fly the flight director orders, PNF must delete the flight director symbols from the PFDs by PF command.
- When flying a visual approach, the flight directors should be deselected.

AUTOTHRUST (A/THR)

The A/THR's design objective is to provide assistance to the crew for thrust management throughout the flight.

The A/THR may be engaged in one of the following modes, which automatically depend on the AP/FD vertical modes:

- **THRUST mode:** The A/THR maintains a fixed thrust level (e.g. THR CLB or THR IDLE), when the AP/FD guides the aircraft in climb or descent at a constant speed (e.g. CLB or DES modes);
- **SPEED/MACH mode:** The A/THR varies the thrust, so as to maintain a target speed, when the AP/FD guides the aircraft on a given trajectory (e.g. V/S, ALT, G/S modes).

When the A/THR is active, the thrust levers are set to detents (e.g. MCT, CLB); they remain in this fixed position, while the A/THR varies or sets the thrust according to the active mode.

When the A/THR is active, the thrust lever position defines the maximum thrust available for the A/THR.

The crew must monitor the A/THR to ensure correct operation:

- On the PFD, by checking the active mode on the FMA, the current speed versus the target speed and, most importantly, the speed trend vector on the speed scale.
- On the ECAM, by checking the thrust command symbols on the engine N1 thrust indication.

To avoid any confusion, Airbus recommends that pilots use one procedure for disconnecting with the instinctive disconnect button:

- Set the thrust levers to the current thrust setting by adjusting the levers until the N1 TLA white circle is adjacent to the actual N1.
- Use the instinctive button to disconnect the A/THR.
- Check that “AUTO FLT A/THR OFF” is displayed on the EWD, and that there is no annunciator in the first column of the FMA.
- Set the thrust manually, which is totally conventional.

The A/THR may be used from thrust reduction, after take off, down to flare, at landing.

If the pilot is going to make landing using manual thrust, he should disconnect the A/THR by the time he has reached 1000 feet AGL on final approach.

The A/THR may be used in most failure cases, when available, in case of:

- One engine failure, without any restrictions;
- Abnormal configuration, with selected target speed for the approach.

FLIGHT MANAGEMENT SYSTEM (FMS)

The FMS is designed to provide assistance to the crew for:

- Navigation
- Flight planning
- Aircraft performance (optimum speeds/altitudes)
- Predictions

The FMS is an important long-term planning and management tool, linked to the AP/FD. When the AP/FD is engaged in Managed modes, the aircraft is guided along the FMS flight plan, using the FMS target speeds.

The FMS MCDU is a major interface between the pilots and the FMS. However, the various FMS entries required at successive flight phases should not distract the crew from the general flight conduct and duties.

The prime concern for the flight crew should be:

- Is the aircraft flying as expected NOW?
- What is the aircraft expected to fly NEXT ?

If any doubt is raised about the aircraft current trajectory, or proposed target speed, the PF must immediately select the appropriate modes and targets on the FCU (which automatically disengages the managed modes).

Subsequently and if time permits, the PNF will analyze and correct whatever might have gone wrong on the MCDU.

All actions and selections required on MCDU should normally be done by PNF during all phases of flight.

GENERAL RULES FOR GOOD USE OF THE FMGS

- *Monitor the AP/FD/ATHR modes and engagement status on the FMA*
- *Any FMA modification must be announced.*
- *Monitor the result of any target selection performed on the FCU, on the related scales of the PFD (e.g. SPD target on SPD scale)*
- *Monitor the AP/FD/ATHR resulting guidance, on the basic flight instrument scales of the PFD (HDG, SPD, ALT, attitude...)*
- *If the PF is not satisfied with the guidance he must :*
 - *REVERT TO BASICS*
 - *FLY THE AIRCRAFT where he wants to go.*
- *If you do selections perfectly correct – A/C will obey perfectly correct*
- *If you do selections perfectly wrong – A/C will obey perfectly wrong*

TASK SHARING ON GROUND

- **CM1 is responsible for:**
 - Weather analyze;
 - Cabin crew briefing;
 - Aircraft technical status and condition check;
 - Correct FMGS and FCU entries;
 - Quantity of fuel on board;
 - Checking load and trim sheet;
 - Performance data calculations;
 - PA announcement;
 - Liaison with cabin crew and ground personnel.
- **CM2 is responsible for:**
 - Preliminary cockpit preparation;
 - Cockpit preparation;
 - Correct FMGS initialization;
 - Load and trim sheet crosscheck;
 - Communication.

All supplementary procedures such as manual engine start, engine start with external pneumatic power, crossbleed engine start, start valve manual operation, etc. and procedures for ground de-icing and anti-icing are performed by principle of: CM2 reads, CM1 does.

TASK SHARING FOR NORMAL FLIGHT

PF and PNF duties are started from the time when take off is initiated and ended when landing roll completed.

- **PF (Pilot Flying) is responsible for:**
 - FMA and FCU targets announcements;
 - Thrust levers setting;
 - Flight path and airspeed control;
 - Aircraft configuration (PF orders, PNF executes);
 - Navigation;
 - Checklist initiation and response (if applicable).
- **PNF (Pilot Non Flying) is responsible for:**
 - Flight instrument monitoring;
 - Checklist reading / checklist response correct answer;
 - Communication;
 - Execution of required actions on PF command;
 - Alternates and destination weather monitoring / collection;
 - Computerized flight plan filling;
 - FMA changes and PFD targets acknowledgements.

During handling the aircraft PF should not carry out other activities, e.g. tune radios, select transponder codes, make any actions on FMGS MCDU and overhead panel or make PA announcement. These must all be done by PNF, so that steering and lookout are not jeopardized. Additionally, PF should not read technical documents, books or any other published press when handling the aircraft.

The Captain is always PF when:

- Taxiing the aircraft from block off till line up position and from the end of rolling after landing till block on;
- Weather conditions do not allow CM2 to fly the aircraft;
- CAT II/III approach;
- RTO is required;
- Dual engine failure;
- ELEC EMER CONFIG;
- He judges to be PF.

CM2 may taxi the aircraft by CM1 request only in a straight line.

The flight crew has to follow ONE HEAD UP philosophy during the all phases of flight and PF must transfer control if he intend to make descent preparation, FMGS changes, cockpit and papers preparation, etc.

PF / PNF DUTIES TRANSFER

Transfer of control is initiated by a command and followed by an acknowledgement and may be performed until final approach is initiated, otherwise Captain becomes PF until landing or G/A is completed.

- **"I HAVE CONTROL"** is either the command that the other pilot is to pass control and assume PNF duties; or the acknowledgement by the other pilot that he has assumed PF duties.
- **"YOU HAVE CONTROL"** is either the command that the other pilot is to take control and assume PF duties; or the acknowledgement by the other pilot that he has assumed PNF duties.

● If transfer of control is intended:

- **"YOU HAVE CONTROL"** ANNOUNCE PF
- **"I HAVE CONTROL"** ANNOUNCE PNF

● When PF is able to perform his normal duties again:

- **"I HAVE CONTROL"** ANNOUNCE PF
- **"YOU HAVE CONTROL"** ANNOUNCE PNF

● If transfer of the radios is intended:

- **"YOU HAVE COMMUNICATION"** ANNOUNCE PNF
- **"I HAVE COMMUNICATION"** ANNOUNCE PF

● When PNF is able to perform his normal duties again:

- **"I HAVE COMMUNICATION"**ANNOUNCE **PNF**
- **"YOU HAVE COMMUNICATION"** ANNOUNCE **PF**

TASK SHARING FOR ABNORMAL / EMERGENCY PROCEDURES

- **PF is responsible for :**
 - Thrust levers setting;
 - Flight path and airspeed control;
 - Aircraft configuration;
 - Navigation;
 - Communication, until ECAM or QRH actions completed;
 - Checklist initiation and response (if applicable);
 - Initiating and stopping procedures, required by ECAM or QRH;
 - Cabin crew interaction.
- **PNF is responsible for :**
 - ECAM and QRH actions,
 - Checklist reading / checklist response correct answer,
 - Execution of required actions on PF command,
 - Communication after ECAM or QRH actions completed.
- **The Captain is always PF when:**
 - RTO is required;
 - Dual engine failure;
 - ELEC EMER CONFIG;
 - He judges to be PF.

A cross-check by dual response must be performed before actuation of critical controls including:

- *Thrust lever reduction of failed engine;*
- *Engine Master switches;*
- *Engines and APU fire P/B;*
- *IDG disconnect P/Bs;*
- *Other guarded P/Bs;*
- *IRS selectors*

and before any other irreversible actions.

TAKING OVER THE FLIGHT CONTROLS

Because of the nature of "fly by wire" and "side stick" systems, the PNF should not make control inputs to correct the PF's handling of the aircraft.

If a take-over becomes necessary during flight, the PNF must call clearly "**I have control**", and press the sidestick priority pushbutton, keeping it pressed until the transfer of control is clearly established.

If a take-over becomes necessary by Captain (check pilot) decision during final approach, he should keep control until landing. If go around performed when Captain (check pilot) took over control, he should keep control until "AFTER TAKE OFF / CLIMB" checklist completed.

CREW BRIEFINGS

The main objective of the crew briefing is for the PF to inform the PNF of his intended course of action. Take off and approach briefings should be adapted to the conditions of the flight and concentrate on the items that are relevant for the particular take off or approach and landing.

Briefings should include items listed below in TAKE OFF and APPROACH BRIEFING sections, but not limited, making maximum cross-reference to the MCDU, PFD, ND where it is possible and preferably be done in English.

Whenever practical complete take off briefing at the gate and approach briefing prior to the top of descent.

CM1 may use the phrase "**Standard abnormal briefing**" to cover RTO briefing, but full RTO briefing should be practiced at least once at the first flight of the day.

PNF may interrupt PF briefing to clarify any misunderstandings. Upon completion of the briefing PF should ask PNF about any questions.

If during taxi to the holding position or just before take off the crew has received any changes in ATC clearance, concerning SID, RW in use, first cleared altitude, heading or track after take off, it is mandatory to re-program FMGS or FCU in accordance with ATC requirements and perform departure briefing, including items, listed in DEPARTURE BRIEFING section.

During descent preparation for expected CAT II/III approach and landing the CM1 as PF should perform additional briefing for CAT II/III approach, including items, listed in CAT II/III APPROACH BRIEFING section.

All items which should be discussed during briefing have been written on back side of normal check list and should be used as a guide, with cross-reference to MCDU, PFD, ND wherever possible to ensure that the pilot's intentions, covered in the briefing, correspond to the FMGS setup.

TAKE OFF BRIEFING

Type of Aircraft

Note model type to keep due attention for tailstrike avoidance.

MEL/ NOTAMS

Check and review current DDL, CDL, NOTAMS items significantly impact on the flight.

Review if the MEL may require crew operational procedure(O).

Note if there any reduction in CATII/III or Autoland capability.

Runway State(MCDU FPLN page)

Runway Identification/Dry/Wet/Contaminated/Icy/Short Field/Rough Surface.

Significant Weather

Review the possibility of any of the following:

- strong wind on take-off;
- icing conditions on take-off and initial climb;
- low visibility take-off;
- operations in windshear;
- weather avoidance after take-off.

Flaps (MCDU PERF TAKE-OFF page)

Confirm the flap setting to be used for take-off as stated in the Performance RTOW Charts for the runway expected to be used for take-off.

FLEX/TOGA (MCDU PERF TAKE-OFF page, RTOW chart)

Depending on RTOW charts calculations, RW contamination or windshear suspected, confirm whether FLEX or TOGA take-off shall be performed.

Packs (Overhead Panel)

Confirm packs configuration:

- PACKS ON - using ENG BLEED or APU BLEED ON;
- PACKS OFF.

RTOW- Regulatory Take-off Weight (RTOW Chart)

Ensure that RTOW is not limited for the RW in use for the take-off or otherwise consider:

- preferable RW for take-off or,
- if single RW operation configure aircraft for take-off with Packs-OFF or APU BLEED-ON if available.

SID/First Cleared Altitude (Jeppesen chart, MCDU FPLN page, FCU)

Read and brief the Standard Instrument Departure from the top down to the bottom of the Jeppesen chart including a chart index No and Effective date, giving due attention to QFE/QNH operations, tracks, altitude/speed/radials constraints etc.

Discuss any special notes pertaining to the SID.

Confirm that all FMGS tracks, constraints, distances in accordance with SID.

Set the FCU altitude to the first altitude constraint in the SID.

Flight Plan Route (MCDU FPLN page)

Confirm that CM2 has inserted the correct flight plan and SID, tracks, distances, speed and altitude constraints have been checked and confirmed. Any alterations made by CM2 on the MCDU flight plan will be discussed and cross-checked at this stage, if not already done. Special attention will be given to altitude/speed/tracks constraints.

Acceleration Altitude (Jeppesen chart, MCDU PERF TAKE-OFF page)

Confirm that the Acceleration Altitude is in accordance with ATC requirements.

Transition Altitude (Jeppesen chart, MCDU PERF TAKE-OFF page)

Confirm that the FMGS database transition altitude is correct and consistent with published SID.

Climb Speed (MCDU PERF CLB page)

Brief whether the managed speed will be kept or otherwise in case of clouse-in turn just after take-off a selected speed shall be entered in the MCDU PERF CLIMB page.

Radio Aids (MCDU RAD NAV page, ND display)

Discuss the radio navigation aids set-up for departure (frequencies, courses, radials etc.). Note selections made on EFIS panel according to MCDU selection.

Captain Take-off Briefing

Since whether or not Captain is PF that is only Captain responsibility to reject or continue take-off in case of abnormalities, that is why he should confirm task sharing for the RTO and continued take-off events for each day of flight or crew member changed as follow:

"For any failure before V1 I will call "STOP" or "GO". In case of "STOP" I will take stop actions:

- *thrust levers - idle*
- *max reverse*
- *steer the aircraft*
- *parking brake- on*
- *"Attention crew at station"*
- *"ECAM action"*

and YOU will perform First Officer rejected take-off duties (F/O should announce his actions aloud to ensure both crew members for good crew communication and task sharing):

- *check "Ground spoilers", "Reverse green", "Decel"*
- *cancel warning*
- *"70 knots"*
- *notify ATC*
- *locate ON GROUND EMERG EVAC CHECKLIST*
- *perform ECAM actions.*

In case of "GO" take off will be continued, no actions below 400 feet except of GEAR RETRACTION".

One Engine Out Acceleration Altitude (MCDU PERF TAKE-OFF page, RTOW chart)

Ensure that FMGS One Eng Out Acceleration Altitude is consistent with and not below Minimum One Eng Out Acceleration Altitude required by RTOW chart otherwise correct it and insert into MCDU PERF TAKE-OFF page as reminder.

MSA (Published SID)

Keep in mind published MSA for any deviation during take-off in case of emergencies.

Emergency Turn (MCDU SEC.FPLN, RTOW chart)

If an Engine Out SID is dictated in the RTOW charts the published SID will need to be aborted and Engine Out SID should be flown instead.

If an engine fails, the Noise Abatement Procedure shall be cancelled.

Ensure that Engine Out SID is inserted in the Secondary Flight Plan if published.

Consider TOGA in heavy take-off conditions.

Overweight Landing Consideration (QRH "Overweight landing" procedure)

Ensure that no overweight landing expected in case of emergency return otherwise consider landing configuration as well packs configuration.

Secondary Flight Plan (MCDU SEC.FPLN page)

Confirm inserted Secondary FPLN according to the following:

- a return to the departure airfield. It is recommended to insert performance data into SEC PERF APPROACH page or;
- if weather is below landing minimum or visibility less than 400m the diversion to the alternate for take-off. Alternate for take-off should not be far than 1 hour flight time, approximately 380nm distance or;
- alternate RW for departure with modified SID and revised take-off data performance.

A.ICE/WXR/TERR

Brief A.ICE/WXR/TERR usage in accordance with circumstances.

DEPARTURE BRIEFING

RWY, configuration, speeds, thrust setting.

SID name, Jeppesen chart index, date of issue, lateral & vertical profile, speed & altitude restrictions (if applicable), HDG or TRK, first cleared altitude, airborne FREQ.

Radio aids, FIX INFO, (if applicable).

EO TO profile, MSA (SSA).

APPROACH BRIEFING

Type of Aircraft

Note model type to keep due attention for tailstrike avoidance.

STATUS(ECAM SYSTEM display)

Check and review the inoperative system(s) on ECAM STATUS page and consider crew actions if they significantly impact on the descent and (or) approach phase.

MEL/NOTAMS

Check and review current NOTAMS items significantly impact on the flight.

Review if the MEL may require crew operational procedure(O).

Note if there any reduction in CATII/III or Autoland capability.

Significant Weather

Review the possibility of any of the following:

- strong wind on landing;
- icing conditions on descent and approach phase;
- low visibility landing;
- operations in windshear;
- weather avoidance during descent and approach.

QNH(QFE) / TRANSITION LEVEL(ATIS, APPROACH CHART)

Brief which altimeter setting will be used on approach and preselect it on EFIS control panel In level flight. Note the transition level in accordance with ATIS information otherwise refer to approach chart.

F.PLN Routing / Holding (F.PLN page, Jeppesen STAR, RNAV Transition)

Review the inserted STAR, RNAV Transition (if applicable) and ensure tracks, distances, speed and altitude constraints have been checked and confirmed. In case of expected holding pattern confirm the MHA, speed, inbound track, turn direction, outbound time or distance have been checked. Any alterations made by PF on the MCDU FPLN page will be discussed and cross-checked at this stage, if not already done. Special attention will be given to altitude/speed/tracks constraints.

MSA (Jeppesen APPR CHART)

Confirm MSA of Jeppesen chart. Crew awareness is necessary for any route deviation during approach. Be aware of altitude passing and do not descend below MSA.

APPROACH CHART index / effective date (Jeppesen APPR CHART)

Confirm APPROACH CHART index and effective date validity to ensure both crew members keep similar charts for intended approach.

FAF / FPA (Jeppesen APPR CHART, FPLN page)

Confirm FAF altitude passing, distance from reference point displayed on MCDU in accordance with APPR CHART, and confirm FPA displayed on MCDU in compliance with published on APPR CHART for ILS approach and calculate FPA for NPA (multiplied DES GRAD% by .60).

TYPE OF APPROACH/RW Ident (FPLN page, ND display)

Confirm type of approach:

- ILS - consider decelerated approach;
- NPA - stabilized approach

Confirm RW identification.

ILS (VOR, NDB) Frequency / RADIO AIDS/RW TRACK (Jeppesen APPR CHART, RAD NAV page, ND, PFD)

Discuss the radio navigation aids set-up for intended approach. Confirm the ILS frequency and RW track have been correctly autotuned or inserted manually in compliance with APPR CHART and displayed on PFD when LS pushbutton depressed or ensure, in case of VOR (NDB) approach, VOR (NDB) ident and RW track have been manually inserted on MCDU RADNAV page and correctly displayed on ND when ROSE VOR (NAV) is selected on EFIS control panel. Note selections made on EFIS panel in accordance with MCDU RNAV page.

Airport Elevation (Jeppesen APPR CHART, FPLN page, ECAM SD CRUISE page)

Confirm AP Elevation on FPLN MCDU page in compliance with published on APPR CHART and ECAM SD CRUISE page.

MDA / DH (MCDU PERF APPR page, PFD, Jeppesen APPR CHART)

Confirm MDA/DH displayed on PFD and inserted into MCDU PERF APPR page in compliance with Jeppesen chart.

GO AROUND (MCDU FPLN page, ND display, Jeppesen chart)

Read and brief GO AROUND procedure giving due attention to tracks, altitude/speed/radials constraints. Discuss any special notes concerning flaps retraction, AP/FD/FMGS mode changes etc. Confirm that all FMGS tracks, constraints, holdings in accordance with Jeppesen chart.

Flaps (MCDU PERF APPR page, QRH "Approach with one engine inoperative", "Overweight Landing", "Circling with one engine inoperative", overhead panel)

Consider flaps setting for approach consistent with circumstances:

- for windshear or downburst conditions- CONF 3;
- for severe turbulence or strong wing approach conditions aircraft is certified in configuration FULL and CONF 3 however, CONF 3 provides more energy and less drag;
- in case of approach with one engine inoperative be aware of "Approach with one engine inoperative" or "Circling with one engine inoperative" QRH procedures to determine flaps setting;
- in case of emergency return consider "Overweight landing" QRH procedure.

Confirm GPWS FLAP 3 - ON for approach in CONF 3.

VAPP (MCDU PERF APPR page, FPLN page, standby ASI)

Confirm Vapp on MCDU PERF APPR page and correct if required (for example approach in severe icing conditions). Confirm Vapp have been inserted into MCDU FPLN page as speed constraint at Final Descent point for intended stabilized approach. Confirm speed bugs setting on standby ASI.

STOPPING (Jeppesen chart)

Brief autobrake and reverse using upon landing. Discuss if any landing distance increment is expected. Note any restrictions required by Jeppesen chart for landing, RW vacation, frequency change etc.

Runway State

RW state (wet/contaminated/icy/short field).

ALTERNATE/EXTRA TIME (MCDU FPLN page, MCDU FUEL PRED page)

Confirm inserted flight plan to the alternate is correct and give due attention to speed, altitude constraints. Confirm extra time and fuel is sufficient once any events requiring holding occurs (low visibility, RWY snow removal etc.), otherwise consider deviate to the alternate without holding.

SEC.FPLN (MCDU SEC.FPLN page, CFPL)

Confirm inserted Secondary FPLN according to the following:

- copy of the Active F.PLN;
- diversion to the spare alternate.

A.ICE/WXR/TERR

Brief A.ICE/WXR/TERR usage in accordance with circumstances.

CAT II/III APPROACH BRIEFING

NOTAM – review.

A/C status.

Crew certification.

Airline approval.

Flight deck lighting.

Seat position.

Use of landing lights.

“Low visibility proc. in progress” reported (ATC/ATIS).

Review standard callout & crew coordination

STABILIZED APPROACH CRITERIA

The following approach gates and minimum stabilization heights are established to achieve timely stabilized approach:

Meteorological conditions	Height above Airfield Elevation
IMC	1000 ft
VMC	500 ft

An approach is considered stabilized only if all the following conditions are achieved before or when reaching the applicable stabilization height:

For all types of approach

1. The aircraft is on the correct lateral and vertical flight path (based on Nav aids guidance or visual references);
2. Only small changes in heading/pitch are required to maintain the correct flight path;
3. The aircraft is in the desired landing configuration;
4. The power is stabilized and the aircraft is trimmed to maintain the target final approach speed on the desired glide path;
5. The landing checklist has been accomplished as well as any required specific briefing;
6. No flight parameter exceeds the criteria provided below:
 - For all types of approach:
 - Airspeed lower than **V_{target} – 5 kt** or greater than **V_{target} + 10 kt**
 - Vertical Speed greater than **1000 ft/min**
 - Pitch lower than **- 2,5° Nose Down** or greater than **10° Nose Up**
 - Bank Angle greater than **7°**
 - For LOC-only and ILS CAT I approaches:
 - LOC deviation: **1 dot** or Excessive Deviation Warning
 - GS deviation: **1 dot** or Excessive Deviation Warning
 - For ILS CAT II/CAT III approach:
 - LOC deviation: **1/2 dot** at 300 ft AGL, or **1 dot** at 500 ft AGL, or Excessive Deviation Warning
 - GS deviation: **1 dot** or Excessive Deviation Warning

For visual and circling approaches

1. For visual approaches, wings must be level when the aircraft reaches 500 ft above airfield elevation;
2. For circling approaches, wings must be level when the aircraft reaches 400 ft above airfield elevation;

If any of these criteria are exceeded when aircraft is below 1000' (IMC) or 500' (VMC) go around is mandatory.

Note: Unique approach procedures or abnormal conditions requiring a deviation from the above elements of a stabilized approach should be briefed specially.

ALTIMETER SETTING

Aircraft must be operated according to the barometric altimeter readings as follows:

- in Terminal area, at or below transition altitude – the altitude readings are based on aerodrome QFE (QNH);
- at or above the transition level – FL readings are associated with the altimeter standard pressure setting (1013.2 hPa);
- QNH or QFE or QNE values must be set on all altimeters.

Before departure barometric altimeters must be set to the aerodrome QFE or to the QNH prevailing at the aerodrome of departure.

During cruise QNH (QFE) baro reference for destination airport may be preset on the EFIS control panel. It should be done only in level flight with “ALT” (green) or “ALT CRZ” displayed on FMA. Stand by altimeter, which is not going to be used as reference during approach & landing, is recommended to be set to the destination QNH (QFE) during descent preparation.

During descent barometric altimeters must be set to the aerodrome QFE or to the QNH prevailing at the aerodrome of arrival when descending through the transition level or when cleared by ATC to an altitude (height).

- 500 ft before crossing transition altitude (transition level) and when cleared for further climb (descent) PNF informs the PF **“APPROACHING TRANSITION”**;
- crossing transition altitude (transition level) PF initiates altimeters setting by calling **“SET STANDARD”** or **“SET QNH...(QFE...)”**;
- when altimeters setting has been completed by the crew, PNF crosschecks setting and announces **“STANDARD SET. CROSSCHECKED. PASSING FL... NOW”** or **“QNH (QFE)... SET. CROSSCHECKED. PASSING... FT NOW”**; PF announces **“CHECKED”**;
- finally, the crew performs respective checklist.

FLAP SETTING FOR TAKE OFF AND LANDING

There are three different configurations given by the FCOM to the crew for take off: CONFIG 1+F; CONFIG 2 and CONFIG 3. This allows the crew to select best configuration that gives either:

- the highest permissible take off weight, or for a given weight,
- the highest flexible temperature to save engine life;
- lower T/O speeds;
- preferred configuration for comfortable aircraft handling.

If different configurations give equivalent performance (equivalent flex is obtained) the crew should select the configuration associated with the lowest take off speeds.

A high configuration (CONFIG 2/CONFIG 3) is preferable to minimize tailstrike risks or on badly paved runways and accelerate stop distance limited runways to decrease take off speeds.

A low configuration (CONFIG 1+F) is preferable to optimize climb gradient more specifically in hot weather conditions or suspected windshear and severe turbulence.

It is recommended to select CONFIG 2 for take off as long as it does not induce a FLEX TEMP reduction higher than 5° and provides maximum tailstrike clearance.

The normal flap setting for landing is CONFIG FULL and should be used for manual landings and autoland. CONFIG 3 may be used by Captains discretion for manual landing and autoland and is recommended in suspected windshear, turbulence conditions. CONFIG 3 landing reduces flaps wear and provides small fuel saving and more energy, but higher landing speed can result more brake wear, higher brake temperature and longer cooling period. CONF. FULL is recommended to be used in CAT II/III weather conditions to increase visual segment at decision height.

FLAPS AND LANDING GEAR SELECTIONS

All landing gear and flaps selections should be made by the PNF when it is required by the PF commands. Before making landing gear and flaps selection, PNF must closely check that the airspeed is within the limits and then will perform appropriate call and action.

There is no requirement to report that the flaps selected position has been achieved (ECAM will alert any inability of the system to achieve the selected position) but the PNF has to check the blue number on the ECAM flap indicator to confirm the correct selection has been made.

For landing gear operation PNF replies **“GEAR UP (DOWN)”** when selecting the gear position, and checks the lights on the landing gear indicator panel to confirm gear operation.

AIRCRAFT MANAGEMENT

It is recommended to fly with FD ON, AP ON and A/THR ON throughout the flight. Manual aircraft handling may be employed for pilot practice or due to equipment failure following FMGS guidance command. All pilots are encouraged to keep their handling ability at satisfactory level.

It is not permitted to select only one FD OFF. PNF must select FDs ON or OFF at the same time and announce **“FDs ON”** or **“FDs OFF”**.

In case of abnormal configuration AP may be used down to 500 ft AGL. Maximum usage of AP should be made in the event of an engine failure. For an engine failure during take off AP should be engaged as soon as the aircraft is fully under control and stabilized on the correct trajectory.

In the unlikely event of AP and/or A/THR failure it is imperative that the PF assumes manual control immediately.

During final approach PF must keep one hand on the thrust levers, another one on sidestick and feet on pedals.

It is recommended for PF to keep a hand on the speed brake lever when in use.

Use of speed brake is not recommended on final approach. All actions on overhead panel should be done by PNF on PF command (if applicable) when the aircraft is in flight.

To switch ON or OFF seat belts sign when aircraft is in flight is responsibility of CM1.

Weather radar may be used by both pilots as appropriate.

TCAS AND ATC

TCAS is designed to alert flight crew to the potential conflict with other aircraft within the surveillance area.

TCAS should be flown in the TA/RA mode under most conditions from the moment of entering an active runway for departure until landing and clearing of the runway.

Select TA only mode in the following cases:

- Engine failure;
- Dispatch with landing gear down (if applicable);
- 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 ...).

The pilots should not maneuver the aircraft on the sole basis of a Traffic Advisory (TA). Always follow the RA orders, even if they lead to cross the altitude of the intruders, as they ensure the best global separation.

Note: *Traffic Advisory information is only intended to assist the sighting of other airplanes and alert the flight crew that an RA, requiring a change in flight path, may follow.*

Whenever the aircraft has deviated from assigned clearance in response to an RA, the flight crew shall fill in the Incident Report form and report the circumstances to the Company upon completion the flight.

• **Actions to be taken on receiving a TA:**

- 1) The flight crew should immediately assess the information provided by the TA and commence a visual search of that portion of the sky within which the potential threat is likely to be seen.

It is a good practice for PF to announce to the PNF **“I have control, you watch outside”**

- 2) The flight crew should prepare to respond to an RA.

• **Actions to be taken on receiving an RA:**

- 1) Pilots are to initiate the required maneuver immediately, in doing so:
 - disconnect the autopilot and flight directors (if applicable);
 - adjust aircraft’s pitch promptly to achieve the required vertical speed (follow the green sector).
- 2) Maneuvers should never be made in the direction opposite to that given in an RA.
- 3) PNF shall notify ATC as soon as practicable responding to the RA that directs a deviation from assigned altitude using the standard phraseology:

Circumstance	Phraseology
When the aircraft initiates the RA action	“TCAS CLIMB” or “TCAS DESCENT”
When the aircraft has begun returning to the assigned clearance	“RETURNING TO ____ FT/FL ____”
If unable to pass a message until having responded to an RA and returning to the assigned clearance	“TCAS CLIMB (or DESCENT), RETURNING TO ____ FT/FL ____”
If unable to pass a message until the aircraft has returned to the assigned clearance	“TCAS CLIMB (or DESCENT), COMPLETED, ____ FT/FL ____ RESUMED”
If unable to comply with a clearance because a manoeuvre has been initiated in response to an RA	“UNABLE TO COMPLY, TCAS RESOLUTION ADVISORY”

Note: Air traffic control and aircraft callsigns shall be applied to each transmission.

Pilots should comply with the vertical speed limitations during the last 2000 ft of climb or descent. In particular, pilots should limit vertical speeds to 1500 fpm during the last 2000 ft of climb / descent, especially when the aircraft is aware of the traffic that was converging in altitude and intended to level off 1000 ft above or below the assigned altitude.

All TCAS RAs take precedence over ATC instructions concerning altitude change.

Stall warnings or ground proximity warning system (GPWS) warnings take precedence over TCAS advisories.

Do not descend below minimum safe altitude (height) in response to TCAS descent RAs.

If the flight crew receives a TCAS RA to climb while being on glide slope, perform a go-around procedure.

It is authorized not to follow TCAS RAs in case the pilots visually identify other traffic while simultaneous parallel approaches are conducted.

EGPWS TERRAIN DISPLAY

EGPWS is intended to provide warning of unintentional closure with the ground as a result of which remedial action can be taken by the flight crew. It is not infallible, but an immediate and positive response must be made to all its alerts and warnings. Only after immediate and positive visual verification of the outside can such warning be judged inappropriate.

During night or IMC conditions, apply the EGPWS alerts procedure immediately. Do not delay reaction for diagnosis.

During daylight VMC conditions, with terrain and obstacles clearly in sight, the alert may be considered cautionary. Take positive corrective action until the alert ceases or a safe trajectory is ensured.

It is recommended to use TERR on ND during operations in the mountain area and in the not well-known area.

Normally PNF should display TERR on ND until reaching TOC on departure and from TOD until leaving the runway on arrival.

Caution “TERRAIN AHEAD” gives typically 60 sec reaction time prior to the potential terrain conflict; warning “TERRAIN AHEAD. PULL UP” gives 30 sec reaction time. If TERR on ND is not selected, caution or warning is triggered, terrain data are automatically displayed on ND and TERR on ND light comes on.

EGPWS has priority over the PWS and approved to operate with GPS PRIMARY or NAV ACCUR HIGH.

When operating at airport not stored in the data base, set EGPWS terr. P/B “OFF” on the overhead panel when A/C is within 15 nm from this airport.

PA ANNOUNCEMENT

It is Captain's responsibility to maintain contact with passengers in order to keep them informed about details of the flight and deviations from normal operations.

The public address system (PA) is an important and effective means available to Captain to inform the passengers and enhance the company reputation.

Captain may delegate PA to the first officer.

Announcements should be coordinated with the purser to avoid a duplication of information.

Announcements at least should consist of:

- Welcoming and predeparture information, which should be done at a convenient stage prior to take off (recommended to be made before push back when boarding completed,);
- Inflight information, which should be performed at a convenient stage after reaching TOC;
Care must be taken not to disturb the passengers with routine announcements during the night.
- Arrival information before descent, which should be performed at a convenient stage (recommended before reaching TOD);
- Arrival information after landing at destination, which should be performed upon parking.

As soon as the doors are closed, it is the responsibility of Captain or the designated crew member to inform passengers about the substantial irregularities, such as departure or approach delay, technical malfunctions, deviations from the intended plan of operations which are of interest to the passengers.

AUTOBRAKES AND BRAKES

The use of autobrake is recommended under normal conditions.

The use of autobrake LOW mode for normal operations reduces brake wear and recommended on long and dry runways. LOW mode sends progressive pressure to the brakes 4 seconds after the ground spoilers deploy in order to decelerate the aircraft at 3 kt each second.

The use of autobrake MED mode for normal operation is recommended to reduce runway occupancy, when landing on a short or contaminated runway and when operating in low visibility weather conditions. MED mode sends progressive pressure to the brakes 2 seconds after ground spoilers deploy in order to decelerate the aircraft at 6 kt each second.

MAX mode is normally selected for take off and is not recommended to be used for landing.

Minimum demonstrated landing distances in the QRH are based upon maximum foot pedal braking during test flight. Full pedal braking with anti skid has deceleration rate of 10 kt each second.

It is recommended to arm automatic braking system to press firmly the appropriate pushbutton for duration of, at least, 1 second.

Automatic braking system should be disengaged by action on brake pedals. The autobrake pushbuttons should not be used to disengage the armed mode or to switch ON autobrake mode during the landing run.

When landing distance is sufficient to vacate the RW without autobrake the flight crew may not use it.

When aircraft at a gate (stand) with chocks ON and engines have been shutdown, Airbus recommends releasing the parking brake if brake temperature exceeds 500°C. But if there is any doubt, that aircraft will move after releasing the parking brake, Captain should leave parking brake ON.

When Captain is setting parking brake OFF at a gate (stand) he must ensure that the aircraft is not moving.

HOLDING PATTERNS

Holding speeds should be flown in accordance with criteria specified in ICAO Doc.8168.

When entering a holding pattern into the FMGC the inbound course and the direction of turn should be checked against the chart. Normally a hold of one minute leg should be selected unless the holding pattern on the chart is based upon a DME distance. It is permissible to request an extended holding pattern if a significant delay is expected and the pattern may be modified to avoid bad weather with the permission of ATC.

The most efficient speed in the hold is GREEN DOT as this provides minimum fuel burn. However, there are occasions when it is necessary to select a higher speed to ensure an adequate margin above V PROT. In most circumstances a 5-10 kt increment above GREEN DOT will be adequate, but in turbulence a higher speed up to the maximum permitted for the hold may be selected.

The hold should normally be monitored using ROSE map display and an ADF/VOR needle tuned to the holding facility. Before leaving the hold to commence the approach the “activate approach phase” prompt in the FMGC should be selected to maintain Green Dot once the hold is exited.

RVSM

Operational procedures.

Refer to FCOM 2.04.50 p. 1÷3.

B-RNAV / P-RNAV

Operational procedures.

Refer to FCOM 2.04.51 p. 1÷5.

OPERATION IN ICING CONDITIONS

Operational procedures.

Refer to FCOM 3.04.30 p. 1, FCOM 3.04.91 p.5.

STANDARD CALLS

Standard phraseology is essential to ensure effective crew communication for aircraft with two-crewmember operation.

Standard calls are intended and designed to enhance the flight crew situational awareness.

Command and response calls should be performed in accordance with the defined PF / PNF task sharing.

Nevertheless, if a call is omitted by one crewmember, the other crewmember should perform the call, per good crew resource management (CRM) practice.

The other crewmember should accomplish the requested command or verify the requested condition and respond accordingly.

The absence of a standard call at the appropriate time or the absence of acknowledgement may be an indication of a system or indication malfunction, or may indicate a possible incapacitation of the other crewmember.

Standard calls are used to:

- Give a command (task delegation) or transfer an information.
- Acknowledge a command or an information transfer.
- Give a response or ask a question (feedback).

CHECK CALLOUTS

- **“CHECK”** : A command for the other pilot to check an item.
- **“CHECKED”** : A response that an item has been checked.
- **“CROSSCHECKED”** : A call verifying information from both pilots stations.

ACTIONS COMMANDED BY PF

The following commands do not necessarily initiate a guidance mode change, eg : selected to managed / managed to selected. The intent is to ensure clear, consistent, standard communication between crewmembers.

All actions performed on the FCU must be verified on the PFD/ND.

“SET”

The “SET” command means using an FCU knob to set a value, but not to change a mode. SET is accomplished by only rotating the appropriate selection knob. Example :

- “SET GO AROUND ALTITUDE ____”
- “SET FL ____”
- “SET HDG ____”

“MANAGE/SELECT”

The “MANAGE” command means pushing an FCU knob to engage, or arm, a managed mode or target.

The “SELECT” command means pulling an FCU knob to engage, or arm, a selected mode or target. Example :

- “HDG 090 SELECT” (Heading knob is turned and pulled).
- MANAGE NAV (Heading knob is pushed).
- “FL 190 SELECT” (Altitude knob is turned and pulled).
- “FL 190 MANAGE” (Altitude knob is turned and pushed).
- SPEED 250 KTS SELECT (Speed knob is turned and pulled).
- MANAGE SPEED (Speed knob is pushed).

Notes:

1. If the value was previously set, there is no requirement to repeat the figure. Simply call e.g. HDG SELECT; SPEED SELECT; FL SELECT.
2. It is sometimes preferable to first pull the FCU knob before setting the value (e.g. a long turn).

The VS/FPA selector knob has no managed function. The standard calls for the use of this knob are as follows :

V/S Plus (or Minus) 700 SELECT or –

FPA Minus 3° SELECT (V/S (FPA) knob is turned and pulled)

PUSH TO LEVEL OFF (V/S (FPA) knob is pushed)

“ARM”

The “ARM ____” command means arming a system by pushing the specified FCU button.

e.g. : “ARM APPROACH”

e.g. : “ARM LOC”.

“ON/OFF”

The simple “ON” or “OFF” command is used for the autopilot, flight directors, autothrust and the bird (flight path vector).

e.g. : “BIRD ON”

Note: All actions on the FCU and MCDU must be verified on the PFD and ND, as follows :

- First, ensure that the correct FCU knob is used, then verify indications on the PFD/ND.
- Mode changes should be confirmed by calling the color when appropriate (e.g. BLUE, MAGENTA).

FMA

Unless listed otherwise (e.g. CAT II & III task sharing), all FMA changes will be normally called by the PF.

ALTITUDE

The PNF calls when passing 1000 feet before the cleared altitude or FL, and is acknowledged by the PF calling : "CHECKED".

e.g. : "thousand to go"

When PF sets flight level, for example 9600m, during metric airspace operation, he should call : "FLIGHT LEVEL THREE ONE FIVE, NINE THOUSAND SIX HUNDRED METERS SET". The PNF should acknowledge by calling : "CHECKED".

When PF sets flight level, for example 340, he should call : "FLIGHT LEVEL THREE FOUR ZERO SET". The PNF should call : "CHECKED".

HEADING OR SPEED

When PF sets heading (speed), for example 250, he should call : "HEADING (SPEED) 250 SET". The PNF should acknowledge by calling : "CHECKED".

FLIGHT PARAMETERS

The PNF will make callouts for the following conditions during final approach:

- for ILS approach (CAT I, CAT II/III) operation

<u>"SPEED"</u>	<i>When the speed becomes lower than speed target – 5 kt, or greater than speed target + 10 kt.</i>
<u>"PITCH"</u>	<i>When the pitch attitude becomes lower than -2.5° or greater than 7,5° nose up.</i>
<u>"BANK"</u>	<i>When the bank angle becomes greater than 7°.</i>
<u>"SINK RATE"</u>	<i>When the descent rate becomes greater than 1000 fpm.</i>
<u>"LOC" / "GS"</u>	<i>When excessive LOC or GLIDE deviation occurs. 500 ft AGL = 1 dot LOC 300 ft AGL = 0.5 dot LOC ; 1 dot GS</i>

- for NPA operation

<u>"SPEED"</u>	<i>When the speed becomes lower than speed target – 5 kt, or greater than speed target + 10 kt.</i>
<u>"PITCH"</u>	<i>When the pitch attitude becomes lower than -2.5° or greater than +7,5°.</i>
<u>"BANK"</u>	<i>When the bank angle becomes greater than 7°.</i>
<u>"SINK RATE"</u>	<i>When the V/S becomes greater than 1000 fpm.</i>
<u>"COURSE"</u>	<i>When deviation becomes greater than 1/2 dot (VOR) or 5° (ADF).</i>
<u>"... FT HIGH (LOW)"</u>	<i>At altitude checkpoints.</i>

VISUAL REFERENCES

The visual references required at MDH (MDA) to continue the approach may be any of the following:

- for NPA, circle to land or visual approaches:
 - threshold / threshold lights;
 - touchdown zone marking / lights;
 - approach light system;
 - high intensity RWY lights;
 - RWY centerline lights;
 - sequenced strobe (flash) lights;
 - VASI.
- for CAT I approach:
 - approach lights;
 - threshold lights;
 - RWY edge lights;
 - touchdown zone markings;
 - PAPIs.
- for CAT II approach:
 - RWY centerline lights;
 - touchdown zone lights;
 - RWY edge lights;
 - 3 light segment of the centerline of the approach lights + one crossbar;
- for CAT III approach:
 - touchdown zone lights.

If the visual references have not been established, a go-around must be executed.

ABNORMAL AND EMERGENCY CALL OUTS

ECAM Procedures

1. **"ECAM ACTION"** is commanded by PF when required.
2. **"CLEAR ... (title of the system)?"** is asked by the PNF for confirmation by the PF, **that** all actions have been taken/reviewed on the present ECAM WARNING/CAUTION or SYSTEM PAGE.
e.g. : **"CLEAR HYDRAULIC?"**
3. **"CLEAR ... (title of the system)"** is the command by the PF that the **action** and review is confirmed.
4. **"ECAM ACTIONS COMPLETED"** is the announcement by the PNF that all **APPLICABLE ACTIONS** have been completed.
5. Should the PF require an action from the PNF during ECAM procedures, the order **"STOP ECAM"** will be used. When ready to resume the ECAM the order **"CONTINUE ECAM"** will be used.

2 ПРЕПОЛЕТНАЯ ПОДГОТОВКА

2.1 FLIGHT PREPARATION

TECHNICAL CONDITION OF THE AIRCRAFT

The crew will verify the technical state of the aircraft differed defect list (DDL), with regard to airworthiness, acceptability of malfunctions (MEL/CDL), and influence on the flight plan.

WEATHER BRIEFING

The crew will get a weather briefing.

The briefing should include :

- Actual and expected weather conditions, including runway conditions for take off and climb-out.
- Significant weather en route, including winds and temperatures.
- Terminal forecasts for destination, alternate and en route alternate airports.
- Actual weather for destination and alternates, for short range flights and recent past weather, if available.
- Survey of the meteorological conditions at airports along the planned route.

Weather can affect the choice of routing (for example, influence which route is quickest) and the choice of flight level. The flight crew must also consider the possibility of runways being contaminated at the departure and destination airfields. The flight crew must also verify ISA deviations and en route icing conditions, and must consider the possibility of holding due to weather at the destination.

NOTAMS

The flight crew must examine NOTAMS for changes to routings, unserviceable nav aids, availability of runways and approach aids etc, all of which may affect the final fuel requirement.

FLIGHT PLAN AND OPERATIONAL REQUIREMENTS

The crew will check the company flight plan for routing, altitudes, and flight time.

The Captain will check the ATC flight plan and ensure that it :

- Is filled in and filed, in accordance with the prescribed procedures,
- Agrees with the fuel flight plan routing.

The crew will check the estimated load figures, and will calculate the maximum allowable take off and landing weights.

OPTIMUM FLIGHT LEVEL

The flight crew should choose a flight level that is as close to the optimum as possible. To obtain the optimum flight level, use the chart in the QRH or in the FCOM (Refer to FCOM 2.05.20).

As a general rule, an altitude that is 4000 feet below the optimum produces a significant penalty (approximately 5 % of fuel). Flight 8000 feet below the optimum altitude produces a penalty of more than 10 % against trip fuel. (The usual contingency allowance is 3 %).

FUEL REQUIREMENTS

COMPUTERIZED FLIGHT PLAN CHECK

In most cases the flight crew uses a computer-derived flight plan to obtain the correct fuel requirements. Although these computerized requirements are normally accurate, the flight crew must check them for gross errors.

The easiest way to do this is to use the "Quick Determination of F-PLN" tables in FCOM 2.05.40. Although the aircraft will fly at ECON MACH that is based on the cost index, the 0.78 Mach table is accurate enough to permit the crew to check for gross error.

To assist in fuel loading decision when extended delay is expected on the ground (for any reason, e.g. weather, congested traffic and so on), the following information may be helpful:

- both engines idle fuel burn - 12 kg/min (approximately);
- APU fuel burn - 2 kg/min (approximately).

For convenience the planned fuel in tanks, trip fuel and taxi fuel may be rounded up to units of one hundred for the purpose of the loadsheet.

REFUELLING

Once the refueling is completed FO should check and transfer from delivery receipt sheet to flight log the amount of uplifted fuel. If a difference between calculated arrival fuel plus uplifted fuel against actual fuel displayed on ECAM fuel page is greater than 100 kg, fuel check will need to be performed by an engineer and additional delivery receipt sheet or revised refuel sheet should be requested. But this discrepancy can be explained by APU running.

Captain should be satisfied that fuel has been loaded correctly and all appropriate entries have been made in technical log book.

If refueling with passengers on board is required flight crew should refer to Flight Operation Manual section 8 paragraph 8.2.1.4.

FUEL MONITORING AND RECORDING

During flight, a fuel check must be carried out at TOC, TOD, as well as during CRZ every 30 minutes and should be compared with CFP fuel prediction when overflying a convenient waypoint.

The arrival remaining fuel entered in the flight log is read directly from the ECAM FOB total in kilograms after engines shut down at a gate. The fuel amount must be entered using the lowest units of one hundred kilograms (e.g. if ECAM FOB displays 4540 kilograms enter 4500 kgs).

FUEL TRANSPORTATION

The crew must check the policy covering the “tankering” of fuel on where there is a favorable fuel price differential or operational requirement.

Remember that carrying unnecessary extra fuel increases the fuel consumption for that sector and therefore reduces the economy of the operation (lower flex temperature, more tire and brake wear, more time in climb phase, lower optimum flight level etc.).

CABIN CREW BRIEFING

Prior to departure, during pre-flight preparation Captain shall:

- a) Receive the report from purser on the cabin crew complement and readiness for flight;
- b) Establish the code statement or special signals to use by a cabin crew member communicating with the flight deck;
- c) Carry out the briefing with the cabin crew, e.g. informs about specifics of forthcoming flight, expected turbulence areas, gives additional instructions regarding the flight safety, extended water operations, operations in polar areas and over mountainous areas, etc.

Note: *The briefing with the cabin crew may be carried out in the airport briefing room or on board.*

2.2 CM2 SAFETY EXTERIOR INSPECTION

Items marked by (*) are to be completed during a transit stop by CM1. This inspection ensures that the aircraft and its surroundings are safe for operations. On arriving at the aircraft, check for obstructions in the vicinity, engineering activity, refueling, etc.

- * - **WHEEL CHOCKS CHECK IN PLACE**
- * - **LANDING GEAR DOORSCHECK POSITION**

WARNING

Do not pressurize the green hydraulic system without clearance from ground personnel, if any gear door is open. Remember that the green hydraulic system is pressurized if the yellow system is pressurized and the PTU is on auto.

- * - **APU AREACHECK**

Observe that the APU inlet and outlet are clear.

2.3 CM1 EXTERIOR INSPECTION

The exterior inspection ensures that the overall condition of the aircraft and its visible components and equipment are safe for the flight.

Prior to the commencement of the Exterior Inspection CM1 reviews the Aircraft Maintenance Log and verifies that the Daily Engineering check has been completed, that any defects have been rectified and signed off and the MEL reference quoted and Limitations complied with. Checks for any relevant MEL/CDL requirements.

Complete inspection is normally performed by maintenance personnel or in the absence of maintenance personnel by CM1 before each originating flight. Items marked by asterisks (*) must be performed again by CM1 before each flight.

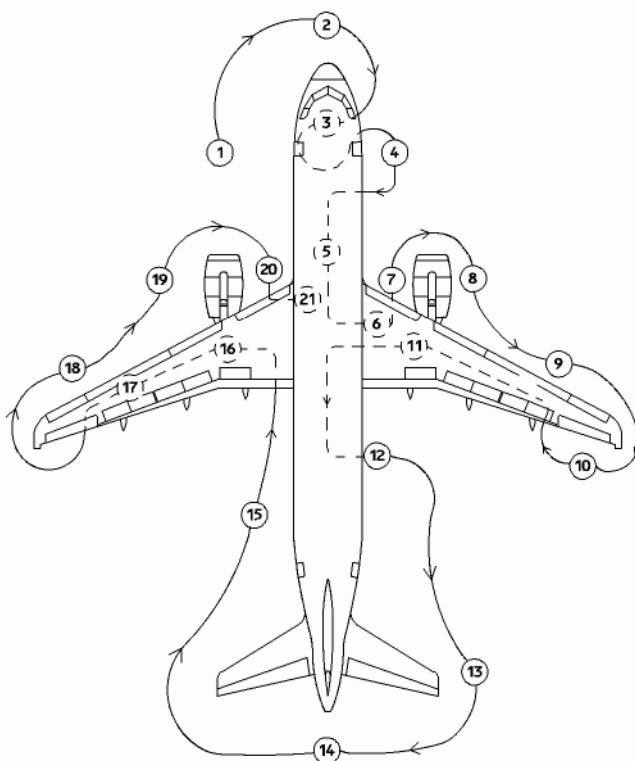
The parking brake must be on during the exterior inspection to allow the flight crew to check brake wear indicators.

- Check structure for impact damage
- Check that there is no evident fuel, oil or hydraulic leaks.

WARNING

If a landing gear door is open, contact the maintenance crew before applying hydraulic power.

EXTERIOR WALK-AROUND



(1) LH FWD FUSELAGE

- *- AOA probes.....CONDITION
- F/O and CAPT static portsCLEAR
- Avionics equipment vent air inlet valve.....CONDITION
- Oxygen bayCLOSED
- Oxygen overboard discharge indicator.....GREEN
- *- Toilet servicing doorCLOSED

(2) NOSE SECTION

- *- Pitot probes.....CONDITION
- STBY static portsCLEAR
- *- TAT probes.....CONDITION
- *- Radome and latchesCONDITION/LATCHED
- Forward avionics compartment doorCLOSED
- Ground electrical power door (if not required.)CLOSED

(3) NOSE L/G

- *- Nose wheel chocks¹IN PLACE
- *- Wheels and tiresCONDITION
- Nose gear structure.....CONDITION
- Taxi, TO, turn-off lights.....CONDITION
- Hydraulic lines and electrical wires.....CONDITION
- Wheel well.....CHECK
- Safety pinREMOVED

(4) RH FWD FUSELAGE

- RH + AFT avionic compartment doorsCLOSED
- Avionic equipment vent air outlet valveCONDITION
- F/O-CAPT static portsCLEAR
- *- AOA probeCONDITION
- Forward cargo door and selector panel.....CHECK

(5) LOWER CENTER FUSELAGE

- Potable water drain panel (if installed).....CLOSED
- Antennas.....CONDITION
- Drain mastCONDITION
- RAM air inlet flapCONDITION
- LP and HP ground connection doorsCLOSED
- Anti-collision lightCHECK
- CTR TK magnetic fuel levelFLUSH
- Pack air intakes and outlets.....CLEAR

¹ May be removed if two main landing gear have chocks in place.

(6) RH CENTER WING

- Yellow hydraulic bay doorCLOSED
- Fuel panelCLOSED
- Inner tank magnetic fuelFLUSH
- Fuel water drain valve inner tankNO LEAK
- Landing light.....CONDITION
- Wing leading edge ventilation intake.....CLEAR
- *- Slat 1.....CONDITION

(7) ENG 2 LH SIDE

- Oil fill access doorCLOSED
- *- Fan cowl doorsCLOSED/LATCHED
- *- Drain mast.....CONDITION/NO LEAK
- *- Engine inlet and fan bladesCHECK

(8) ENG 2 RH SIDE

- Vent inletCLEAR
- Pressure-relief/Start valve handle access doorCLOSED
- Turbine exhaustCLEAR
- Pylon/access panelCONDITION/CLOSED

(9) RH WING LEADING EDGE

- *- Slats 2, 3, 4, 5CONDITION
- Inner and outer cells magnetic fuel levelFLUSH
- Fuel water drain valves (outer cell, surge tank).....NO LEAK
- Refuel couplingCLOSED
- Surge tank air inlet.....CLEAR
- *- Fuel ventilation overpressure discINTACT
- Navigation lightCONDITION
- *- Wing tip.....CONDITION

(10) RH WING TRAILING EDGE

- Static dischargersCHECK
- *- Control surfaces.....CONDITION
- *- Flaps and fairingsCONDITION

(11) RH L/G AND FUSELAGE

- *- Chocks²REMOVED
- *- Wheels and tiresCONDITION
- Brakes and brake wear indicatorCONDITION
- Torque link damperCONDITION
- Hydraulic linesCHECK
- Landing gear structureCHECK
- Downlock springs.....CHECK
- Safety pin.....REMOVED
- Ground hydraulic connection yellowCLOSED
- Water drain mastCONDITION
- Shroud fuel drain..CONDITION/NO LEAK

(12) RH AFT FUSELAGE

- Cargo door and selector panelCHECK
- Bulk door (for A-320/A-321 only).....CHECK
- *- Toilet service access door³CLOSED
- Outflow valveCONDITION
- Drain mastCONDITION
- Flight recorder access doorCLOSED

(13) TAIL

- *- Stabilizer, elevator, fin, and rudderCONDITION
- Static dischargersCHECK
- *- Lower fuselage structure (tail impact on runway).....CONDITION

(14) APU

- Access doors.....CLOSED
- Air intakeCONDITION
- Drain.....CONDITION/NO LEAK
- Oil cooler air outletCLEAR
- ExhaustCLEAR
- Navigation light.....CONDITION
- Fire extinguisher overpressure indication (red disc).....IN PLACE

(15) LH AFT FUSELAGE

- *- Stabilizer, elevator, fin, and rudderCONDITION
- *- Potable water service door⁴CLOSED
- Ground hydraulic connection blue and green doors.....CLOSED
- Hydraulic reservoir filling door.....CLOSED

² Must be in place if nose wheel chocks removed.

³ May be opened if toilet is being servicing.

⁴ May be opened if water system is being servicing.

(16) LH LANDING GEAR

- *- Chocks⁵ REMOVED
- *- Wheels and tires CONDITION
 - Brakes and brake wear indicator CONDITION
 - Torque link damper CONDITION
 - Hydraulic lines CHECK
 - Landing gear structure CHECK
 - Downlock springs CHECK
 - Safety pin REMOVED

(17) LH WING TRAILING EDGE

- *- Flaps and fairing CONDITION
- *- Control surface CONDITION
 - Static dischargers CHECK

(18) LH WING LEADING EDGE

- *- Wing tip CONDITION
 - Navigation light CONDITION
 - Surge tank air inlet CLEAR
- *- Fuel ventilation overpressure disc INTACT
 - Fuel water drain valve NO LEAK
 - Inner and outer cell magnetic fuel level FLUSH
- *- Slats 2, 3, 4, 5 CONDITION

(19) ENG 1 LH SIDE

- Oil fill access door CLOSED
- *- Fan cowl doors CLOSED/LATCHED
- *- Drain mast CONDITION/NO LEAK
- *- Engine inlet and fan blades CHECK

(20) ENG 1 RH SIDE

- Vent inlet CLEAR
- Pressure relief/Start valve handle access door CLOSED
- Turbine exhaust CLEAR
- Pylon/access panel CONDITION/CLOSED

(21) LH CENTER WING

- *- Slat 1 CONDITION
 - Wing leading edge ventilation intake CLEAR
 - Fuel water drain valves NO LEAK
 - Inner tank magnetic fuel FLUSH
 - Landing lights CONDITION
 - Hydraulic reservoir pressurization door CLOSED
 - RAT doors CLOSED

⁵ Must be in place if nose wheel chocks removed.

2.4 CM2 PRELIMINARY COCKPIT PREPARATION

Items marked by asterisks (*) are the only steps to be completed during a transit stop. The following procedure, performed by the CM2 ensures that all required checks are performed before the application of electrical power to avoid inadvertent operation of systems and danger to the aircraft and personnel. Including APU start and the establishment of electrical and pneumatic power.

WEATHER RADAR

- Power supply switchCHECK OFF
- Predictive windshear system CHECK OFF

ENG

- MASTER 1 and 2 OFF
- MODE selector NORM

L/G

- L/G lever CHECK DOWN

WIPERS

- WIPERS OFF

ELEC

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

- BAT 1 and 2CHECK OFF
- BAT 1 and 2 VOLTAGECHECK ABOVE 25.5 V

Battery voltage above 25.5 V ensures a charge above 50 %.

- If battery voltage is below 25.5 V :

a charging cycle of about 20 minutes is required.

- BAT 1 and 2 AUTO
- EXT PWRON

Check on ECAM ELEC page, battery contactor closed and batteries charging.

after 20 minutes :

- BAT 1 + 2 OFF
- BAT 1 and 2 VOLTAGECHECK ABOVE 25.5 V

- If battery voltage is above 25.5 V :

- BAT 1 and 2 AUTO

If the APU is started on batteries only, it should be started within 30 minutes after the selection of batteries to AUTO (35 minutes after battery selection to AUTO, the battery charge is less than 25 % of maximum capacity).

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

- BAT 1 and 2AUTO
- EXT PWR (when AVAIL light is on)ON

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 (AC Power available)
- APU FIRE pushbutton lighted red.
- SQUIB and DISCH lights on.

***APU START**

During transit stop APU START may be delayed till the moment when external electric power is going to be removed.

▪ **If EXT PWR ON light is on :**

- APU MASTER switchON

ON light comes on.

APU page appears on ECAM.

- APU START.....ON

FLAP OPEN indication appears on ECAM APU page.

On 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 page replaces ECAM APU page.

- EXT PWR.....AS RQRD

▪ **If EXT PWR ON light is out:**

- **APU MASTER switch ON**

ON light comes on.

- **APU START ON**

At 95% RPM:

- *START ON light goes out.*
- *AVAIL light comes on.*
- *APU GEN comes on line.*
- *ECAM APU page appears after 10 seconds.*
- *If required, adjust brightness on ECAM control panel.*

10 seconds later:

- *ECAM DOOR page replaces ECAM APU page.*

COCKPIT LIGHTS

* - **COCKPIT LIGHTSAS RQRD**

- *Set OVHD INTEG LT, STBY COMPASS, DOME, ANN LT switches as required.*
- *Set FLOOD LT and INTEG LT as required.*

Note: *DOME light is the only lighting source in the EMER ELEC configuration. The DIM position is recommended for take off.*

PARKING BRAKE

* - **PARKING BRAKE ON**

* - **ACCU PRESS & BRAKES PRESS indicatorsCHECK**

- *Check for normal indications.*
- *The ACCU PRESS indication must be in the green band. If required use the electric pump on yellow hydraulic system to recharge the brake accumulator.*

WARNING

Yellow and green hydraulic systems are pressurized from yellow electric pump. Get ground crew clearance before using the electric pump.

F/CTL

* - **SPEED BRAKE lever CHECK RET and DISARMED**

- **FLAPSCHECK POSITION**

Check on the upper ECAM display that the FLAPS position agrees with the handle position.

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**

Set ON (if applicable. Refer to FCOM 3.04.91 p.5)

*AIR COND

- * - **APU BLEED** **ON**

Do not set APU BLEED ON, if APU START is going to be delayed during transit stop.

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

- **ALL WHITE LIGHTS** **OFF**
- **X BLEED** **AUTO**
- **Zone temperature selectors** **AS RQRD**

Full range temperature 24 ± 6° C

CARGO HEAT

- **SELECTORS** **AS RQRD**

Set temperature selectors as required.

ELEC

- **Scan / check : no amber lights except GEN FAULT lights**

VENT

- **Check all lights off**

Note: If preliminary cockpit preparation is being performed during heavy rain, EXTRACT push button switch must be ON OVRD, this closes the avionics ventilation system, preventing rainwater from entering. If bleed air is not available, apply limited time.

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 CLR or CANCEL them. If any action is required, call maintenance personnel as soon as possible.*

- * - **DOOR** **PRESS**

If oxygen pressure is half boxed in amber, check "MIN FLT CREW OXY CHART" to verify if the pressure is sufficient for the scheduled flight (Refer to FCOM 3.01.35).

- * - **HYD** **PRESS**

Check that the quantity indexes are in the normal filling range.

- * - **ENG** **PRESS**

Check that the oil quantity is at or above 9.5 qts + estimated consumption (maximum average estimated consumption is ~ 0.5 qt/h).

Minimum starting oil temperature is - 40 °C.

EMERGENCY EQUIPMENTCHECK

Check the following equipment:

- *Escape ropes stowed*
- *Life jackets stowed*
- *Axe stowed*
- *Smoke hoods stowed*
- *Portable fire extinguisher lock wired and pressure in the green area*
- *Charged Flashlights*
- *Asbestos gloves*

RAIN REPELLENT

- **PRESSURE and QUANTITY INDICATORSCHECK**

CAUTION

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

REAR and OVERHEAD CIRCUIT BREAKERS panels

- **REAR and OVERHEAD CIRCUIT BREAKERS panelsCHECK**

Check that all circuit breakers are set. Reset as necessary.

GEAR PINS and COVERS

- * - **GEAR PINS and COVERSCHECK**

Check that three are on board and stowed.

STAFF PAPERSCHECK

Check following documents on board:

• FCOM volumes 1,2,3,4	• Standard Operating Procedures
• Weight and Balance Manual (WBM)	• Папка с сертификатами
• Minimum Equipment List (MEL)	• НПП ГА – 85
• Airplane Flight Manual (FM)	• РПП ОАО «Аэрофлот»
• QRH (in duplicate)	• Папка справочного тех. материала
• Take off Charts (RTOW)	• Aircraft Technical Logbook
• Emer Proc and Eqpmt Manual	• Normal CHECKLIST (in duplicate)

2.5 CM2 SECURITY COCKPIT PREPARATION

The security cockpit preparation will be carried out on the first flight of the day.

FLIGHT DECK SECURITY CHECK COMPLETE

Check that all stowages are cleaned and there are no any foreign items, which will not be used during flight:

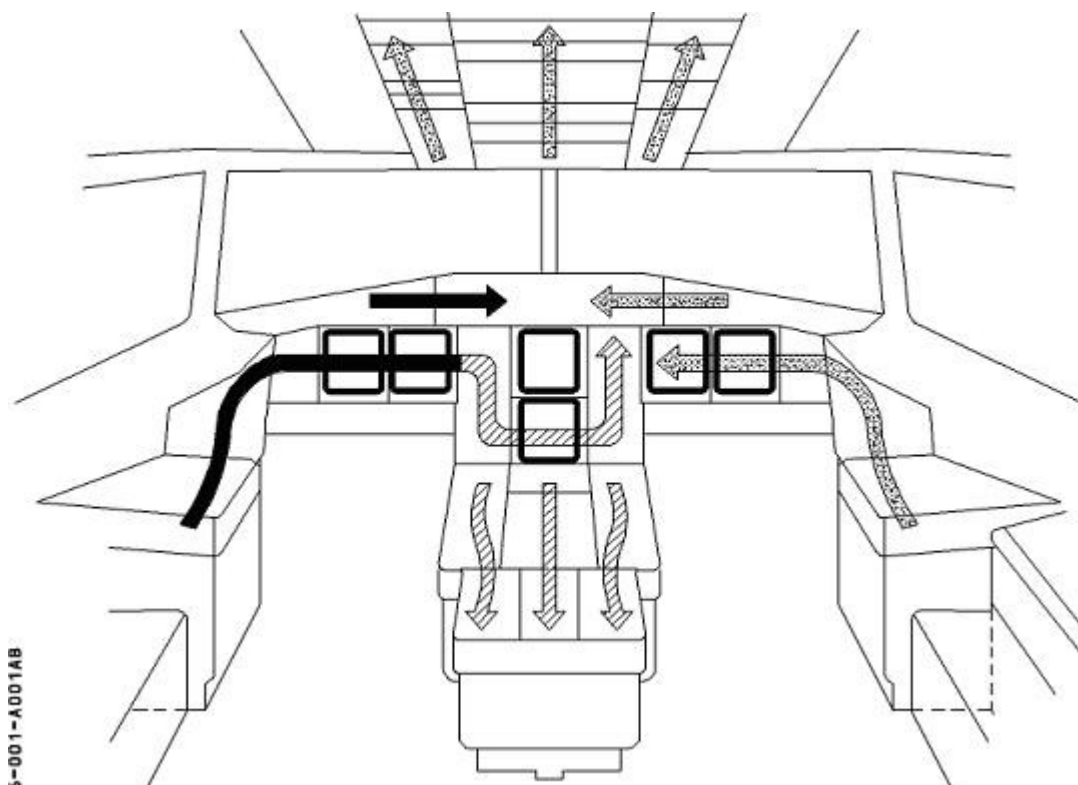
- *Wardrobe*
- *Waste bin (L/H side)*
- *Cup holder stowage (L/H side)*
- *Checklist stowage (L/H side)*
- *Paper stowage area L/H side Captain*
- *Ashtray (L/H side)*
- *Rudder pedals and floor well area of Captain*
- *Air vent by rudder pedals (L/H side)*
- *Upper surface of instrument covering*
- *Center console/throttle box*
- *Rudder pedals and floor well area of first officer*
- *Ashtray (R/H side)*
- *Checklist stowage (R/H side)*
- *Cup holder stowage (R/H side)*
- *Air vent by rudder pedals (R/H side)*
- *Paper stowage area R/H side first officer*
- *Waste bin (R/H side)*

2.6 COCKPIT PREPARATION

Items marked by (*) are the only steps to be completed during a transit stop.

The CM1 and CM2 should perform the cockpit preparation according to the panel scan sequence.

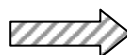
PANEL SCAN SEQUENCE



CM1 AREA OF RESPONSIBILITY



CM2 AREA OF RESPONSIBILITY



PF AREA OF RESPONSIBILITY

OVERHEAD PANEL

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

RCDR

- * - **RCDR GND CTL ON CM2**

Select RCDR GND CTL to ON to enable recording of the ground checks and crew briefings.

- **CVR TEST.....PRESS AND RELEASE CM2**

Check low frequency signal through the loud speakers with the parking brake ON.

EVAC

- **CAPT and CAPT/ PURS switch..... CAPT/ PURS CM2**

*ADIRS

- * - **Mode rotary selectors (1+2+3)..... NAV CM2**

- *The ADIRS outputs are used by many of the aircraft's systems, so it is essential to set the selectors to NAV as soon as possible to provide data to the related systems.*
- *Perform a complete alignment if:*
 - *It is the first flight of the day*
 - *The flight crew changes*
 - *The GPS is not available, and long segments in poor radio navaid coverage airspace are expected.*
- *For other flights, perform a fast alignment, if the residual ground speed greater than 5 knots. The alignment is not necessary, if the residual ground speed is less than 5 knots.*
- *In case of ADIRS alignment, check that the ALIGN lights of the three ADIRS are on.*
- *For more information on ADIRS OPERATION, refer to SUPPLEMENTARY TECHNIQUES (FCOM 3.04.34).*

EXT LT

- * - **EXTERIOR LIGHTS.....AS RQRD CM2**

Set the STROBE switch to AUTO, the BEACON switch to OFF, and remaining switches as required. NAV & LOGO to 1 for the first flight of the day, 2 – for the second one.

* SIGNS

- * - **SEAT BELTS ON CM2**

- * - **NO SMOKING AUTO CM2**

- * - **EMER EXIT LT ARM CM2**

Note: Leaving the NO SMOKING selector ON prevents the emergency batteries from charging.

CABIN PRESS

- **LDG ELEV AUTO CM2**

* AIR COND

- * - PACK FLOW..... AS RQRD CM2

Select in accordance with table below:

A/C type	If pax. less than	pack flow	Note
A-319	85	LO ¹	¹ if the weather is very hot, select "HI"
A-320	115	LO ¹	
A-321	140	ECON	

If the APU is supplying, pack controllers select HI flow (Normal flow for A-321) automatically, independent of the selector position.

ELEC

- ECAM ELEC PAGE.....SELECT CM2
- BAT 1 + 2OFF then ON CM2

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

* FUEL

- * - AII FUEL TK PUMPSON CM2
- * - MODE SEL.....CHECK AUTO CM2
- * - X FEEDCHECK CLOSED CM2

ENG 1 - ENG 2 FIRE

- ENG 1 and 2 FIRE pushbuttonsCHECK IN and GUARDED CM2
- AGENT 1 and AGENT 2 lights.....CHECK OUT CM2
- ENG 1 (2) TEST pushbuttonPRESS CM2

Check:

- ENG 1 (2) FIRE warning on ECAM + CRC + MASTER WARN light.
- ENG FIRE pushbutton lighted red.
- SQUIB and DISCH lights on.
- FIRE light (on ENG panel) on.

AUDIO SWITCHING panel

- AUDIO SWITCHING panel NORM CM2

THIRD OCCUPANT AUDIO CONTROL PANEL

- PA reception knob..... Select reception CM2
 - This allows cabin attendant announcements to be recorded on the CVR.
 - For proper recording, set volume at or above medium range.

RMP 3

- RMP ON CM2
- Green NAV lightCHECK OFF CM2
- SEL lightCHECK OFF CM2
- “DATA”CHECK CM2

MAINTENANCE PANEL

- Check all lights out.....CM2
- If not out, select associated pushbutton switch off.....CM2

RMP 1+2

- RMP ON CM2
- Green NAV lightCHECK OFF CM2
- SEL lightCHECK OFF CM2
- COM FREQUENCIES.....TUNE CM2

* AIRFIELD DATA

- ATISOBTAIN CM2

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

* 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" message appears, do not press any MCDU key until the message clears.

If “OPP FMGC IN PROGRESS” appears it means that the on side FMGS is not working. In order to resume dual operation pull the failed FMGC circuit breaker for 5 seconds then push.

Note:

- Before resetting FMGC 1 (or 2), switch OFF FD 1 (or 2).
- After applying external power or APU generator power, wait 2 minutes before resetting the FMGC circuit breakers.

CAUTION

Always wait 1 minute after “PLEASE WAIT” message disappears from MCDU, before engaging or reengaging the FD’s of the reset FMGC.

Allow suitable time (up to 90 seconds) for self test and resynchronization process to be completed before accessing the MCDU.

If the MCDU keyboard is ineffective (pilot cannot call up any MCDU pages for display) and MCDU MENU page remains displayed, the MCDU is frozen. To cure this recycle the related MCDU circuit breakers (pull C/B and push it back in after 10 seconds).

- Complete each page using information of the computerized flight plan.

* - **FM database validity CHECK CM2**

- Press the DATA key, and display the A/C STATUS page (if not displayed).
- Check ENGINE & AIRCRAFT TYPE.
- Check DATA BASE validity and stored WPT / NAVAIDS / RWY / ROUTES if any
- Delete the stored data, if applicable.
- Enter (compare) idle/perf. factor according to CFP degradation factor.

* - **NAVAID DESELECTION AS RQRD CM2**

If NOTAMs warn of any unreliable DME or VOR/DME, display DATA, then POSITION MONITOR. Access the SEL NAVAID page, and deselect the related nav aids.

* - **FLIGHT PLAN INITIALIZATION COMPLETE CM2**

- Press the INIT key.
- Insert CO RTE or city pair, and check FROM/TO.
- Check/modify ALTN/CO RTE.
- Enter flight number (AFL_ _ _).
- Check latitude/longitude using airport view Jeppesen chart or CFP.
- Enter (and/or check) cost index computed by CFP.
- Enter intended initial CRZ FL, or check 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.

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

• **If the database does not contain a company route:**

The flight plan must be constructed manually:

- Press the INIT key.
- Enter a city pair in the FROM/TO field. The ROUTE SELECTION page comes up with "NONE".
- Select RETURN key then construct the flight plan manually.

If waypoints, nav aids or airports are not in the nav database, the pilot must define and store them, using the "data stored" function.

* - **ALIGN IRS prompt PRESS CM2**

- ADIRS position initialization involves setting the ADIRS navigation starting point. This is only necessary for a complete or fast alignment.
- Press the ALIGN IRS prompt to send the coordinates displayed on the MCDU INIT page to the three ADIRS.
- Use the defaulted departure airport reference point coordinates to initialize the ADIRS.
- When flying without GPS on long segments without radio coverage, it is better to use the gate coordinates to initialize the ADIRS: To insert these coordinates, slew them on the MCDU, and then press the ALIGN IRS prompt.

* - **F-PLN A page COMPLETE AND CHECK CM2**

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 using scroll keys.*
- *Lateral revision at WPT for ROUTE modification if needed. (Refer to 4.04.10 FCOM).*
- *Vertical revision. Check or enter climb speed limit, constraints according to ATC clearance. Enter step altitude as appropriate.*

* - **F-PLN CHECK CM2**

- *Check the F-PLN using F-PLN page and 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 in the computer (paper) flight plan.*

* - **WINDS AS APPROPRIATE CM2**

Choose between using TRIP WIND or forecast wind for CLB and CRZ phases. (Refer to 4.04.20 FCOM).

Note: 1. *In case of limited time for flight preparation wind insertion may be done after reaching TOC.*

2. *Trip wind data may be inserted on INIT B page.*

* - **SECONDARY FLIGHT PLAN AS APPROPRIATE CM2**

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 return to the departure airfield. Insert airfield data into SEC PERF APPR page.*

b) *If weather is below landing minimums at the departure airfield, the secondary flight plan should be that required for a diversion immediately after take off.*

c) *If there is a chance of a change in runway or SID during taxi, prepare for it by copying the active flight plan and making the necessary modifications on SEC F-PLN and SEC PERF TO page.*

d) *If there is an emergency turn procedure or E.O. SID published in Jeppesen chart or Runway Analyze Book it may be entered in the secondary flight plan.*

* - **RADIO NAV CHECK CM2**

- *Check the VOR, ILS and ADF 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.*
- *Preferably use the identifier for navids entry.*
- *If the ADF idents is not in the database, be sure to include a decimal point when tuning the frequency (e.g. 315. or 325.7).*

* - **PROG. PAGE CHECK CM2**

* - **ACARSINITIALIZE CM2**

To access ACARS during preflight, ACARS initialization should be done in order listed below:

- Push MCDU button.
- Select ATSU.
- Select AOC MENU.
- Select AOC COMPANY page 1 of 2.
- Select AOC FLIGHT INIT page 1 of 2:
 - insert flight number (line 1L);
 - insert departure airport (line 2L);
 - insert alternate 1 (line 3L);
 - insert flight plan time (line 4L);
 - insert day (line 1R);
 - insert destination airport (line 2R);
 - insert alternate 2 (if applicable) (line 3R);

***COCKPIT DOOR**

- **ANN LTTEST CM1**

Check that the OPEN and FAULT lights (on the pedestal), and the three STRIKE STATUS lights (on the overhead panel) come on.

- **ANN LTBRT CM1**

Check that all lights go off.

- **COCKPIT DOOR CHECK CORRECT OPERATION CM1**

- Set the toggle switch to the UNLOCK position. Check that the door opens, and the OPEN light comes on.
- Then, with the door fully opened, release the toggle switch (check that it returns to the NORM position). Close the door. CHECK that it is locked, and the OPEN indication goes off.

- **COCKPIT DOOR MECHANICAL OVERRIDE CHECK CM1**

Check that the door opens normally, and that it closes when the mechanical override is used.

* - **COCKPIT DOOR CHECK CLOSED CM1**

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 entering a code on the code pad and depressing the request button. Except for crew entry/exit, the cockpit door should remain closed whenever at least one passenger on board.

WHEN BOTH PILOTS SEATED

After completing external check the CM1 should confirm the following by performing scan of following items:

* - **IRS ALIGN CHECK CM1**

Check that IR mode rotary selectors are in NAV mode.

- * - **NO WHITE LIGHTS**.....CHECK **CM1**
Check no white lights on overhead panel.
 - * - **ATIS**OBTAIN **CM1**
 - * - **FM database validity**.....CHECK **CM1**
 - * - **NAVAID DESELECTION**.....AS RQRD **CM1**
 - * - **INIT page «A»**CHECK **CM1**
Confirm city pair in the FROM/TO field in the init page “A” of MCDU.
 - * - **FLIGHT PLAN A** CHECK **BOTH**
*Select the EFIS CSTR P/B switch ON. Ensure that the inserted flight plan including SID agrees with the planned route; check SID index, effective date, SID routing checks should be done by principle of read (from Jeppesen chart) by **CM2** and check (by scrolling on MCDU) by crew comparing tracks and distances between waypoints which are displayed on the second line from top of MCDU.*
Correct stringing of waypoints should be checked using ND in PLAN mode.
*Flight plan routing should be reviewed by principle of read (from CFP) and check (by scrolling on MCDU), but track and distance comparison is not required. Correct stringing of waypoints along whole flight plan should be checked using ND in PLAN mode, **CM2** reads and both checks.*
 - * - **SECONDARY FLIGHT PLAN**CHECK **CM1**
- NOTE**

It is the crew's responsibility to ensure that the route inserted, including SID, crosschecked with flight plan.
- * - **RADIO NAV page**CHECK **CM1**
Check that all RAD. NAV. AIDS are inserted accordingly to SID and ADF-VOR select switches on EFIS control panel are set properly.
 - * - **PROG. PAGE**CHECK **CM1**
 - * - **INIT page “B”**SELECT **BOTH**

GLARESHIELD

* EFIS CONTROL PANEL

- **Glareshield integral light and flood light**AS RQRD **PF**
- * - **BARO REF**SET **BOTH**
 - Set QNH (or QFE) on EFIS control panel and on the standby altimeter.
 - Check barometer settings and altitude indications on PFD and standby altimeter.
- * - **FD**CHECK ON **BOTH**
- * - **ILS**AS RQRD **BOTH**

* - **CSTR** **ON BOTH**

* - **ND mode and range** **AS RQRD BOTH**

MODE: Display the ARC mode on the ND if the take off direction is approximately the departure direction, or the ROSE NAV mode if the direction change is to be more than 70° after take off (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 BOTH**

Display VOR and ADF needles as needed.

*FCU

* - **SPD MACH window** **CHECK DASHED PF**

* - **HDG-** **CHECK DASHED PF**

* - **HDG-V/S / TRK-FPA** **CHECK HDG-V/S PF**

* - **ALT window** **INITIAL EXPECTED CLEARANCE ALT PF**

* - **V/S** **CHECK DASHED PF**

* - **OUTER ALT SEL knob** **CHECK 100 FT PF**

* - **METRIC ALT pushbutton** **AS RQRD PF**

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

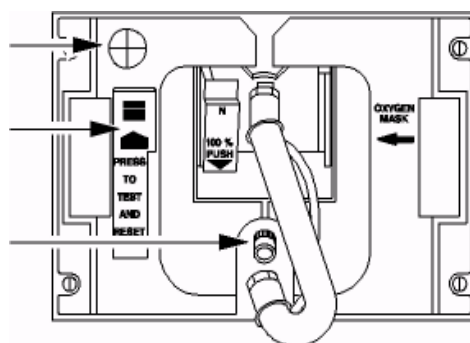
LATERAL CONSOLES

* - **ATC HIJACKING ALERT LIGHT** **CHECK OFF BOTH**

Each pilot should check, that ATC HIJACKING ALERT LIGHT is OFF on opposite side (CM1 checks that this light is OFF at side of CM2 and vice versa).

OXYGEN MASK TEST

BLINKER
RESET/TEST BUTTON
EMER PRESS SELECTOR



On the OXYGEN panel:

- **CREW SUPPLY** **CHECK ON BOTH**

On the glareshield:

- **LOUDSPEAKERS** **ON BOTH**

On the audio control panel:

- INT reception knob **PRESS OUT-ADJUST BOTH**
- INT/RAD switch **INT BOTH**

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 when performing this check.*

Check that the reset/test button returns to the up position and the N 100 % selector is in the 100 % position.

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

Note: *If there is observer in cockpit all masks must be checks.*

On the ECAM DOOR/OXY page:

- **REGUL LO PR message** **CHECK OFF BOTH**
 - *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 in the closed position may not be detected during the oxygen mask test).*

CM 1 / 2 INSTRUMENT PANELS

- **PFD and ND brightness knob** **AS RQRD BOTH**
Check the ND outer ring to maximum range (radar display)
- **LOUDSPEAKER** **SET BOTH**
One o'clock position is recommended.
- **FOOT WARMER (if installed)** **ON BOTH**
- * - **PFD** **CHECK BOTH**
 - *Check PFD/ND 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 BOTH**
 - *Check for correct display.*
 - *Crosscheck compass indication on the ND and DDRMI.*
 - *Check ground speed less than 5 knots, heading (max difference 4° between two ND's), initial waypoint, VOR/ADF indications.*
- * - **"INSTRUMENT CHECK"** **ANNOUNCE PF**

THE INSTRUMENT CHECK SHALL CONSIST OF READING BY PF THE FOLLOWING:

INSTRUMENT		CALL-OUT
PFD	AIRSPEED CALL FMA FD TARGET ALT ALTITUDE SCALE VSI BARO ATTITUDE HEADING SCALE	"30 KNOTS" "CLIMB / ALT – NAV – BLUE" "ONE FD TWO" " _ _ _ " "ALTITUDE _ _ _ " "V/S _ _ _ " "QNH / QFE _ _ _ " "PITCH _ _ _ , BANK _ _ _ " "HEADING _ _ _ (ND) _ _ _ (RMI) _ _ _ "
ND	GS INIT WPT VOR1/ADF1 VOR2/ADF2	"GND SPEED _ _ _ " "TO WPT _ _ _ " "VOR(ADF)1 _ _ _ " "VOR(ADF)2 _ _ _ "

CTR INSTRUMENT PANEL

- * - **STBY ASI** **CHECK PF**
- * - **STBY ALTI and STBY ALTI in meter** **CHECK PF**
Set QNH (QFE).
- * - **STBY HORIZON** **CHECK PF**
Check no flag - Erect if necessary.
- * - **DDRMI** **CHECK PF**
Check compass indication.

*** CLOCK**

- Check time and date, elapsed time at zero, chrono at zero, adjust if necessary, set GPS position **PF**

NOSEWHEEL STEERING

- **A/SKID & N/W STRG** **ON PF**

PEDESTAL

ACP

- INT knob **PRESS OUT / VOLUME CHECK BOTH**
Make sure that INT volume is turned up to permit contact with the ground crew.
- VHF 1 **CHECK PF**
Check transmission and reception. Preselect airborne frequency.
- HF (if required for flight) **CHECK PF**
 - Check transmission and reception
 - Do not transmit on HF during refueling.

*** WEATHER RADAR**

- * - Power supply switch **CHECK OFF PF**
- * - WINDSHEAR switch **CHECK OFF PF**
- * - GAIN **AUTO PF**
- * - MODE **AS RQRD PF**

SWITCHING panel

- SWITCHING panel **CHECK PF**
Check all selectors at NORM.

*** ECAM control panel**

- * - STS **PRESS PF**
Check that INOP SYS display is compatible with MEL.
If a message is displayed in MAINTENANCE STATUS:
 - At transit : Disregard, unless AIR BLEED maintenance status.
 - 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.
- * - PRESS **PRESS PF**
Check that the CAB PRESS page displays LDG ELEV AUTO, to confirm correct position of the LDG ELEV selector.
- * - FUEL QTY **CHECK PF**
 - CM1 also checks that ECAM fuel on board corresponds to the F-PLN.
 - Check that fuel imbalance is within limits.
 - Check fuel distribution is normal.

***THRUST LEVERS**

- * - THRUST LEVERS **CHECK IDLE PF**

* ENG

- * - ENG MASTER switch CHECK OFF PF
- * - ENG MODE selector CHECK NORM PF

* PARKING BRK

- * - PARKING BRAKE ON PF
 - Check pressure on BRAKE PRESS indicator.
 - If chocks are in place, release the parking brake to increase brake cooling.

GRAVITY GEAR EXTN

- GRAVITY GEAR EXTN CHECK STOWED PF

ATC

- THRT/ALL selector SET ALL PF
Normally ALL will be set, but in congested areas THRT may be selected, depending on screen clutter.
- SYS 1 / 2 selector SET SYS 1 PF
- * - TRAFFIC selector SET ABV PF
- * - MODE selector CHECK/SET STBY PF
- * - SQUAWK 2000 PF

* TAKE OFF BRIEFING

- * - TAKE OFF BRIEFING PERFORM PF
- * - “BEFORE START C/L DOWN TO THE LINE” CALL CM1
- * - BEFORE START C/L DOWN TO THE LINE COMPLETE BOTH

* FMGS DATA INSERTION

FMGS DATA INSERTION has to be done with all weights and fuel figures received and checked. Crew should have two loadsheets: one for Captain and another – for first officer.

- * - LOADSHEET CHECK BOTH

The crew should thoroughly check the load and trim sheet silently and independently, particularly for gross errors. Crew makes sure that the loadsheet data are correct: correct flight data, correct aircraft, dry operating index, configuration, fuel on board, etc.

The Captain reads out ZFCG and ZFW from loadsheet. CM2 checks that data are correct.

Note: *If two loadsheets are not available at the moment, the Captain should highlight the ZFCG, ZFW, FUEL, TOW and the first officer must verify that highlighted data are correct. The Captain reads out ZFCG and ZFW, CM2 enters ZFCG and ZFW into FMGS init page “B”.*

- * - **ZFCG/ZFW** **INSERT CM2**

The CM1 reads from loadsheet and checks data insertion.

- * - **FUEL PLANNING** **CHECK CM2**

Should be used as gross error check of the planned fuel requirement if wind data have been already inserted.

- * - **BLOCK FUEL** **INSERT CM2**

- * - **GROSS WEIGHT CALCULATION**..... **CHECK BOTH**

CM2 reads out FMGS calculated TOW from init page "B". Crew should confirm, that FMGS calculated TOW equates to the TOW from the loadsheets. Captain should also check that the correct values have been inserted into the FMGS with reference to his own MCDU.

Note: If two loadsheets are not available at the moment crew should verify that calculated TOW equates to the highlighted TOW from the loadsheet.

NOTE

The characteristic speeds displayed on the MCDU (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).

TAKE OFF DATA INSERTION (PERF TAKE OFF page):

- **TAKE OFF DATA** **PREPARE and CHECK BOTH**

- *The CM2 calculates the take off speeds and flexible temperature, using the RTOW charts.*
- *The CM1 independently calculates the take off speeds and flexible temperature as crosscheck.*
- *Take particular care in determining the take off configuration. (Refer to 2.02.20 FCOM). Confirm any take off weight limitation.*
- *The CM1 reads and CM2 inserts the take off data on the MCDU's PERF pages. CM2 enters calculated speeds into CFP.*

- * - **PERF page**..... **SELECT CM2**

- * - **V1, VR, V2** **INSERT CM2**

Both pilots should confirm that V₁ and V₂ are correctly displayed on PFD and V₂ and green dot speed are bugged on stand by ASI by CM1.

- **TRANS ALT.** **CHECK CM2**

- * - **THR RED/ACC altitude** **MODIFY or CHECK CM2**

Consider to use NAPD 1 or 2 (A or B) for noise abatement in accordance with airport regulations.

- * - **TO SHIFT** **AS RQRD CM2**

Enter the take off SHIFT distance, if take off is to be from an intersection. This is essential for position updating at take off and, consequently, for navigation accuracy (not required if "GPS PRIMARY" depicted on PROGRESS page).

- * - **FLAPS/THS reminder** **INSERT CM2**

Both pilots should check/calculate pitch trim unit setting according to CG value from loadsheet.

* - **FLX TO TEMP****INSERT CM2**

* - **ENG OUT ACC altitude****MODIFY or CHECK CM2**

Both pilots should check that OEI acceleration altitude of RTOW chart is within the tolerance.

CLIMB, CRUISE SPEED PRESELECTION

* - **PRESET SPEEDS**.....**AS RQRD BOTH**

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 (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.

Note: CLB SPD preselection applies when:

- ATC specifies an initial climb speed
- The initial climb speed must be lower than normal because:
 - There are to be turns greater than 120° in initial climb out.
 - Obstacle clearance or some other situation requires a high climb angle.
 - The air field has a risk area to be quickly cleared (e.g. birds reported).

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 be either cleared or modified on the VERT REV page at the origin (or a climb waypoint).

*** ATC CLEARANCE**

Obtain ATC clearance or use the probable clearance.

* - **ATC CLEARANCE** **OBTAIN CM2**

It is possible to obtain ATC clearance through data link.

* - **ATC clearance** **MONITOR / CHECK CM1**

Confirm, that FMGS inserted SID and FCU settings are in accordance with ATC clearance.

* - **ATC CODE** **SET CM2**

3 ВЫПОЛНЕНИЕ ПОЛЕТА

3.1 BEFORE PUSH BACK or START

Items marked by (*) are the only steps to be completed during a transit stop.

- * - **SEATS, SEAT BELTS, HARNESSSES, RUDDER PEDALS, ARMRESTS.....ADJUST BOTH**
The seat is correctly adjusted when the pilot's eyes are in line with the red and white balls.
- * - **MCDU IN TAKE OFF CONFIGURATION BOTH**
*It is recommended that the crew display **F-PLN** on the **PNF** side and **PERF TAKE OFF** on the **PF** side.*
- * - **EXT PWRCHECK OFF CM1**
Check that external power has been removed.
- * - **WINDOWS and DOORS CHECK CLOSED BOTH**
 - Check cockpit sliding windows closed and locked by pressing the control handle to mechanical stop (red circle on handle fully visible).
 - Check cockpit door closed and locked.
 - Check, on the ECAM lower display, that all doors are closed.
- * - **PUSH BACK/START UP CLEARANCEOBTAIN CM2**
Obtain ATC push back/start up clearance.
- * - **A/SKID & N/W STRG AS RQRD CM2**
When push back is required, set A/SKID & N/W STRG to OFF. This ensures that, in case of a nose landing gear electrical box failure, the NWS remains disconnected during the entire push back phase, and thus avoid possible nose landing gear damage.
The following Master Caution will occur:
BRAKES ANTISKID/NWS OFF (amber).
Check that NWS and A/SKID is displayed as inoperative on the WHEEL page. Consequently the following items are displayed as inoperative (amber) on the STS page:

CAT 3	DUAL
ANTI	SKID
N/W	STRG

Clear the A/SKID & N/W STRG OFF ECAM caution.
Note: *When the second engine generator comes on-line, the NWS Master Caution will reoccur. Disregard this A/SKID/NWS Master Caution and clear it.*
- * - **NW STRG DISC CHECK AS RQRD CM1**
In case of push back (conventional or towbarless), the nosewheel steering selector bypass pin must be in tow position. The ECAM NW STRG DISC memo indicates this to the flight crew.

CAUTION

If NW STRG DISC is not displayed on the ECAM, but the ground crew confirms that the steering selector bypass pin is in towing position, then the push back must not be performed. This is to avoid possible nose landing gear damage at the green hydraulic pressurization.

To dispatch the aircraft in such a case, refer to MEL.

In case of power push by the main landing gear, the nosewheel steering selector should remain in the normal position to steer the aircraft. Refer to 3.04.80 FCOM.

* - **BEACON**ON **CM1**

* - **THR LEVERS** **CHECK IDLE** **CM1**

CAUTION

Engines will start, regardless of the 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** **CM1**

The ACCU PRESS indication must be in the green band with parking brake ON.

CAUTION

If, during engine start with 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 push back is required, set the PARKING BRK to OFF (only when the communication with ground crew established and ATC clearance obtained).*

CAUTION

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

* - **"BEFORE START CHECKLIST below the line"** **CALL** **CM1**

* - **BEFORE START CHECKLIST below the line** **COMPLETE** **BOTH**

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").

- **COMMUNICATION with ground crew.....ESTABLISH CM1**

Establish communication with ground crew to check: the towbar connected, chocks removed, ground crew ready for alternate braking system check and for push back as well.

Note: If no push back required the flight crew must ensure that chocks wheels are ON prior to commencing this procedure.

- **Y ELEC PUMPCHECK OFF CM1**

- **PARKING BRAKEOFF CM1**

- **BRAKE PEDALSPRESS CM1**

Apply maximum pressure on both pedals.

- **BRAKE PRESSURE (on BRAKE press indicator)..... CHECK CM1**

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

- **BRAKE PEDALSRELEASE CM1**

- **PARKING BRAKEON CM1**

- * - **ATC/TCAS MODE selectorAS REQUIRED CM2**

Set XPNDR if Mode S required.

- * - **PUSH BACK/START UP CLEARANCEOBTAIN CM1**

- *Obtain ground crew clearance if push back is required.*
- *After push back is completed, set the PARKING BRAKE to ON and inform the ground crew to allow towbar to be disconnected.*

3.2 ENGINE START

AUTOMATIC ENGINE START

Use the automatic engine start procedure in most circumstances. However, if the start aborts due to insufficient starter inlet air pressure (e.g. on high airfields or in case of low pressure from an external pneumatic power group), it is recommended to proceed with the manual start procedure, rather than use the automatic one.

If, during the engine start the ground crew reports a fuel leak from engine drain mast, run the engine at idle for 5 minutes. If the leak disappears during the 5 minutes, the aircraft can be dispatched without maintenance action. If the leak is still present after 5 minutes, maintenance action may be required before next flight.

- **ENG MODE selector** **IGN/START CM1**
The lower ECAM display shows the ENG page.
- **ELAPSED TIME** **START CM2**
- **"STARTING ENGINE 2"** **ANNOUNCE CM1**
Engine 2 is usually started first. It powers the yellow hydraulic system, which pressurizes the parking brake.
- **MASTER switch 2** **ON CM1**
 - Do not turn the MASTER switch ON before all amber crosses and messages have disappeared on the engine parameters (upper ECAM display).
- **ENGINE PARAMETERS**..... **MONITOR BOTH**

ON ECAM UPPER DISPLAY	ON ECAM LOWER DISPLAY
N2 increases	<i>Corresponding start valve in line. Bleed pressure indication green. Oil pressure increases.</i>
At 16% N2	<i>Indication of the active igniter (A or B)</i>
At 22 % N2 - FF increases 15 seconds (maximum) after fuel is on - EGT increases - N1 increases	
At 50 % N2	<i>Start valve cross line. Igniter indication off</i>

- Parameter callouts are not mandatory, but should be monitored by both pilots.
- In case the electrical power supply is interrupted during the start sequence (indicated by the loss of ECAM DUs), abort the start by switching OFF the MASTER switch. Then, perform a 30-second dry crank.

- **MAIN AND SECONDARY ENG. IDLE PARAMETERS..... CHECK NORMAL CM1**
 - At ISA sea level: N1 about 19.5 %*
 - N2 about 58.5 %*
 - EGT about 390° C*
 - FF about 275 kg/h*
 - Grey background on N2 indication disappears.*
- **PROBE / WINDOW HEAT..... CHECK / SET AUTO CM2**
 - Set to AUTO if it was ON.*
- **"STARTING ENGINE 1" ANNOUNCE CM1**
- **MASTER switch 1 ON CM1**
 - Same procedure as for engine 2.*
 - Both pack valves reopen with 30 second delay after the second engine N2 is above 50 %.*
 - Note: A PTU FAULT is triggered, if the second engine is started within 40 seconds following the end of the cargo doors operation.*

3.3 AFTER START

AFTER START

- **ENG MODE selector** **NORM CM1**
 - Turning the ENG MODE selector to NORM indicates the end of the start sequence. AFTER START actions may be performed.
 - On ECAM lower display the WHEEL page replaces the ENG page.
 - Leaving the ENG MODE selector at the START/IGN position would prevent continuous relight selection on the ground (would be supplied at lift off). In addition, the ENG page would remain displayed. The selector must be cycled to recover normal control of ignition and to display WHEEL page.
 - After start, to avoid thermal shock, the pilot should operate the engine at idle or near idle for at least 2 minutes before advancing the thrust lever to high power. Taxi time at idle may be included in the warm-up period.
- **"AFTER START PROCEDURE"** **ANNOUNCE CM1**
- **APU BLEED** **OFF CM1**
 - Turn APU BLEED off just after ENG start to avoid ingesting engine exhaust gases.
 - APU BLEED valve closes, ENG BLEED valves open.
- **GROUND SPOILERS** **ARM CM2**
- **RUD TRIM** **ZERO CM2**

If RUD TRIM position indication is not at zero, press the RESET pushbutton.
- **FLAPS lever** **SET CM2**
 - Set flaps for take off.
 - Check their position on the ECAM upper display.
 - If taxiing in slush, keep the flaps retracted until reaching the holding point before take off.
- **PITCH TRIM** **SET CM2**

Set take off CG on pitch trim wheel within the tolerance of 1%.
- **ENG ANTI ICE** **AS RQRD CM2**

Note: Icing conditions may be expected when the OAT (on the ground and for take-off), or when TAT (in flight) is 10° C or below with visible moisture in the air or standing water, slush, ice or snow is present on the taxiways or runways.
- **WING ANTI ICE** **AS RQRD CM2**

When wing ANTI ICE is switched on the 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 CM2**
 - AVAIL light goes out after APU cooling period.
- **A/SKID & N/W STRG** **ON CM2**

It should be done only when "NW STRG DISC" memo disappeared.

- **ECAM DOOR page** **SELECT CM1**
 - Check that all slides are armed
 - Deselect the DOOR page after verifying the slides.
- **ECAM STATUS** **CHECK CM1**
 - Check that there is no status reminder (STS) on the ECAM upper display.
 - If the status reminder is displayed, press the STS pushbutton, and then clear STS after verifying.
- **"CLEAR TO DISCONNECT"** **ANNOUNCE CM1**
- **"FLIGHT CONTROLS CHECK"** **ANNOUNCE CM1**
- **FLIGHT CONTROLS** **CHECK BOTH**
 1. At a convenient stage prior to taxi and before arming the autobrake, the CM1 silently applies full longitudinal and lateral sidestick deflection. On the F/CTL page the CM2 checks full travel of all elevators and all ailerons, and the correct deflection and retraction of all spoilers. The CM2 calls out **"FULL UP"**, **"FULL DOWN"**, **"NEUTRAL"**, **"FULL LEFT"**, **"FULL RIGHT"**, **"NEUTRAL"**, as each full travel/neutral position is reached.
The CM1 silently checks that the CM2 calls are in accordance with the sidestick order.
Note: In order to reach full travel, full sidestick must be held for a sufficient period of time.
 2. The CM1 presses PEDAL DISC pushbutton on nosewheel tiller and silently applies full left rudder, full right rudder and neutral. The CM2 calls out **"FULL LEFT"**, **"FULL RIGHT"**, **"NEUTRAL"**, as each full travel/neutral position is reached. CM2 should follow pedal movement with his feet.
 3. The CM2 applies full longitudinal and lateral sidestick deflection and silently checks full travel and correct sense of all elevators and all ailerons, and the correct deflection and retraction of all spoilers, on the ECAM F/CTL page.
 4. CM1 – check PITCH TRIM position on F/CTL page in units UP or DOWN.
Note: The FLT CTL page is automatically shown for 20 seconds.
- **AUTO BRK** **MAX CM2**
 - ON light comes on.
 - The selection of MAX mode prior to take off improves safety, in the event of an aborted take off.
If the take off must be aborted, the autobrake system applies maximum braking as soon as the thrust levers are set to idle, if ground speed is above 72 knots.
- **"AFTER START CHECK LIST"** **CALL CM1**
- **AFTER START CHECK LIST** **COMPLETE BOTH**

3.4 TAXI

- **ATC TAXI clearance** **OBTAIN CM2**
- **NOSE light** **TAXI CM1**
 - Turn on the nosewheel light to TAXI day and night.
 - RWY TURN OFF lights may be switched ON, as required.
- **GROUND clearance** **OBTAIN CM1**

Obtain a hand signal on the left / right side with the NWS disconnect pin removed. This is indicated by the thumb up signal.
- **"RIGHT SIDE CLEAR"** **ANNOUNCE CM2**
- **"LEFT SIDE CLEAR"** **ANNOUNCE CM1**
- **PARKING BRAKE** **OFF CM1**

Check that brake pressure is zero (triple indicator). Slight residual pressure may be indicated for a short period of time.
- **THRUST LEVERS** **AS RQRD CM1**
 - Little, if any, power above idle thrust will be needed to get the aircraft moving (**40 % N1 maximum**). Thrust should normally be used symmetrically. Once the aircraft starts to move, little thrust is required.
 - Use of the engine anti-ice increases ground idle thrust, so the pilot must use care on slippery surfaces.
 - The engines are close to the ground. Avoid positioning them over unconsolidated or unprepared ground (beyond the edge of the taxiways, for example).

Avoid high thrust settings at low ground speeds, which increase the risk of ingestion (FOD), and the risk of projection of debris towards the trimmable horizontal stabilizer and towards the elevators.
- **"BRAKE CHECK"** **ANNOUNCE CM1**
- **BRAKES** **CHECK CM1**

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

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

Thereafter, the normal maximum taxi speed should be 30 knots in a straight line, 10 knots for a sharp turn. As the ground speed is difficult to assess, monitor ground speed on ND. Do not "ride" the brakes. As 30 knots is 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.

- **"PRESSURE ZERO" CHECK / ANNOUNCE CM2**

- Check that green pressure has taken over yellow pressure. The yellow pressure on the brake pressure triple indicator must be at 0 when pressing the brake pedals.

Although green hydraulic power supplies braking system, if pedals are quickly pressed a brief brake pressure indication appears on BRAKE PRESS indicator.

IF TAKE OFF DATA / CONDITIONS HAVE CHANGED, OR IN CASE OF RUNWAY CHANGE, PREPARE UPDATED TAKE OFF DATA AS APPROPRIATE:

- **F-PLN (Runway) REVISE/CHECK BOTH**

- **FLAPS LEVER AS APPROPRIATE CM2**

Select take off position according to RTOW charts.

- **V1, VR, V2 CHECK/REINSERT BOTH**

- **FLEX TO temperature CHECK/REINSERT BOTH**

FMGS / FCU / PFD / ND

- **F-PLN (SID, TRANS) REVISE or CHECK BOTH**

Take particular care to 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 BOTH**

Use VERT REV at departure, or at a CLB waypoint.

- **CLEARED ALTITUDE ON FCU SET CM2**

- **HDG ON FCU IF REQUIRED, PRESET CM2**

- *If a heading is required by the ATC after take off, preset the heading on the FCU. NAV mode will be disarmed.*

- *RWY TRK mode will keep the aircraft on the runway track.*

- **FD CHECK SELECTED ON BOTH**

- **FMA CHECK BOTH**

- **FLIGHT INSTRUMENTS CHECK BOTH**

- **RADAR (if required) ON CM2**

Once the aircraft has left the apron TILT can be set to MAN to evaluate the weather, by moving the TILT knob up and down. Set TILT back to AUTO, when observations are completed (for A-321 only).

If radar is required for the flight, and the TILT is used in manual mode, 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° UP for weather returns.*
- *Select tilt at 4° UP for take off.*

- **PREDICTIVE WINDSHEAR SYSTEM AUTO CM2**

Once the aircraft has left the apron.

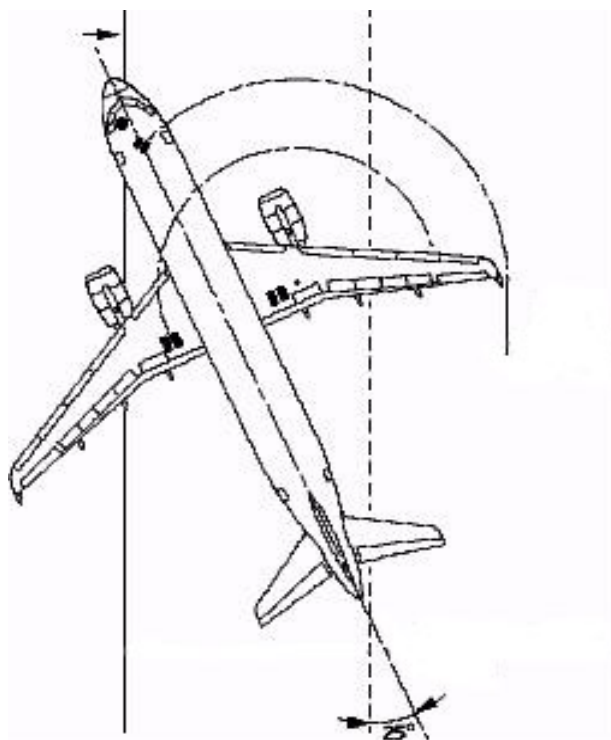
- ATC code **CONFIRM/SET CM2**
- **DEPARTURE BRIEFING** **CONFIRM PF**
This briefing should normally be only a brief confirmation of the thorough take off briefing made at the gate. Any changes in the clearance are to be addressed at this time. Make extensive use of the displays if it is possible.
- **CABIN READY** **CHECK CM1**
*Check no blue message on ECAM, if necessary obtain cabin report from the purser, as a minimum: **"CABIN SECURED FOR TAKE OFF"***
- **TO CONFIG pushbutton** **PRESS CM2**
Check that ECAM upper display shows "TO CONFIG NORMAL".
- **TO MEMO** **CHECK NO BLUE LINE BOTH**
- **"BEFORE TAKE OFF CHECKLIST down to the line"** **CALL CM1**
- **BEFORE TAKE OFF CHECKLIST down to the line** **COMPLETE BOTH**

180° TURN ON RUNWAY

A standard runway is 45 meters wide. However, A-319/320 type needs a pavement of 30 meters wide for a 180° turn, A-321 needs 32 meters wide. The following procedure is recommended for making such a turn in the most efficient way.

- **FOR THE CM1**

- Taxi on the right-hand side of the runway and turn left, maintaining 25° divergence from the runway axis. Maximum ground speed is 10 knots.
- When the CM1 is at about 2 meters before the runway edge, he turns the nosewheel full right and sets **40 % to 43 % N1 (A319)**.
- When the CM1 is physically over the runway edge, he turns the nosewheel full right and sets **50 % to 55 % N1 (A320/321)**.



Note: To avoid skidding the nosewheel on a wet runway, perform the turn at very low speed, using asymmetric thrust and differential braking as necessary.

3.5 BEFORE TAKE OFF

- **BRAKE TEMP** **CHECK CM2**
If brake temperature is above 300° C, delay take off.
- **TAKE OFF OR LINE UP CLEARANCE** **OBTAIN CM2**
- **APPROACH PATH CLEAR OF TRAFFIC** **CHECK BOTH**
- **“LINE UP PROCEDURE”** **ANNOUNCE CM1**
- **CABIN CREW** **ADVISE CM2**
Set SEAT BELTS OFF, then ON twice.
- **AIRBORNE FREQUENCY (VHF 1)** **PRESELECT CM2 / CHECK BOTH**
- **ENG MODE selector** **AS RQRD CM2**
Select IGN if:
 - The runway is covered with standing water.
 - Heavy rain is falling.
 - Heavy rain or severe turbulence is expected after take off.
- **ATC/TCAS Mode selector** **TA or TA/RA CM2**
It is recommended to select TA mode:
 - In case of known nearby traffic which is in visual contact.
 - At particular airports and during particular procedures identified as having a significant potential for unwanted or inappropriate resolution advisories (closely spaced parallel runways, converging runways...).
- **TERR on ND on PNF side** **ON CM2**
- **PACK 1 and 2** **AS RQRD CM2**
PACKs pushbuttons should be checked on the overhead panel.
Consider selecting packs off or APU bleed ON either to improve performance or to reduce maintenance costs by reducing take off EGT. This will improve performance only when TOGA thrust is used. The use of flex thrust may reduce maintenance costs. The effect is particularly significant when small amounts of thrust reduction are used. It is relatively insignificant when maximum thrust reduction is used. Use of APU bleed is not authorized if wing anti ice is to be used.
- **EXTERIOR LIGHTS** **SET CM1**
 - Set the RWY TURN OFF, LAND and NOSE switches to ON/TO, in order to minimize bird strike hazard during take off.
 - Set the STROBE lights to ON, before entering the runway.
- **SLIDING TABLE** **STOW BOTH**
- **“BEFORE TAKE OFF CHECKLIST below the line”** **CALL CM1**
- **BEFORE TAKE OFF CHECKLIST below the line** **COMPLETE BOTH**
Read the checklist below the line, when line up or take off clearance is received.

3.6 TAKE OFF

AIRCRAFT SHOULD BE ALIGNED ON RW CENTER LINE.

- If icing conditions last longer than 30 minutes, or if significant engine vibration occurs, the engine should be accelerated to approximately 70 % N1 for 30 seconds before operating at higher thrust. (See also parking brake limitation 3.01.32 FCOM). If airport surface conditions and congestion do not permit to accelerate the engine to 70 % N1, then power setting and dwell time should be as high as practical. This run up should also be performed **just prior take off** with particular attention to engine parameters to ensure normal engine operation.
- When operating in conditions of freezing rain, freezing drizzle, freezing fog or heavy snow, ice shedding may be enhanced, by additional runups at intervals, not to exceed 10 minutes, advancing throttles to 70% N1 momentarily (no hold time).

Rolling take off is recommended when possible.

- **"TAKE OFF"**ANNOUNCE CM1
- **BRAKES**RELEASE CM1

● If CM2 is PF:

- **"YOU HAVE CONTROL"**ANNOUNCE CM1
- **"I HAVE CONTROL"**ANNOUNCE CM2
- **CHRONO**START BOTH

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

- **THRUST LEVERS**FLX or TOGA CM1
 - To counter the nose-up effect of setting engine take off thrust, apply half forward stick until the airspeed reaches 80 knots. Release the stick gradually to reach neutral at 100 knots.
 - For crosswind take offs, 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 tendency to turn into wind.
 - CM1 progressively adjusts engine thrust in two steps :
 - from idle to about 50 % N1.
 - from both engines at similar N1 to take off thrust.
 - Once the thrust is set, the Captain keeps 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 CM1
 - PF applies full forward stick.
 - For crosswind take offs, 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 tendency to turn into wind.

- CM1 sets 50 % N1 on both engines then rapidly increases thrust to about 70 % N1 then progressively to reach take off thrust at 40 knots ground speed, while maintaining stick full forward up to 80 knots. PF Release stick gradually to reach neutral at 100 knots.
- Once the thrust is set, the Captain keeps his hand on the thrust levers until the aircraft reaches V1.

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

- **DIRECTIONAL CONTROL USE RUDDER PF**

At 130 knots (wheel speed) the connection between nosewheel steering and the rudder pedals is removed, hence in strong crosswinds more rudder input will be required at this point to prevent the aircraft from turning into the wind.

- **PFD / ND SCAN BOTH**

- Check the flight mode annunciator on the PFD:
 - MAN TOGA (MAN FLX ...), SRS, RWY (or blank), both FDs on.
- Check the FMGS position (aircraft on runway centerline).

• **"MAN TOGA (MAN FLEX ...), SRS, RWY, A/THR BLUE"ANNOUNCE PF**

• **"CHECKED"ANNOUNCE PNF**

● **Before reaching 80 knots:**

- **TAKE OFF N1CHECK PNF**

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.

- **"POWER SET"ANNOUNCE PNF**

- **PFD and ENG indications SCAN PNF**

- Scan airspeed, N1, and EGT throughout the take off.
- Disregard the EGT index pulsing amber when using TOGA or FLX thrust.

- **"HUNDRED KNOTS"ANNOUNCE PNF**

- The PF crosschecks the speed indicated on the PFD.
- Below 100 knots the Captain may decide to abort the take off according to the circumstances.
- Above 100 knots, rejecting the take off is a more serious matter.

- **"CHECKED" ANNOUNCE PF**

- **"V1"ANNOUNCE PNF**

CM1 will hand off from thrust levers when "V1" called.

- **"ROTATE"ANNOUNCE PNF**

- **ROTATIONPERFORM PF**

- At VR, initiate the rotation to achieve a continuous rotation with a 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.
- If some lateral control has been applied on the ground, center the stick during rotation so that the aircraft gets airborne with a zero roll rate demand.
- After lift-off, follow the SRS pitch command bar.
If no FD is functioning :
 - Select 15° pitch with two engines.
 - If one engine has failed, adapt pitch to maintain at least V2 (pitch about 12.5°).
- The PNF should monitor the attitude, and call out:
 - "PITCH, PITCH", if the pitch angle reaches 7,5° on the ground.

CAUTION

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

- **"POSITIVE CLIMB" ANNOUNCE PNF**

Check V/S indicator and baro altitude are started to rise.

- **"GEAR UP"ORDER PF**

- **LDG GEARSELECT UP PNF**

- **GRND SPLRSDISARM PNF**

- **EXTERIOR LIGHTSSET PNF**

Set NOSE & RWY TURN OFF light switches to OFF.

LAND lights should be left ON up to FL100

- **APAS RQRD PF**

- **"GEAR UP"CONFIRM/ANNOUNCE PNF |**

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

- **THRUST LEVERSCL PF**

Move the thrust levers promptly to the CLB detent, when the flashing LVR CLB prompt appears on the FMA. A/THR is now active.

In manual flight, the pilot must anticipate the change in pitch attitude in order to prevent the speed from decaying when thrust is reduced.

- **PACK 1 (if applicable)ON PNF**

- Select PACK 1 ON after CLB thrust reduction.

Note: Selecting pack ON before reducing take off thrust would result in an EGT increase.

● **Above acceleration altitude (or once in climb phase):**

The following procedure ensures that the aircraft is effectively accelerating toward climb speed.

• **At F speed:**

- **"FLAPS 1"** ORDER PF
- **"SPEED CHECKED"** CONFIRM PNF
- **FLAPS 1** SELECT PNF
- **"FLAPS 1"** ANNOUNCE PNF

Note: For take off in CONF 1 + F, "F" speed is not displayed.

• **At S speed:**

- **"FLAPS ZERO"** ORDER PF
- **"SPEED CHECKED"** CONFIRM PNF
- **FLAPS ZERO** SELECT PNF
- **"FLAPS ZERO"** ANNOUNCE PNF

Note: CRUISE page replaces ECAM ENG page.

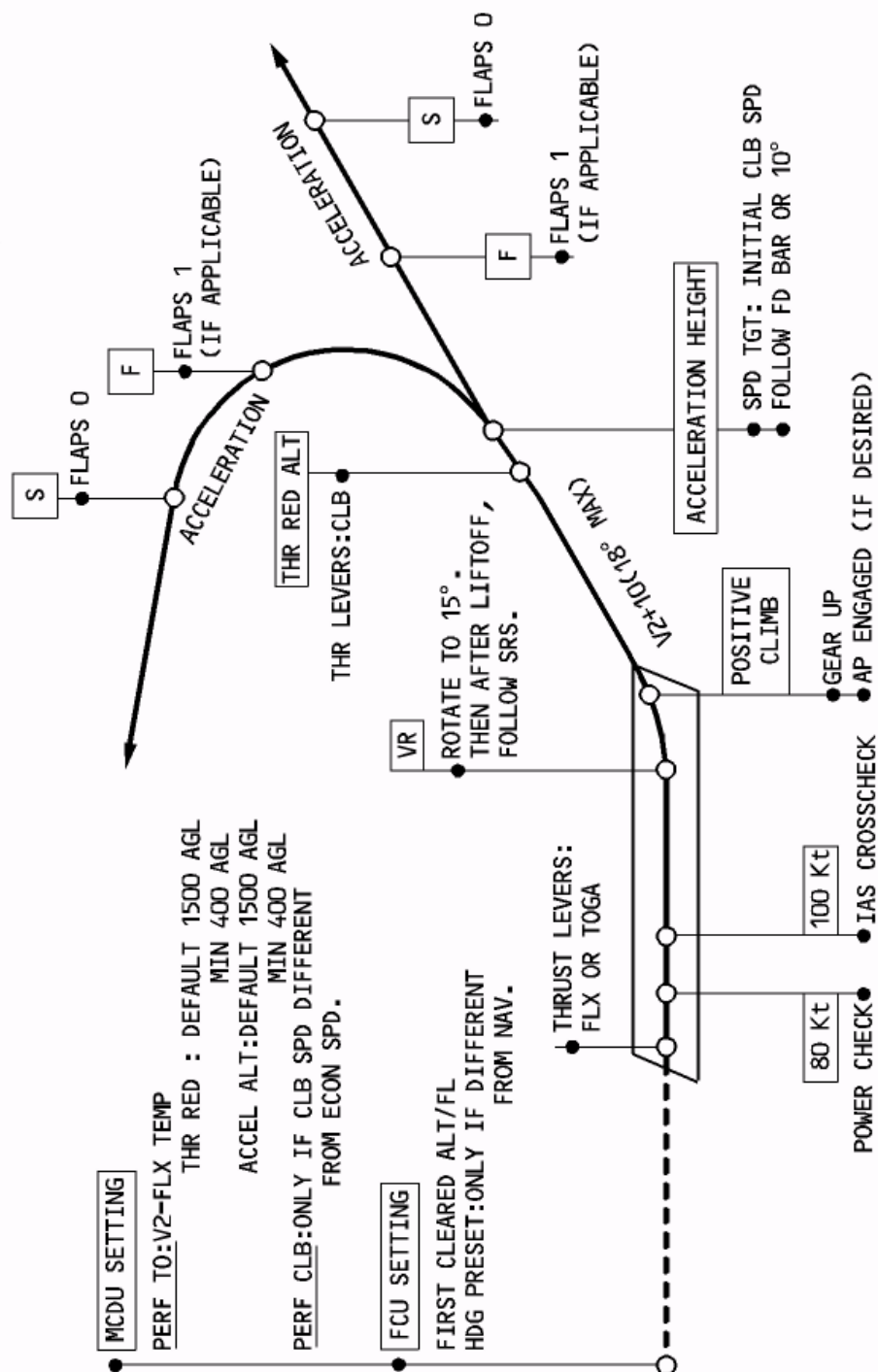
- **PACK 2 (if applicable)** ON PNF

- Select PACK 2 ON after flap retraction.

Notes: 1. PACK 2 may be selected earlier, but not sooner than 10 seconds after PACK 1 is selected ON, for passenger comfort.

2. If packs are not switched on after the take off phase, an ECAM caution will be triggered.

NORMAL TAKEOFF PATTERN



NOTE: IN CASE OF AN IMMEDIATE LANDING, IF THE PATTERN IS MADE BELOW 1500 FEET, SELECT ECAM RECALL DURING THE DOWNWIND LEG

3.7 AFTER TAKE OFF

- **APU BLEEDAS RQRD PNF**
If the APU has been used to supply air conditioning during take off, select APU BLEED to OFF. For use of APU BLEED, refer to APU LIMITATION chapter (see 3.01.49 pages FCOM).
- **APU MASTER switchAS RQRD PNF**
- **ENG MODE selectorAS RQRD PNF**
Select IGN if severe turbulence or heavy rain is encountered.
- **ATC/TCAS Mode selector TA/RA PNF**
Select TA/RA if the take off has been performed with TA only.
- **"AFTER TAKE OFF CHECKLIST" CALL PF**
- **AFTER TAKE OFF CHECKLIST COMPLETE BOTH**

3.8 ABNORMAL TAKE OFF**ABORTED (REJECTED) TAKE OFF**

The decision to reject take off must be made by either Captain or check-pilot, when he carries out CM2 duties according to circumstances, beginning from the moment when **“TAKE OFF”** call was announced till **“V1”** call.

DECISION MANAGEMENT BELOW 100KT

It is impossible to list all cases and therefore Captain should seriously assess ECAM information and consider disconnecting take off if ECAM caution or warning is activated.

DECISION MANAGEMENT ABOVE 100KT AND BELOW V1

Above 100KT, rejecting the take off is a more serious matter and for example, on slippery RW could lead hazardous situation. Therefore, as speed approaches to V1, the pilot should be “go-minded” if none of failures listed below has occurred:

1. Fire warning or severe damage.
2. Sudden loss of engine thrust.
3. Malfunctions or conditions that give unambiguous indication that the aircraft will not fly safely.
4. ECAM warning which are not inhibited above 80KT:
 - a. Engine or APU fire (red)
 - b. Engine fail (amber)
 - c. Configuration warning:
 - Slats/flaps not in TO config. (red)
 - Pitch trim not in TO range (red)
 - Rudder trim not in TO range (red)
 - Speed brake not retracted (red)
 - Sidestick fault (by take over) (red)
 - Park brake on (red)
 - d. Engine oil low pressure (red)
 - e. Engine reverser unlocked (amber)
 - f. L+R elevator fault (red)
 - g. Thrust lever fault (amber)

Nose gear vibration should not lead to RTO above 100KT.

In case of tire failures between V1-20KT and V1, unless debris from the tires has caused serious engine anomalies, it is far better to get airborne, reduce fuel load and land with full runway length available.

The callout **“V1”** has precedence over any other call.

DECISION MANAGEMENT ABOVE V1

Take off must be continued as it might be impossible to stop aircraft on the remaining length of runway.

ABORTED (REJECTED) TAKE OFF PROCEDURE

The decision to reject TO and stop action shall be made by the Captain. Both pilots should be prepared for take off abortion. Only Captain remains the absolute responsibility to assess the situation and has full discretion for decision to reject TO.

Decision to reject TO when speed approaches to V1 should not be taken lightly, because circumstances and conditions may vary significantly. Once take off has commenced, only a following criteria will be used for STOP decision up to V1:

- Any fire
- Engine failure
- ECAM red warning
- Captain's discretion

An external noise may be used to support flight deck indication of engine malfunction, but must not be used without checking of engine parameters. It is important not to mistake gear and/or tire failure with engine failure. Therefore PNF must closely monitor engine parameters during rollout. Decision to reject take off with failed gear or tire is not advisable when close to V1.

As soon as Captain decides to reject TO, he should call **"STOP"**, and perform stop actions, otherwise he should call **"GO"**, if take off is to be continued by PF. If first officer was handling the aircraft when "stop" was called, the Captain should take over control.

Notes: - Take off may be rejected up to 100KT for any significant malfunction.
- Take off should be rejected at or above 100KT only for major malfunctions. Above 80KT most of amber cautions are inhibited.

Once the decision to stop has been made, Captain should call **"STOP"** and:

- Move thrust levers to idle
- Set full reverse thrust if above 80KT (idle reverse thrust if below 80KT)

First officer should monitor and call:

- **"REVERSE GREEN"**
- **"DECEL (or NO DECEL)"**
- cancel any audio
- **"70 KNOTS"**
- **"AFL ... REJECTED TAKE OFF"**
- locate **"ON GROUND EMER/EVACUATION"** checklist.

Manual braking should be performed if there is autobrake malfunction. Reverse idle thrust may be selected when passing 70KT, if necessary. Full reverse thrust may be retained until the aircraft has come to stop. Stopping the aircraft on the runway is of prime importance. The aircraft should be stopped on the runway with parking brake ON and the engines at forward idle thrust.

In the event of an engine fire, consideration should be given to turning the aircraft so, that any wing will blow the fire or smoke away from the fuselage. Other words, turn the aircraft so way, to put normal operating engine into the wind. Captain should maneuver the aircraft on the runway assuming that an emergency evacuation will be required.

Notes: - *If deceleration is initiated with the speed below 72KT, autobrake will not be operative, because the ground spoilers will not be extended.*

- *Antiskid is deactivated when the ground speed drops below 20KT.*

Once the aircraft has come to stop, the Captain should make PA call **“ATTENTION CREW! AT STATIONS”** (twice), and then order: **“ECAM ACTION”**. All actions are performed by CM2 and all communications are performed by the Captain. Aircraft should stay on the runway until it is absolutely clear that an evacuation is not necessary and that it is safe to do so. After ECAM actions have been completed, and passenger evacuation is not required, the Captain should make PA call: **“CANCEL ALERT! CABIN CREW AND PASSENGERS REMAIN SEATED”** including instructions on Russian language. Then should assess situation to continue taxi or not by checking ECAM WHEEL page. When the runway is vacated, Captain should order **“AFTER LANDING CHECKLIST”**.

If evacuation is required, appropriate procedure should be carried out by the reference to the “ON GROUND EMER/EVACUATION” procedure, located at the bottom of the normal checklist. When **“ATC (VHF1)”** line of the procedure is reached, this action should be accomplished by declaring an emergency:

- **“MAYDAY, MAYDAY, MAYDAY”**
- **“AFL ... EMERGENCY EVACUATION”** (twice)

When **“EVACUATION”** line of the procedure is reached, this action should be accomplished by making PA announcement:

- **“PASSENGER EVACUATION”** (twice), **KEEP CLOSED RIGHT (LEFT) SIDE DOORS”**

Advisory information such as **“HAZARD ON RIGHT (LEFT) SIDE”** may be added, if appropriate. Then Captain should activate EVAC COMMAND signal and then cancel the sound of the alert horn in the cockpit by pressing the HORN SHUT OFF pushbutton on the overhead panel.

Detailed cabin/cockpit evacuation procedure is described in FCOM 3.02.90.

Notes: - *To avoid passenger evacuation due to false fire warning, a fire condition shall be confirmed by all means available (ATC, cabin crew) whenever possible.*

- *After a rejected take off, if the aircraft comes to a complete stop using autobrake MAX, release the brakes before taxi by disarming the spoilers.*

- It is important the crew understands, that emergency evacuation is quite dangerous procedure for old, disabled and infant passengers. Therefore emergency evacuation decision should not be easily taken.

When emergency evacuation is not necessary and the aircraft can not be moved, Captain should initiate controlled disembarkation. To do this Captain should:

- Check parking brake is on.
- Start APU
- Shut down engines
- Notify ATC and passengers

Controlled disembarkation should be done by using airstairs or slides.

ENGINE FAILURE AFTER V_1 – CONTINUED TAKE OFF

If an engine problem occurs after V_1 , the take off must be continued. First pilot who recognizes the problem announces **“MASTER CAUTION”** and the nature of the problem (e.g. **“ENGINE FAILURE”**) without identifying the engine. The rudder is used conventionally to stay on the runway centerline. The call **“POSITIVE CLIMB”** should take precedence over other calls after **“ROTATE”** was announced.

At V_R rotate the aircraft smoothly to a pitch attitude of $12,5^\circ$. After lift off the SRS demands should be followed. Retract the gear in normal way. Rudder is used to prevent yaw. Shortly after lift off the BETA TARGET will appear and should be zeroed using the rudder and rudder trim. TO/GA thrust may be applied, but certification does not require the use of TO/GA, because climb gradient will be provided with FLEX power. Above 100FT RA the AP should be engaged to reduce workload. Once the aircraft has stabilized safely, PNF should call ATC if flight plan is going to be changed:

- **“PAN PAN, PAN PAN, PAN PAN”**
- **“AFL ... ENGINE FAILURE”**
- state intentions and/or request assistance

At a minimum of 400FT AAL PNF will identify failure calling, e.g. **“ENGINE №2 FAILURE”** and at this moment ECAM action may be started. The order **“ECAM ACTION”** should be given by PF. The PNF will then read and do the ECAM procedures. When acceleration height (altitude) has reached ECAM actions should be interrupted to allow both pilots to monitor level off and configuration changes.

Therefore PF should:

- order: **“STOP ECAM”**
- push V/S selector knob (PUSH TO LEVEL OFF)
- at F speed order **“FLAPS 1”**
- at S speed order **“FLAPS ZERO”**
- at GREEN DOT pull altitude selector knob (to engage “OP CLB” mode)
- move thrust levers to MCT

The aircraft will continue climb using maximum continuous thrust and maintain green dot speed (engine out operating speed in clean configuration) until reaching first cleared altitude. Then speed will increase to 250KT (by default).

PNF resumes ECAM actions and asks: **"CLEAR ... (SECONDARY FAILURES)?"** When PNF clears all secondary failures, he announces **"STATUS"**. At this moment PF orders: **"STOP ECAM"** and ask for AFTER TAKE OFF checklist. PNF reads AFTER TAKE OFF checklist, and then announces **"AFTER TAKE OFF CHECKLIST COMPLETED"**. PF orders: **"CONTINUE ECAM"**. PNF reads STATUS, review inoperative systems and ask **"CLEAR STATUS?"** Then PNF announces **"ECAM ACTIONS COMPLETED"**. Since ECAM actions completed, the crew should define next course of action and inform ATC with taken decision.

Note: - If TO/GA power has not been used, it is necessary to move thrust levers out of FLEX/MCT detent to CLB detent and back to FLEX/MCT, in order to get MCT power.

- Maximum take off thrust is only allowed for 10 minutes.

When engine fails after V1, crew will apply following:

1. Join EO SID (if published)

Notes: If engine fails after EO SID diversion point crew will maintain SID track.

2. Perform standard EO procedure (if no EO SID published)
3. Ask for radar vectors (if above MSA/SSA)
4. Perform immediate visual return if in VMC when inextinguishable fire or bomb on board reported (suspected).

STANDARD EO PROCEDURE

Climb straight ahead to 1500 ft above aerodrome elevation. Level off to retract flaps on schedule to zero during turn to referenced navigation aid. After flap retraction, which may be prior to or after reaching the referenced navigation aid, continue climb to desired altitude (e.g. MSA, minimum holding altitude) performing further ECAM action. If required, enter the holding pattern over referenced navigation aid. If no holding pattern is published, holding direction will be given by ATC.

IMMEDIATE RETURN

If immediate return is required, when in VMC, all actions of engine failure procedure after V1 are the same described above, till reaching acceleration height (altitude). When V/S SELECTOR KNOB is pushed to level off, speed should be manually selected to “S” and flaps 1 configuration should be maintained till base turn. On downwind leg, approach phase should be activated and SPD SELECTOR KNOB should be pushed (manage mode). FMGS programming for landing runway may be accomplished, for ground speed mini function. But remember, that the ECAM procedure takes precedence over FMGS programming so an arrival runway or approach may not be available; however, use basic autopilot modes if desired. If flight plan has not been updated with the new destination (landing runway), selected speed must be used. Detailed procedure of immediate VMC landing following an engine failure on take off, located in FCOM 3.02.10 p6.

ENGINE FAILURE DURING INITIAL CLIMB OUT

Proceed as above. If the failure occurs above V2, the SRS commanded attitude should be maintained. The V2 is the minimum speed. In the event of an engine failure with flaps or slats extended and after THR CLB has been selected, PF should select MCT (“LVR MCT” will flash on FMA), and complete ECAM actions. Flaps should be retracted on the normal schedule. There will normally be sufficient climb performance to allow the flaps to be retracted during this climbing acceleration. Exceptionally, at high weights and/or in high ambient temperatures setting the V/S to zero may be required. In this case, when the aircraft levels off, ECAM action should be interrupted.

EMERGENCY RADIO TRANSMISSION CALLS

Following an engine fire the initial ECAM procedure instructs the crew to “Notify ATC”. This prompt, occasionally causes problems if the PF chooses to make the distress R/T call at a time of high workload when the key task is to fly accurately. Clearly, the crew should prioritize and avoid conflict between key and secondary tasks. However, an early R/T call is necessary in the case of deviation from the SID in order to follow an emergency turn procedure. A fire warning will result in a red LAND ASAP, ECAM message; it will change to amber when the fire is extinguished.

MAYDAY: Normally, a red LAND ASAP requires a MAYDAY call.

PAN: An amber LAND ASAP requires a PAN call, though special circumstances (e.g. smoke or additional failures) may dictate that a MAYDAY is more appropriate.

SUMMARY OF RTO PROCEDURE AND FURTHER ACTIONS

PHASE 1	CPT (CM1)	F/O (CM2)
	- "STOP"CALL simultaneously - THR. LEVERSIDLE - REV. THR.....MAX. AVAIL. - if brake response insufficient: - MAN BRAKEAPPLY - REV. THR.....IDLE - REV. THR.....OFF	- BRAKE RESPONSEMONITOR - REVERSECONFIRM - "REVERSERS GREEN"CALL - "DECEL (NO DECEL)"CALL - ANY AUDIOCANCEL - "70 KNOTS"CALL - ATCINFORM - "AFL ___ REJECTED TAKE OFF" - MALFUNCTIONCALL - ON GROUND EMERGENCY EVACUATION CHECKLISTLOCATE

PHASE 2	CONSIDER POSITIONING THE AIRCRAFT TO KEEP ANY POSSIBLE FIRE AWAY FROM THE FUSELAGE	
	- PARK BRAKE.....APPLY Set park brake ON after a/c stops - "ATTENTION CREW! AT STATIONS" (twice)CALL - "ECAM ACTION"CALL	- ECAM ACTION.....INITIATE

PHASE 3	EVACUATION IS NOT REQUIRED	
	- PASSENGER ADDRESS.....CALL - "CANCEL ALERT" (twice) - "CABIN CREW and PASSENGERS REMAIN SEATED" - SITUATION TO VACATE THE RW.....ASSESS	- ATC.....INFORM - "AFL___ CANCEL ALERT" - SITUATION TO VACATE THE RW.....ASSESS - ATC.....INFORM - "AFL ___ READY TO VACATE RW"
WHEN RW VACATED		
	- "AFTER LANDING C/L"CALL	- AFTER LANDING C/L.....INITIATE

PHASE 3	EVACUATION IS REQUIRED
- "ON GROUND EMER./EVAC. C/L".....CALL - "MAY DAY, MAY DAY, MAY DAY".....CALL - "AFL__EMERGENCY EVACUATION" (twice).....CALL - "NOTIFIED".....CALL - "PASSENGER EVACUATION"(twice)...CALL - "KEEP CLOSED RIGHT (LEFT) SIDE DOORS (EXITS)".....CALL - EVAC. COMMAND SIGNAL.....ACTIVATE - HORN SHUT OFF P/B.....PRESS PROCEED AS PER "CREW DUTIES DURING PASSENGER EVACUATION"	- ON GROUND EMER /EVAC PROCEDURE.....INITIATE - A/C / PARK. BRK.....STOP/ON - ATC (VHF1).....NOTIFY - Δ P.....CHECK (if MAN CAB PR has been used) - ENG. MASTER 1 and 2.....OFF - CABIN CREW (PA).....NOTIFY - FIRE P/Bs (ENG. and APU).....PUSH - AGENTS (ENG. and APU)...AS RQRD - EVACUATION.....INITIATE

3.9 CLIMB

- Normal vertical mode is CLB or OP CLB with managed speed active.
- MCDUPERF CLB PF
 - PF MCDU should be showing the PERF CLB page (allowing PF to monitor when the aircraft will reach the FCU selected altitude) but he may select other pages such as F-PLN page as may be tactically necessary.
 - The MCDU PROG page displays OPT FL and MAX REC FL. It is worth noting that this OPT FL is a function of the cost index.
 - The displayed MAX REC FL gives the aircraft at least a 0.3 g buffet margin. The pilot may enter a cruise flight level above this level into the MCDU and the FMGS will accept it, provided that it does not exceed the level at which the margin is reduced to 0.2 g.
- MCDU F-PLN PNF

PNF MCDU should be showing the F-PLN page (allowing him to enter any ATC long-term revisions to the lateral or vertical flight plan).
- CLIMB SPEED MODIFICATIONS:
 - If ATC, turbulence or operational considerations lead to a speed change :

Select the new speed with FCU SPD selection knob and pull. Speed target is now "selected". To return to managed speed mode, push FCU SPD selection knob. The speed target is now "managed".

Note: The best speed (and rate of climb) for long-term situations lies between green dot speed and ECON speed. At high altitude, acceleration from green dot to ECON speed can take a long time.
- EXPEDITE CLIMB
 - If ATC requires a rapid climb through a particular level :

Push the EXP pushbutton on the FCU. The target speed is now green dot speed.

FMA: THR CLB/EXP CLB/NAV

Note: Use EXP only for short-term tactical situations. For the best overall economy fly at ECON IAS return to ECON CLB speed:

 - Push ALT selector knob.
 - Check FMA: THR CLB/CLB/NAV
- "**APPROACHING TRANSITION**" ANNOUNCE PNF

500 ft before reaching transition altitude.
- "**TRANSITION**" ANNOUNCE PNF
- "**SET STANDARD**" CALL PF
- BARO REF PULL STD BOTH
 - At transition altitude (baro setting flashing on PFD) set STD on the EFIS control panel and STBY ALT.
 - Cross-check baro settings and altitude readings.

- **"STANDARD SET CROSS-CHECKED.PASSING FL ...NOW"CALL PNF**
- **"CHECKED" ANNOUNCE PF**
- **CRZ FL SET AS RQRD PF**
 - If ATC clears the aircraft to its intended CRZ FL or above, there is no need to modify the CRZ FL entered in the INIT A page during cockpit preparation. The FCU will automatically take into account a higher CRZ FL selected with the FCU ALT knob.
 - If ATC limits CRZ FL to a lower level than the one entered in the INIT A page (or present on the PROG page) the flight crew must insert this lower CRZ FL in the PROG page.

Otherwise there is no transition into CRZ phase: the managed speed targets and Mach are not modified, and SOFT ALT mode is not available. In that case FMA will display: MACH/ALT/NAV instead of MACH/ALT CRZ/NAV.
- **"CLIMB CHECKLIST" CALL PF**
- **CLIMB CHECKLIST COMPLETE BOTH**
 - **At FL100:**
- **"FL ONE HUNDRED PROCEDURE" ANNOUNCE PF**
- **LAND lights OFF PNF**
- **ECAM MEMO REVIEW PNF**
- **RAD NAV pageCHECK PNF**

Clear manually tuned VORs and ADFs from MCDU RAD NAV page, using CLR key.
- **OPT/MAX ALTANNOUNCE PNF**

3.10 CRUISE

- **SEAT BELTS** **AS RQRD CM1**
- **EFIS option** **ARPT BOTH**
- **METRIC ALT p/b**..... **AS RQRD PF**
 - Set METRIC ALT p/b to ON if in metric airspace.
 - Set METRIC ALT p/b to OFF if out of metric airspace.

- **ALTIMETERS**..... **CHECK BOTH**

Check altimeters before entering RVSM air space.

PNF annotates CFP with PFD 1-2 and standby altimeter indications. Should an altimeter subsequently fail this information will assist in the determination of the failed indication.

Primary indications must be within 200 ft when within RVSM airspace and this is independent of tolerances laid down in the FCOM.

- **TERR on ND** **OFF PNF**
- **ECAM MEMO** **REVIEW PF**
- **ECAM SYS PAGES** **REVIEW PF**

Periodically review system display pages and, in particular:

ENG: - Oil pressure and temperature

BLEED: - BLEED parameters

ELEC: - Parameters, GEN loads

HYD: - A slight decrease in quantity is normal.

Fluid contraction during cold soak can be expected.

Green system is lower than on ground, following LDG gear retraction.

FUEL: - Fuel distribution. Check no fuel leak suspected.

COND: - Duct temperature, compared with zone temperature.

Avoid large differences for passenger comfort.

FLT CTL: - Note any unusual control surface position.

- **SEC F-PLN page** **AS RQRD PF**

Recopy the active flight plan in the secondary if an immediate return flight plan or take off alternate has been constructed previously.

- **VHF 2** **SET 121,5 PF**

Emergency frequency 121,5 shall be monitored by the both pilots.

- **ATC/TCAS TRAFFIC selector** **SET BLW PF**

- **FLIGHT PROGRESS** **CHECK PNF**

Monitor flight progress in the conventional way.

When overflying a waypoint:

- Check track and distance to the next waypoint.

When overflying the 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 3.05.20 FCOM).

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 unusually greater than the fuel on board at departure, suspect a frozen fuel quantity indication. Maintenance action is due before the next flight. If the sum is unusually smaller than the fuel on board at 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 PF

(Refer to 3.05.15 FCOM)

- NAVIGATION ACCURACYCHECK PNF

No navigation accuracy check is required as long as GPS PRIMARY is available.

Otherwise, navigation accuracy must be monitored, at all times but especially when any of the following occurs:

- IRS only navigation
- The PROG page displays LOW ACCY.
- "NAV ACCUR DOWNGRAD" appears on the MCDU.

Methods for checking accuracy :

- Manually tune VOR (VOR/DME or ADF) to a station that is within range on the RAD NAV page and select associated needles on the 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 showing between the aircraft symbol and the navaid symbol on the ND.

- Or insert a VOR/DME idents in BRG/DIST TO field on the PROG page and compare the computed BRG (DIST) with the raw data on the ND. This method allows the FM error to be quantified.

If the check is positive (error < 3NM): FM position is reliable.

- Use ND (ARC or NAV) and managed lateral guidance.

If the check is negative (error > 3NM): 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 switching to ROSE VOR so as not to be misled by FM data).

- CABIN TEMP MONITOR PNF

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

● If the oxygen mask has been used:

- OXY MASKCHECK BOTH

Check that the oxygen mask has been properly stored, as indicated in the FCOM 1.35.20.

3.11 DESCENT PREPARATION

Descent preparation and approach briefing can take approximately 10 minutes, so they should begin approximately 80 NM before top of descent.

- **LDG ELEVCHECK PF**
Check on ECAM CRUISE page that LDG ELEV AUTO is displayed.
- **WEATHER AND LANDING INFORMATIONOBTAIN BOTH**
Check weather reports at ALTERNATE and DESTINATION airports. Airfield data should include runway in use for arrival.
- **ECAM STATUSCHECK PF**
 - Check that there is no status reminder on the upper ECAM display.
 - If there is a status reminder, check the aircraft STATUS.
 - Check the ECAM status page before completing the approach checks. Take particular note of any degradation in landing capability, or any other aspect affecting the approach and landing.

FMGS

- **F-PLN A pageINSERT/CHECK PF**
 - Insert TRANS, APPR, STAR, and APPR VIA if applicable. (Access by lateral revision at destination.)
 - Check speeds and altitude constraints.
 - Add new speed or altitude constraints if required.
 - Check or insert the routing for alternate.
- **DES WINDINSERT/CHECK PF**
Enter winds for descent as well as for alternate.
- **RAD NAV pageINSERT/CHECK PF**
Set nav aids, as required, and check idents on the NDs (VOR-ADF) and PFDs (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.
- **PROG pageINSERT/CHECK PF**
Insert VOR/DME or RW in use at destination in BRG/DIST field.
- **PERF CRUISE pageMODIFY/CHECK PF**
Modify the cabin descent rate if different pressure rate is required.
- **PERF DES pageINSERT/CHECK PF**
Prior to descent, access PERF DES page and check ECON MACH/SPD. If a speed other than ECON is required, insert that MACH or SPD into the ECON field. This new MACH or SPD is now the one for the descent path and TOD computation, and it will be used for the managed speed descent profile (instead of ECON).
A speed limit of 250 knots below 10000 feet is the defaulted speed, in the managed speed descent profile. The flight crew may delete or modify it if necessary on the VERT REV at DEST page.

- **PERF APPR page COMPLETE / CHECK PF**

- Enter the QNH, temperature, and wind at destination.
- During QFE operation enter the QNH value regarding to the QFE without any altitude revisions on the F-PLN page.

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 gust).

- Check the TRANS ALT.
- Insert the MDA (MDH if QFE used), or DH (whichever applies).

Note: A320 family is considered to be category C aircraft.

CAUTION

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

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 APPR 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 landing in configuration 3, in case of a system failure:
 - * First read the VLS CONF FULL value on the PERF APPR page to determine the V_{APP} (or use QRH 2.31).
 - * Then, select CONF 3 on the PERF APPR page.

As a general rule, managed speed can be used if the landing configuration and the configuration selected on the PERF APPR page are the same (If they are not the same, the managed speed will not drop down to the approach speed).

- Check V_{APP} according to the FLAPS FULL or FLAPS 3 selection on the MCDU. The pilot can modify V_{APP} . The new value will be taken into account for ground speed mini-function.

Note: If some abnormality requires a speed increment for the approach, the increment must be added to VLS CONF FULL.

- **GO-AROUND page CHECK/MODIFY PF**

Check the THR RED ALT and ACC ALT, and modify if necessary.

- **FUEL PRED page CHECK/MODIFY PF**

Correct fuel for diversion, check extra time.

- **SEC F-PLN page AS RQRD PF**

Before the top of descent, the SEC F-PLN should either be set to an alternate runway for destination, or to the landing runway in case of circling. In all cases, 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 the new MDA or DH and nav aids.

- **STAND BY ASI**SET PF

Set Vapp and green dot bugs.

- **GPWS LDG FLAP 3**AS RQRD PF

If the pilot plans on landing in FLAPS 3 configuration, the GPWS LDG FLAP 3 switch should be set to ON.

- **AUTO BRK**AS RQRD PF

- *The use of 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, use of the autobrake is unnecessary.*

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

- **"I HAVE CONTROL. CHECK MY JOB"**ANNOUNCE PF

Note: *All FMGS preparations made by PF for descent, approach and landing must be closely crosschecked by PNF.*

- **"YOU HAVE CONTROL"**ANNOUNCE PNF

- **APPROACH BRIEFING**PERFORM PF

During approach briefing PNF has control and communication.

- **DESCENT CLEARANCE**OBTAIN PNF

When clearance is obtained, set the ATC-cleared altitude (FL) on the FCU (also considering 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.

3.12 DESCENT

For en-route (off route) operation each time, when ATC gives a new descent clearance the flight crew must check that a new given altitude (FL) is not below MORA or GRID MORA or MSA, using en-route RAD. NAV. CHARTS or destination radar minimum altitudes chart.

If there is any doubt that a new given altitude (FL) is unsafe, the flight crew must define this altitude (FL) clearance more precisely and call ATC for confirmation.

DESCENT INITIATION

- SEAT BELTSON **CM1**
- EFIS optionCSTR **BOTH**
- TERR on NDON **PNF**
- DESCENTINITIATE **PF**

The normal method of initiating the descent is to select DES mode at the FMGS calculated top of descent (TOD).

- **If ATC requires an early descent :**
Use DES mode which will guide the aircraft down at a lower vertical speed in order to converge on the required descent path.
- **If ATC delays the descent :**
Beyond TOD, a DECELERATE message comes up on the PFD and MCDU. This suggests to the crew that it starts reducing speed towards green dot speed (with ATC permission). When cleared to descend, select DES mode with managed speed active.

Note: V/S mode reduces the level of automation and should be used with caution.

DESCENT MONITORING

- MCDU **PROG/PERF DES PF**

PF MCDU should be set to PROG or PERF DES page:

- PROG page in order to get VDEV and remaining distance direct to the RW (if the RW is inserted into the BRG/DIST field).
- PERF DES in order to get predictions down to any inserted altitude in DES/OP DES modes and EXP mode.

- MCDU **F-PLN PNF**

Note: The NDs show a level-off symbol \-> along the flight path. Its position is based on the current active AP/FD and A/THR modes.

- **DESCENTMONITOR PF**

(Refer to FCOM 4 05.60)

- When flying in NAV mode, use DES mode.
The aircraft descends along the descent flight path: the PFD and PROG page display VDEV, and so it can be monitored. All constraints of the flight plan are taken into account for the guidance.
- When the aircraft is flying in HDG or TRK mode, and thus out of the lateral F-PLN, DES mode is not available.
However the PFD still displays VDEV, and this is useful whenever cross track error is small (up to 5 NM) - this data helps the crew to monitor the descent. The flight crew can use the level \-> symbols on the ND to monitor the descent. MCDU predictions assume a return to the lateral F-PLN 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, the flight crew may select FPA to check that the remaining distance to destination is approximately the altitude change required divided by the FPA in degrees.

$$\text{FPA (°)} = \Delta \text{ FL/DIST (NM)}$$

DESCENT ADJUSTMENT

To increase the rate of descent:

- Increase descent speed (by use of selected speed) if comfort and ATC permit. It is economically better (Time/Fuel) than the following procedures.
- Maintain high speed as long as possible. (SPD LIM may be suspended, subject to ATC clearance).
- If the aircraft is high and at high speed, it is more efficient to keep the high speed to ALT* and decelerate, rather than to mix descent and deceleration.
- If the aircraft goes below the desired profile, use SPEED and the V/S mode to adjust the rate of descent.

Note: EXPEDITE DESCENT.

If a high rate of descent is required, push the EXPED pushbutton on the FCU. The target speed for the descent now becomes Mach 0.8 or 340 knots, whichever is lower. The FMA will display THR IDLE/EXP DES/NAV.

To return to DES mode, push the FCU ALT knob.

To return to SPEED V/S modes, pull the FCU V/S knob.

In all cases, monitor the FMA to ensure that the mode engages properly.

- **SPEEDBRAKES AS RQRD PF**

In OPEN DES: Use speedbrakes to increase the rate of descent. The pilot may use up to half speedbrakes 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.

Notes: 1. If speedbrakes are used above 315 knots/M.75 with the AP engaged, their rate of retraction is low (total time for retraction from full extension is approximately 25 seconds). The ECAM memo page displays SPD BRAKES in amber until retraction is complete.

2. In order to avoid overshooting the altitude, due to speedbrakes retraction in ALT mode, retract the speedbrakes at least 2000 feet before the selected altitude.*

● **At FL100:**

- **"FL ONE HUNDRED PROCEDURE" ANNOUNCE PF**

- **LAND LIGHTS ON PNF**

LAND lights should be switched ON.

- **ILS pushbutton AS RQRD BOTH**

Select ILS, if an ILS or LOC approach is intended.

The PFD displays the LOC and G/S scales and deviation symbol, if there is a valid ILS signal.

- **RAD NAVAIDS CHECK / IDENTIFY PNF**

Ensure that appropriate radio navaids are tuned and identified.

For NDB approaches, manually select the reference navaid.

- **NAV ACCURACY CHECK PNF**

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).

If NAV ACCURACY LOW select EGPWS TERR p/b to OFF.

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 as well as the usage of the EGPWS.

- **"APPROACHING TRANSITION" ANNOUNCE PNF**

500 ft before reaching transition level.

● **Crossing transition level or when cleared to an altitude:**

- **"TRANSITION" ANNOUNCE PNF**

- **"SET QNH / QFE ..." CALL PF**

- **BARO REFSET BOTH**
 - Set QNH (or QFE) 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 FCOM, should be considered.
- **"QNH/QFE ...SET. CROSS-CHECKED. PASSING ...FT NOW" ANNOUNCE PNF**
- **"CHECKED"ANNOUNCE PF**
- **"APPROACH CHECKLIST" CALL PF**
- **APPROACH CHECKLIST COMPLETE BOTH**

ЗАРЕЗЕРВИРОВАНО

4 ЗАХОД НА ПОСАДКУ

4.1 ILS APPROACH

For more information about precision approaches and how to use the FMGS see FMGS pilot's guide (Refer to 4.05.70 FCOM). The approach procedures described here assume that the flight crew uses managed speed guidance which is recommended.

Note: If the forecasted tail wind at landing is greater than 10 knots, decelerated approach is not allowed, and the speed should be stabilized around VREF + 5 knots in final. The ECAM displays the STATUS page automatically.

INITIAL APPROACH

- **FLIGHT PLAN SEQUENCE CHECK BOTH**
PNF should always keep flight plan sequenced during approach on PF request only.
- **ENG MODE selector AS RQRD PNF**
Select IGN if the runway is covered with standing water, or if heavy rain or severe turbulence is expected during approach or go-around.
- **"ACTIVATE APPROACH PHASE" (if applicable) ORDER PF**
 - If the aircraft overflies the DECEL pseudo waypoint in NAV mode, the APPR phase activates automatically.
 - If the aircraft is in HDG/TRK mode, approximately 15 NM from touchdown activate and confirm APPROACH phase on the MCDU.
- **"APPROACH PHASE ACTIVATED" ANNOUNCE PNF**
- **POSITIONING MONITOR PF**
 - In NAV mode, use VDEV information on the PFD and PROG page.
 - In HDG or TRK mode, use the energy circle on ND representing the required distance to land.
- **MANAGED SPEED CHECK PF**
If ATC requires a particular speed, then use selected speed. When the ATC speed constraint ("maintain 170 knots to the outer marker", for example) no longer applies, return to managed speed.
- **SPEEDBRAKES AS RQRD PF**
If the pilot uses the speedbrakes to increase the rate of deceleration or to increase the rate of descent, he should realize that VLS with speedbrakes fully extended, in the clean configuration, may be higher than green dot speed and possibly than VFE FLAP 1. The A/THR in speed mode or the pitch demand in OPEN DES will limit the speed to VLS. In this situation, the pilot should begin to retract speedbrakes upon reaching VLS + 5 knots and should select FLAP 1, as soon as speed is below VFE NEXT. He may then extend the speedbrakes, if necessary. The landing gear may always be extended out of sequence to aid deceleration.

- **NAV ACCURACY MONITOR PNF**

When GPS PRIMARY is available, no NAV ACCURACY monitoring is required. When GPS PRIMARY is lost, check on the PROG page that the required navigation accuracy in appropriate to the phase of flight. Monitor NAV accuracy and be prepared to change approach strategy. If NAV ACCURACY DOWNGRAD occurs, use raw data to check navigation accuracy.

The navigation accuracy determines which autopilot modes the flight crew should use, and the type of displays to be shown on the ND as well as the use of EGPWS.

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 ACCUR check $\leq$ 1NM				
GPS PRIMARY LOST and NAV ACCUR LOW and NAV ACCUR 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				

INTERMEDIATE/FINAL APPROACH (ILS APPROACH ENTERED IN THE F- PLN)

- **APPR pushbutton on FCUARM PF**

- Press the APPR pushbutton, only when ATC cleared the aircraft for the approach. This arms the LOC and G/S modes.*
- LOC and/or G/S capture modes will engage no sooner than 3 seconds after being armed.*

- **Both APs ENGAGE PF**

When APPR mode is selected, both autopilots should be engaged.

AT GREEN DOT SPEED

- **"FLAPS 1"ORDER PF**

- **"SPEED CHECKED"CONFIRM PNF**

- **FLAPS 1 SELECT PNF**

- **"FLAPS 1"ANNOUNCE PNF**

- FLAPS 1 should be selected not less than 3 NM from FAF (final approach fix).*

Note: The ECAM displays the STATUS page automatically if it is applicable and if the flight crew has not already selected a system page manually.

- Check deceleration toward "S" speed.*
- The aircraft must reach or be established on the glide slope with FLAPS 1 and S speed at or above 2000 feet AGL.*
- If the aircraft speed is significantly higher than S on the glide slope, or if the aircraft does not decelerate on the glide slope, extend the landing gear to slow it down. The use of speedbrakes is not recommended because it causes an unwanted increase of VLS.*

- **ATC/TCAS mode selector** **TA or TA/RA PNF**

It is recommended to select 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 resolution advisories (closely spaced parallel runways, converging runway, low terrain along the final approach...).*

- **LOC CAPTURE** **MONITOR BOTH**

- **POSITIONING** **MONITOR BOTH**

Check on the ND, PFD (DDRMI) distance to FAF regarding to appropriate NAV AID to define (confirm) overflying FAF.

- **G/S CAPTURE** **MONITOR BOTH**

Check correct distance according to Approach chart.

● **If above the glideslope :**

- **FCU ALTITUDE** **SET ABOVE A/C ALTITUDE PF**

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.*

- **V/S mode** **SELECT PF**

- **Vertical speed** **ADJUST PF**

Adjust the vertical speed to intercept the glide slope (maximum V/S value – 1500 fpm).

- **G/S CAPTURE** **MONITOR PF**

- **GO-AROUND ALT** **SET PF**

Set the go around altitude on the FCU when G/S captured.

Note: *If any altitude constraints set lowest one.*

- **"GO-AROUND ALT ... SET"** **ANNOUNCE PF**

AT 2000 FT AGL (minimum)

- **"FLAPS 2"** **ORDER PF**

- **"SPEED CHECKED"** **CONFIRM PNF**

- *Check deceleration toward F speed.*
- *If the aircraft intercepts the ILS glideslope below 2000 feet AGL, select FLAPS 2 at one dot below the glideslope.*
- *When the speedbrakes are deployed, extending the flaps beyond FLAPS 1 may induce a slight roll movement, and in calm conditions a small lateral control asymmetry may remain until disturbed by a control input or by an atmospheric disturbance.*

- **FLAPS 2** **SELECT PNF**

- **"FLAPS 2"** **ANNOUNCE PNF**

WHEN FLAPS ARE AT 2

- **"GEAR DOWN"** ORDER PF
- **L/G DOWN** SELECT PNF
- **GROUND SPOILERS** ARM PNF
- **EXTERIOR LIGHTS** SET PNF
 - Set NOSE switch to TAXI.
 - Set RWY TURN OFF switch to ON.
- **CABIN CREW** ADVISE PNF

Set SEAT BELTS OFF then ON twice.
- **"GEAR DOWN"** CONFIRM / ANNOUNCE PNF

WHEN LANDING GEAR IS DOWN

- **"FLAPS 3"** ORDER PF
 - **"SPEED CHECKED"** CONFIRM PNF
 - **FLAPS 3** SELECT PNF
 - **"FLAPS 3"** ANNOUNCE PNF
 - **ECAM WHEEL page** CHECK BOTH
 - ECAM WHEEL page appears below 800 feet, or at landing gear extension.
 - Check for three landing gear green indications.
- If residual pressure is indicated on the triple indicator:
- **RESIDUAL BRAKING PROC** APPLY BOTH
 - **"FLAPS FULL"** ORDER PF
 - **"SPEED CHECKED"** CONFIRM PNF

Check deceleration towards V_{APP}
 - **FLAPS FULL** SELECT PNF
 - Select FLAPS FULL below VFE. (VFE - 15 knots is recommended to minimize flaps wear).
 - **"FLAPS FULL"** ANNOUNCE PNF
 - **A/THR** CHECK IN SPEED MODE OR OFF PF
 - **WING ANTI ICE** OFF PNF

Switch WING ANTI ICE ON only in severe icing conditions.
 - **SLIDING TABLE ...** STOW BOTH
 - **LDG MEMO** CHECK NO BLUE LINE BOTH
 - **"LANDING CHECKLIST"** CALL PF
 - **LANDING CHECKLIST** COMPLETE BOTH

AT MINIMUM STABILIZATION HEIGHT :

- **"ONE THOUSAND"** or **"FIVE HUNDRED"** ANNOUNCE PNF
 - **"STABILIZED"** ANNOUNCE PNF
- Continue approach.*

- If the A/C is not stabilized on the approach path in landing configuration at minimum stabilization height or below:

- **"NOT STABILIZED"** ANNOUNCE PNF
 - **"GO AROUND/FLAPS"** ANNOUNCE PF
- Initiate a go-around.*

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

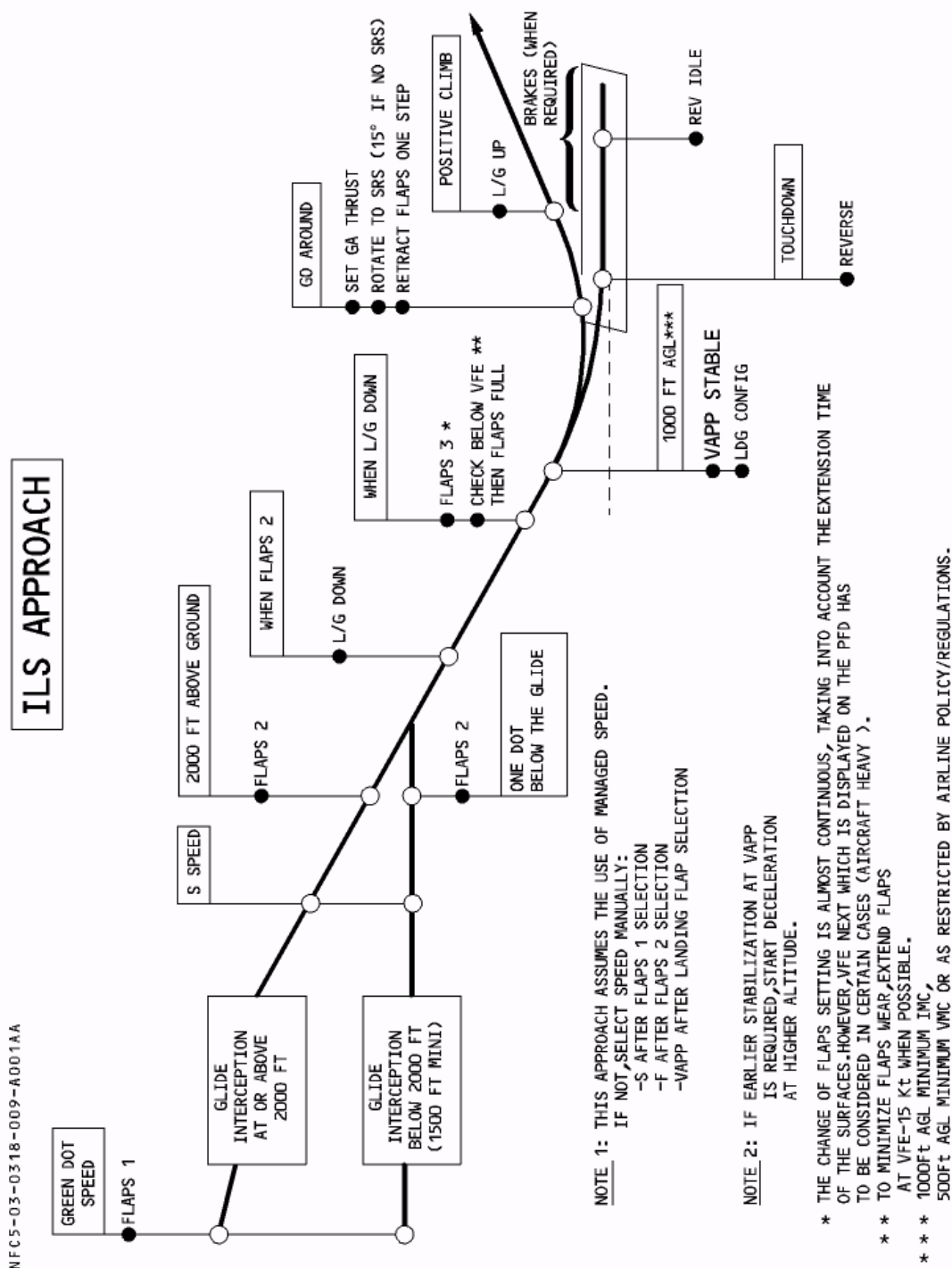
- **"HUNDRED ABOVE"** ANNOUNCE PNF

AT DH (or MDA):

- **"MINIMUM"** ANNOUNCE PNF
- **"LANDING"** or **"GO AROUND/FLAPS"** ANNOUNCE CM1
- **LANDING** PERFORM PF

PF performs landing or Initiate a go-around.

Do not try to catch the glideslope if a/c is slightly above or below. Maintain a constant flight path angle down to the flare. At 50 feet, one dot below glideslope is 14 feet below glideslope.



4.2 CAT II / CAT III APPROACH

FLIGHT PREPARATION

In addition to normal flight preparation, the following planning and preparation must be performed when CAT II or CAT III approaches are envisaged.

Review NOTAMS to make sure that the destination still meets visual or non-visual CAT II or CAT III requirements:

- Runway and approach lighting;
- Radio navaid availability;
- RVR equipment availability; etc.

Aircraft status: check that required equipment for CAT II or CAT III approaches are operative. The required equipment list is given in the FCOM and in the QRH.

When the aircraft log book is available, confirm that no write-up during previous flights affects equipment required for CAT II / CAT III. A maintenance release statement for CAT II / CAT III may be indicated in the log book.

Crew qualification and currency must be reviewed (both CAPT and F/O must be qualified and current).

Weather information: check that the weather forecast at destination is within company and crew minima.

Fuel planning: additional extra fuel should be considered for possible approach delays.

APPROACH PREPARATION

During descent preparation review additionally:

Aircraft status: check on ECAM STATUS page that the required landing capability is available. Although it is not required to check equipment that is not monitored by the system, if any of this equipment is seen inoperative (flag), the landing capability will be reduced.

Weather: check weather conditions at destination and at alternates. Required RVR values must be available for CAT II / CAT III approaches. The selected alternate must have weather conditions equal to or better than airline requirements.

State approval list: check list in JEPPESEN to verify that AFL has been approved to operate in CAT II / CAT III conditions by the state.

Landing minima.

Task sharing: stress task sharing and down grade capability.

Low visibility procedure: review the published low visibility procedure at destination. Unless LVP are reported active by ATIS, clearance to carry out a CAT II / CAT III approach must be requested from ATC, who will check the status of the ILS and lighting and protect the sensitive areas from incursion by aircraft or vehicles. Such an approach may not be undertaken until the clearance has been received.

Seat position: the correct seat adjustment is essential in order to take full advantage of the visibility over the nose. The seat is correctly adjusted when the pilot eyes are in line with the red and white balls located above the glareshield.

Use of landing lights: at night in low visibility conditions, landing lights can be detrimental to the acquisition of visual references. Reflected light from water droplets or snow may actually reduce visibility.

Landing lights would therefore not normally be used in CAT II or CAT III weather conditions.

CAT II / III BRIEFING

The briefing should include items listed in briefing section of general information.

TASK SHARING

The task sharing for a CAT II / CAT III approach is that **CM1 is PF** and **CM2 is PNF**.

The workload is distributed in such a way that the PF primary tasks are supervising and decision making, and the PNF primary task is monitoring operation of the automatic system.

In summary the tasks are shared as follows:

- CM1 -

- Keeps hands on sidestick and thrust levers throughout the approach, landing or go-around;
- Makes FCU selections (if any);
- Takes manual control in the event of AP disconnection;
- Monitors flight instruments.

Approaching DH:

- Starts to look for visual references, progressively increasing external scanning as DH is approached.

At or before DH (if the decision is to continue):

- Calls **“LANDING”** ;
- Scans mostly head-up to monitor the flight path and flare by visual references;
- At **“RETARD”** call-out sets thrust levers to idle;
- Selects and controls reverse thrust;
- Disengages AP when taxi speed is reached.

- CM2 -

- Monitors flight instruments head-down throughout approach, go-around or landing until rollout is completed;
- Calls any deviation or failure warning;
- Calls barometric heights as required, and monitors auto call-out or calls radio heights including **"100 ABOVE"**;
- Monitors FMA and calls mode changes below 200 ft AGL.

At DH (identified by aural and visual warning):

- If decision is not announced by CM1, calls **"MINIMUM"**;
- If no response from CM1, initiates a go-around.

IF DECISION IS TO GO AROUND:

- CM1 -

- Calls **"GO AROUND – FLAPS"**;
- Initiates go-around by setting thrust levers to TOGA;
- Monitors rotation on PFD;
- Checks positive climb (V/S and BARO alt.);
- Commands configuration changes.

- CM2 -

- Standard operating procedures.

CAT II / CAT III APPROACH

CAT II / CAT III approach should be performed using standard ILS approach technique till 1000ft.

Note: As a general rule, if a failure occurs above 1000 ft AGL the approach may continued reverting to a higher DH, providing the appropriate conditions are met.

- **Downgrading from CAT III to CAT II is permitted only if:**
 - ECAM actions are completed,
 - RVR is at least equal to CAT II minima,
 - Briefing is amended to include CAT II procedure and DH,
 - Decision to downgrade is completed above 1000 ft AGL.
- **Downgrading from CAT II to CAT I permitted only if:**
 - ECAM actions are completed,
 - At least one FD is available,
 - RVR is at least equal to CAT I minima,
 - Briefing is amended to include CAT I procedure and DH,
 - Decision to downgrade is completed above 1000 ft AGL.

Note: Switching from one AP to another before 1000 ft AGL is permitted.

FAILURE (if multiple failures, the most limiting applies)	ACTION TO BE PERFORMED ABOVE 1000FT	LANDING CATEGORY
ONE ENGINE OUT	Complete ECAM procedure	CAT III SINGLE
LANDING CAPABILITY DECREASE	Try to recover	As displayed on FMA
LOSS OF A/THR	Switch AP, and try to reengage	CAT II (if A/THR not recovered)
NOSE WHEEL STEERING		CAT III SINGLE (DH = 50 ft) Disengage AP at touch down
ANTI SKID		CAT III SINGLE Disengage AP at touch down
AMBER “CHECK ATT” on two PFD	Check with STBY horizon, use switching to recover (no switching below 1000 ft)	CAT III SINGLE (if the warning disappears) CAT I (if not)
AMBER “CHECK HDG” on two PFD & two ND	Check with STBY compass, use switching to recover (no switching below 1000 ft)	
RED “HDG” on one PFD & on one ND	Use switching to recover (no switching below 1000 ft)	
RED “ATT” on one PFD		
RED “SPD” on one PFD		
DIAGONAL line on one PFD & one ND		
RED “RA” on two PFD	AP and FD not available	CAT I (minimum RVR as per regulation)
SLATS/FLAPS FAILURE (LESS THAN CONFIG 3)		CAT I Disengage AP at or above 500 ft

Below 1000ft AGL the occurrence of any failure implies a go-around, and a reassessment of the system capability. Another approach may then be undertaken to the appropriate minima for the given aircraft status.

CAT III APPROACH
AUTO CALL OUT RA is mandatory. A/THR in SPEED MODE is mandatory. <u>Note:</u> AUTO CALL OUT is not mandatory for CAT II approach; the PNF may perform this function.

AT 1000 FT :

- **"ONE THOUSAND. STABILIZED"** **ANNOUNCE CM2**
- **"CHECKED"** **ANNOUNCE CM1**

Continue approach. Below 1000 ft go-around must be initiated in case of:

- ALPHA FLOOR activation;
- AP OFF (cavalry charge);
- LOSS of CAT 3 (click, click, click);
- AMBER caution (single chime)
- ENGINE failure.

If insufficient visual references.

- **RA CALL OUT MONITOR BOTH / ANNOUNCE CM2**

Monitor CALL OUT or announce as appropriate:

- **"TWO HUNDRED"**
- **"ONE HUNDRED"**
- **"FIFTY"**
- **"THIRTY"**
- **"TWENTY"**
- **"HUNDRED ABOVE"**
- **"MINIMUM"**
- **"RETARD" at 10 ft**

Notes: 1. AUTO CALL OUT RA is required for autoland, and mandatory for CAT III approach.

2. "RETARD" auto call out comes up at 10 ft if LAND mode is engaged with one or two AP engaged. Otherwise it is announced at 20 ft.

AT 350 FT RA:

- **"LAND GREEN" ANNOUNCE CM1**

If LAND does not appear on FMA, announce **"NO LAND GREEN"**

- **"CHECKED" ANNOUNCE CM2**

If **"NO LAND GREEN"** a go-around must be performed **if** insufficient visual references.

AT 200 FT RA and below :

- If AUTOLAND warning appears on the glareshield:

- **"GO AROUND - FLAPS" ANNOUNCE CM1**

Any AUTOLAND warning requires an immediate go-around. If visual references are sufficient and a manual landing is possible, the CM1 may decide to complete the landing.

Note: With LAND or FLARE green on the FMA and at least one AP engaged, the AUTOLAND red light appears on the glareshield when the aircraft is below 200 ft RA and one of the following events occurs:

- The autopilots are lost, or
- The aircraft gets too far off the beam (LOC or G/S flash on PFD), or
- Loss of LOC signal above 15 ft, or loss of G/S signal above 100 ft (transmitter or receivers).
- The difference between both RA indications is greater than 15 ft.

AT Decision Height + 100 FT:

- **"HUNDRED ABOVE" MONITOR AUTO CALL OUT / ANNOUNCE CM2**

- **Outside scanning COMMENCE CM1**

AT Decision Height:

- **"LANDING" or "GO AROUND - FLAPS" ANNOUNCE CM1**

Perform landing or initiate a go-around procedure.

AT 40 FT RA:

- FLARE on FMA CHECK CM2
- **“FLARE” or “NO FLARE”** ANNOUNCE CM2

The CM1 may decide to complete the landing manually, if “NO FLARE” announced disengaging A/P or perform go around.

AT 30 FT RA:

- THR reduction and flare by flight instruments MONITOR CM2
- AUTO CALL OUT MONITOR / ANNOUNCE CM2

AT 10 FT RA:

- Both THR LEVERS RETARD TO IDLE CM1
- Lateral guidance by external reference MONITOR CM1
- Engines parameters MONITOR CM2

AT TOUCH DOWN:

- **“ROLL OUT” or “NO ROLL OUT”** ANNOUNCE CM2

CM1 will disconnect AP immediately, if “NO ROLL OUT” announced.

Note: In case of ANTI SKID or NWS failure, disconnect AP and take manual control at touch down.

Continue standard landing procedure and disengage the APs at the end of rollout (when leaving the runway at the latest).

4.3 NON PRECISION APPROACH

APPROACH GUIDANCE FOR NON PRECISION APPROACHES OTHER THAN LOC NON PRECISION APPROACH

There are different approach strategies are available to perform non-precision approaches:

1. Lateral and vertical guidance, selected by the crew: TRK-FPA (or HDG-V/S) modes.

Note: The non precision approach is flown in selected modes when:

- The approach is not stored in database or
- GPS PRIMARY is lost and the NAV ACCURACY check is negative.

2. Lateral guidance, managed by the FM, and vertical guidance selected by the crew: NAV-FPA (or NAV-V/S) modes.

Note: Until otherwise advised, approaches using managed vertical guidance procedures are not approved.

During non precision final approaches a stabilized descent path adherence as much as possible to the required slope must be maintained, using the pre-calculated rate of descent or FPA value, possibly updated during descent.

It is also advisable to use all auxiliary instrument information (VOR, NDB, DME).

Upon reaching the MDA the approach shall be discontinued if external visual cues are inadequate, if the aircraft is not in the correct position for continuation of the approach or if any other reason dictates such a decision.

Level flight to the MAP is not allowed except circling.

The approach must be discontinued at the MAP at the latest.

In case of cold temperature operation the target altitudes must be corrected when significantly below ISA by adding the corrections located in the section 3.05.05 page 6 of FCOM.

Example:

- final approach alt. (by Jeppesen chart)	= 3000 ft
- air temperature	= - 25°C
- FCU selected alt.	= 3420 ft

APPROACH GUIDANCE FOR LOC NON PRECISION APPROACHES

The Standard Operating Procedure of this section can be used for flying LOC approaches, provided the following approach guidance items are observed.

The FM NAV mode can be used down to LOC interception.

For LOC intermediate and final approach, use the LOC AP/FD mode for lateral navigation, associated with the FPA (or V/S) for vertical navigation.

Vertical navigation must be monitored using raw data (altimeter, distance to the runway given by radio-navaid).

The VDEV indication on the PFD must be disregarded, since it may be incorrect if the MAP is located before the runway threshold.

APPROACH SPEED TECHNIQUE

In all cases, it is recommended to use managed speed with AP ON.

The standard speed technique is to make a stabilized approach using AP/FD and A/THR.

Normally the aircraft intercepts the final descent path in landing configuration and at Vapp. For this purpose, the flight crew should insert Vapp. as a speed constraint at the FAF.

If the ATC vectors the aircraft with speed adopt a decelerated approach technique and the crew uses managed guidance, the aircraft should intercept the final descent path at S speed in CONF 1.

ADDITIONAL NPA PREPARATION

Before top of descent, during DESCENT PREPARATION:

- **Intended approach on the F-PLN pageSELECT PF**
Check the FM lateral and vertical flight path against the published approach chart, using the MCDU and the ND PLAN mode with constraints displayed.
- **V_{APP}ENTER PF**
Enter V_{APP} as SPD constraint at the FAF, with a vertical revision of the F-PLN page.
- **APPROPRIATE NAVAIDSELECT / CHECK PF**
Select / check that the appropriate navaid is selected on the RAD NAV page.

INITIAL APPROACH

- **FLIGHT PLAN SEQUENCECHECK BOTH**
PNF should always keep flight plan sequenced during approach on PF request only.
- **ENG MODE selectorAS RQRD PNF**
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.
- **“ACTIVATE APPROACH PHASE” (if applicable)ORDER PF**
 - *If the aircraft overflies the DECEL pseudo waypoint in NAV mode, the APPR phase activates automatically.*
 - *If the aircraft is in HDG/TRK mode, approximately 15 NM from touchdown activate and confirm APPROACH phase on the MCDU.*
- **“APPROACH PHASE ACTIVATED”ANNOUNCE PNF**
- **POSITIONINGMONITOR PF**
 - *In NAV mode, use VDEV information on PFD and PROG page.*
 - *In HDG or TRK modes, use the energy circle displayed on ND representing the required distance to land.*
- **MANAGED SPEEDCHECK PF**
If ATC requires a particular speed, use selected speed. When the ATC speed constraint no longer applies, return to managed speed.

- **SPEEDBRAKES** **AS RQRD PF**
- **NAV ACCURACY** **CHECK PNF**

When GPS PRIMARY is available, no NAV ACCURACY monitoring is required. When GPS PRIMARY is lost, check on the PROG page that the required navigation accuracy is appropriate to the phase of flight. Monitor NAV accuracy and be prepared to change approach strategy. If NAV ACCURACY DOWNGRAD occurs, use raw data to check navigation accuracy.

The navigation accuracy determines which autopilot modes the flight crew should use, and the type of displays to be shown on the ND as well as the use of EGPWS.

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

NAVIGATION ACCURACY	Approach guidance	ND		AP/FD mode	TERR p/b
		PF	PNF		
GPS PRIMARY	Managed	ARC or ROSE NAV * with navaid raw data		NAV-FPA	ON
NAV ACCUR HIGH					
NAV ACCUR LOW and NAV ACCUR check $\leq 1\text{NM}$					
GPS PRIMARY LOST and NAV ACCUR LOW and NAV ACCUR check $> 1\text{NM}$	Selected	ROSE VOR **	ARC or ROSE NAV or ROSE VOR** with navaid raw data	TRK-FPA	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.

Note: 1. During approach in overlay to a conventional radio navaid procedure, monitor raw data. If raw data indicates unsatisfactory managed guidance, revert to selected 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.

INTERMEDIATE / FINAL APPROACH

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

- **ND MODE and RAW DATA** **SELECT AS APPROPRIATE BOTH**
 - Select ROSE NAV or ARC mode, and VOR or ADF raw data if managed lateral and selected vertical guidance is intended, as appropriate on the ND (refer to the table above) if managed lateral and selected vertical guidance is intended.
 - Select ND in the ROSE VOR mode if lateral and vertical guidance, selected by the crew is intended (refer to the table above).
- **TRK/FPA display** **SELECT PF**
Select TRK/FPA display.
- **MANAGED SPEED** **USE PF**
- **A/THR** **KEEP ACTIVE PF**

WHEN CLEARED FOR APPROACH:

- NAV and FPA or TRK and FPA on the FMA CHECK PF

AT GREEN DOT SPEED:

- **"FLAPS 1"** ORDER PF
- **"SPEED CHECKED"** CONFIRM PNF
- FLAPS 1 SELECT PNF
- **"FLAPS 1"** ANNOUNCE PNF
- ATC/TCAS mode selector TA or TA/RA PNF

It is recommended to select 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 resolution advisories (closely spaced parallel runways, converging runway, low terrain along the final approach...).*

AT S SPEED :

- **"FLAPS 2"** ORDER PF
- **"SPEED CHECKED "** CONFIRM PNF
- FLAPS 2 SELECT PNF
- **"FLAPS 2"** ANNOUNCE PNF

WHEN FLAPS ARE AT 2 :

- **"GEAR DOWN"** ORDER PF
- L/G DOWN SELECT PNF
- GROUND SPOILERS ARM PNF
- EXTERIOR LIGHTS SET PNF
- Set NOSE switch to TAXI.*
- RWY TURN OFF switch to ON.*
- CABIN CREW ADVISE PNF
- Set SEAT BELTS OFF then ON twice.*
- **"GEAR DOWN"** CONFIRM / ANNOUNCE PNF

WHEN LANDING GEAR DOWN :

- **"FLAPS 3"** ORDER PF
- **"SPEED CHECKED"** CONFIRM PNF

- **FLAPS 3** **SELECT PF**
Select FLAPS 3 below VFE.
- **"FLAPS 3"** **ANNOUNCE PNF**
- **ECAM WHEEL page** **CHECK BOTH**
 - ECAM WHEEL page appears below 800 feet, or at landing gear extension.
 - Check three landing gear green indications.
- If residual pressure is indicated on the triple indicator:
 - **RESIDUAL BRAKING PROC** **APPLY BOTH**
- **"FLAPS FULL"** **ORDER PF**
- **"SPEED CHECKED"** **CONFIRM PNF**
 - Check deceleration towards Vapp.
 - Check correct TO waypoint on the ND.
- **FLAPS FULL** **SELECT PNF**
 - Select FLAPS FULL below VFE. (VFE - 15 knots is recommended to minimize flaps wear).
- **"FLAPS FULL"** **ANNOUNCE PNF**
- **A/THR** **CHECK IN SPEED MODE PF**
- **WING ANTI ICE** **OFF PNF**
Switch WING ANTI ICE ON only in severe icing conditions.
- **SLIDING TABLE** **STOW BOTH**
- **LDG MEMO** **CHECK NO BLUE LINE BOTH**
- **"LANDING CHECKLIST"** **CALL PF**
- **LANDING CHECKLIST** **COMPLETE BOTH**

UPON REACHING THE FINAL APPROACH FIX:

- **FINAL APPR TRACK on the FCU** **SET PF**
Set final approach TRACK on the FCU if lateral and vertical guidance, selected by the crew is intended.
- **FPA on the FCU** **SET/PULL PF**
Set an FPA (flight path angle) to the final descent path angle.
Anticipate the selection of the FPA to smoother the interception of the final descent path.
Pull the final FPA approximately 0.3 NM before the final approach fix.
- **GO AROUND ALT** **SET PF**
Set, when A/C is below G/A altitude.
Note: If any altitude constraints set lowest one.

- POSITIONING MONITOR PF

- Check, on the ND, the TO waypoint, the F-PLN to the MAP, and the missed approach procedure (blue line).
- Use RAW DATA to monitor aircraft position and flight path if lateral and vertical guidance, selected by the crew is intended.

- VERTICAL DEVIATION CHECK / ANNOUNCE PNF
- FPA ADJUST PF

Adjust the FPA to fly the intended vertical flight path.

AT MINIMUM STABILIZATION HEIGHT :
- "ONE THOUSAND" or "FIVE HUNDRED" ANNOUNCE PNF
- "STABILIZED" ANNOUNCE PNF

Continue approach.

- If the A/C is not stabilized on the approach path in landing configuration:

- "NOT STABILIZED. GO AROUND" ANNOUNCE PNF
- "GO AROUND/FLAPS" ANNOUNCE PF

Initiate a go-around.

At ENTERED MDA/MDH + 100 FT :
- "HUNDRED ABOVE" ANNOUNCE PNF

- If the required visual reference has been established upon reaching the MDA/MDH:

- "LANDING" ANNOUNCE CM1
- AP DISCONNECT PF
- "FLIGHT DIRECTORS OFF" ANNOUNCE PF
- FD on both side OFF PNF
- "SET RW TRACK" ANNOUNCE PF
- LANDING PERFORM PF

Continue, as with visual approach (Refer to 3.03.20 FCOM).

At ENTERED MDA or MDH:
- "MINIMUM" ANNOUNCE PNF

- If ground references are not visible:

- "GO AROUND/FLAPS" ANNOUNCE PF

Initiate 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:

- push the V/S/FPA knob to level off at MDA + 10% of vertical speed;
- search for visual reference.

● If the flight crew finds no visual reference:

- AT MAP: go aroundINITIATE PF

● If the flight crew finds sufficient visual references and the aircraft is within circling area, for landing on opposite RW to the instrument approach:

- 45° offset track for 30 sec (left or right) SELECT PF
- TRK for downwind SELECT PF
- Early on downwind : SEC F-PLN ACTIVATE PNF

CAUTION

The PNF should activate the SEC F-PLN.

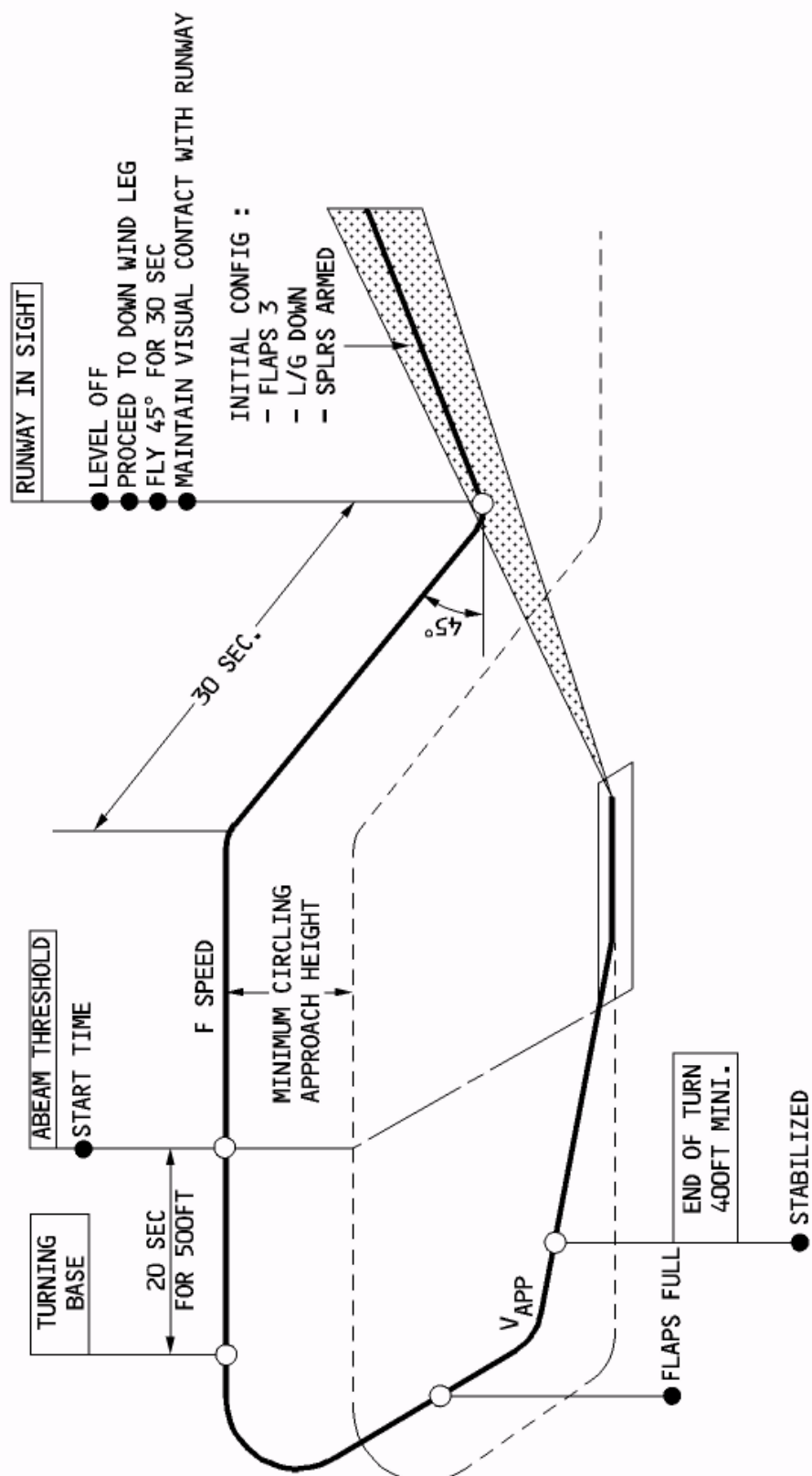
The PF should maintain visual contact during all the circling.

- AUTOPILOT before reaching the base leg DISENGAGE PF
- "FLIGHT DIRECTORS OFF"ANNOUNCE PF
- FD on both sideOFF PNF
- "SET RW TRACK"ANNOUNCE PF

Aircraft must remain within the circling area during approach.

Circling approach must be flown VISUAL. In case of loss of visual contact with ground, proceed for GO AROUND and MISSED APPROACH as defined for the instrument approach. The missed approach must be flown with raw data, since it is no longer part of the F-PLN. Thus the crew has to anticipate how to join the published missed approach, turn direction, configuration in the turn, initial climbout altitude. If a sharp turn is expected, keep FLAP3 (or FLAP2) and low speed; in other words, delay flap retraction until properly on trajectory, if required. All maneuvers to join the published missed approach should be done by turning towards the runway within the circling area.

LOW VISIBILITY CIRCLING APPROACH



4.4 VISUAL 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.

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.

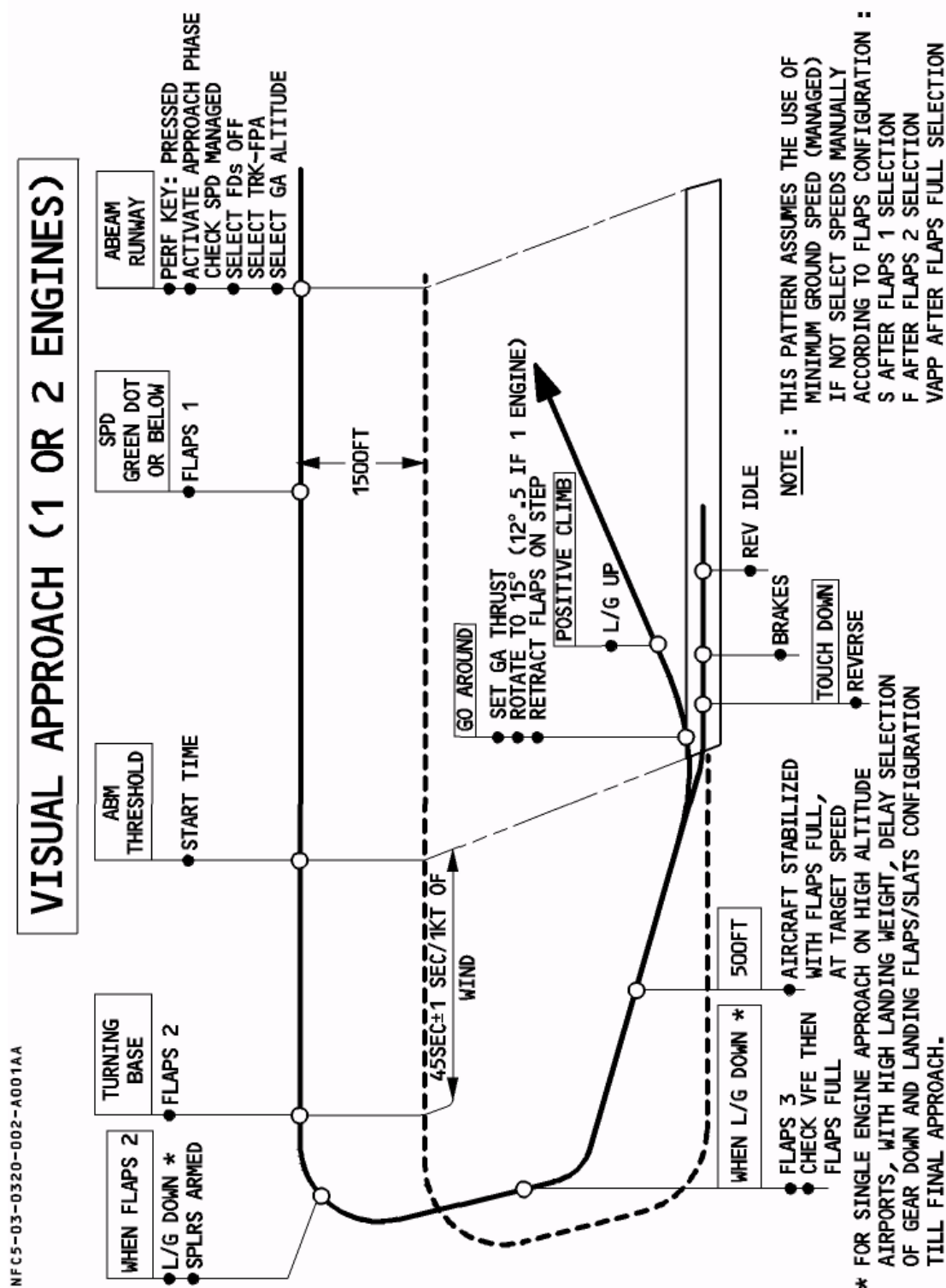
The downwind leg may also be part of the flight plan. This may be a useful indication of the aircraft position in the circuit on the ND, visual references must be used, at the beginning of the downwind leg.

- **"ACTIVATE APPR PHASE"**ORDER PF
- **"APPR PHASE ACTIVATED"** ANNOUNCE PNF
- **"FLIGHT DIRECTORS OFF"**ORDER PF
- **FD on both side**.....OFF PNF
- **"BIRD ON" (to have FPV displayed)**ORDER PF
- **Select TRK-FPA** PNF
- **Check A/THR active**PF

For typical visual pattern extend the downwind leg to 45 seconds (± wind correction). Turn into base leg with a maximum of 30° of bank. Descent with approximate 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.



4.5 LANDING

The cockpit cut-off angle is 20 degrees.

At approximately 30 feet:

- **FLARE**.....**PERFORM PF**
- **ATTITUDE**.....**MONITOR PNF**

The PNF should monitor the attitude, and call out:

- **"PITCH, PITCH"**, if the pitch angle reaches 7,5°.
- **"BANK, BANK"**, if the bank angle reaches 7°.
- **THRUST levers**.....**IDLE PF**

In manual landing conditions, the call out "RETARD" is generated at 20 feet RA as a reminder. Commence a gentle progressive flare and allow the aircraft to touch down without prolonged float.

CROSSWIND LANDINGS

- The preferred technique is to use rudder to align the aircraft with the runway heading during the flare while using lateral control to maintain the aircraft on the runway center line. Routine use of into wind aileron is not recommended, because sidestick deflection commands roll rate until touchdown.

In strong crosswind conditions, small amounts of lateral control may be used to maintain wing level. This lateral stick input must be reduced to zero at first main landing gear touchdown.

GROUND CLEARANCE

- Avoid flaring high.
- A tailstrike occurs if pitch attitude exceeds:
 - 15.5° (13.5° with the landing gear compressed) for A319
 - 13.5° (11° with the landing gear compressed) for A320
 - 11° (9,5° with the landing gear compressed) for A321.

A wingtip or engine scrape occurs if the roll angle exceeds:

- 18° (16° with the landing gear compressed) for A319
- 20° (16° with the landing gear compressed) for A320
- 18° (16° with the landing gear compressed) for A321.
- Be aware of pitch-up tendency with ground spoiler extension.

BOUNCE RECOVERY

The bounce recovery technique depends on the height reached during the bounce.

Recovery from a light bounce:

- *Maintain or regain a normal landing pitch attitude (do not increase the pitch attitude as this could cause a tail strike);*
- *Continue the landing (if remaining RW distance is sufficient);*
- *Use power as required to soften the second touchdown;*
- *Be aware of the increased landing distance.*

Recovery from a high bounce (more than 5 ft):

In the case of a more severe bounce do not attempt to land again as the remaining RW length might not be sufficient to stop the aircraft. The following technique should be applied:

- *Maintain or regain the normal landing pitch attitude;*
- *Initiate a go-around by advancing the thrust levers to TOGA;*
- *Maintain the landing flap configuration;*
- *Be ready for a possible second touchdown;*
- *When safely established in the go-around and no risk of further touchdown exists (i.e. a steady positive rate of climb) follow the normal go-around procedures and;*
- *Re-engage the autopilot as soon as possible to reduce workload.*

REJECTED LANDING

A rejected landing is defined as a go-around maneuver initiated below the minima.

Once the decision is made to reject the landing the flight crew must be committed to proceed with the go-around maneuver and not be tempted to retard the thrust levers in a late decision to complete the landing.

TO/GA thrust must be applied, but a delayed flap retraction should be considered. If the aircraft is on the Runway when thrust is applied a configuration warning will be generated if flaps are in configuration FULL. The landing gear should be retracted, when a positive rate of climb is established with no risk of further touchdown. Climb out as for standard go-around.

In any case, if reverse thrust has been applied, a full stop landing must be completed.

AT TOUCHDOWN :

- **REVAS RQRD PF**
 - Select MAX REV (if no bounce) after the main landing gear touches down.
 - If the airport regulations restrict the use of reversers, select and maintain reverse idle until taxi speed is reached.
 - A slight pitch-up, easily controlled by the crew, may appear when the thrust reversers are deployed before the nose landing gear touches down.
 - Lower the nosewheel without undue delay, if MED is selected.
 - In case of engine failure, the use of the remaining reverser is recommended.
 - Braking may be commenced before nosewheel is down, if required for performance reasons; but when comfort is the priority, it should be delayed until the nosewheel 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 PNF**
Check that the ECAM WHEEL page shows the ground spoilers fully deployed after touchdown.
- **"GROUND SPOILERS. REVERSE GREEN. DECEL".....ANNOUNCE PNF**
Announce "NO SPOILERS", or "NO REVERSE", or "NO DECEL" if they do not deploy.
- **DIRECTIONAL CONTROL.....ENSURE PF**
 - Use rudder pedals for directional control.
 - Do not use the nosewheel steering control handle before reaching taxi speed.
- **BRAKESAS RQRD PF**
 - Monitor the autobrake, if it is on. When required, brake with the pedals and call "BRAKING".
 - Although the green hydraulic system supplies the braking system, if pedals are pressed quickly a brief brake pressure indication appears on the BRAKE PRESS indicator.

At 70 KNOTS :

- **"SEVENTY KNOTS"ANNOUNCE PNF**
- **THRUST levers.....REV IDLE PF**
70 knots is the minimum recommended speed with full reverse thrust.

CAUTION

Avoid using high levels of reverse thrust at low airspeed, because gases re-entering the compressor can cause engine stalls that may result in excessive EGT.

AT TAXI SPEED :

- **THRUST levers.....FWD IDLE PF**

Deselect the REV position upon reaching taxi speed and before leaving the runway. On snow-covered grounds, reversers should be stowed when the aircraft speed reaches 25 knots. When deselecting REV, be careful not to apply forward thrust by moving the thrust levers beyond the FWD IDLE position.

CAUTION

On taxiways, the use of reversers, even when restricted to idle thrust, may have the following effects:

- The engines may ingest fine sand and debris that may be detrimental to both the engines and the airframe systems.
- On snow covered areas, snow will recirculate into the air inlet, which may result in engine flame-out or roll back. Except in an emergency, do not use reverse thrust to control aircraft speed while taxiing.

BEFORE 20 KNOTS :

- **AUTO BRK.....DISENGAGE PF**

Disengage the autobrake to avoid some brake jerks at low speed by applying the pressure to one or both pedals.

- **CHRONO.....STOP BOTH**

Stop clocks before leaving the RW.

4.6 GO AROUND

Apply the following three actions simultaneously:

- **THRUST LEVERS** **TOGA PF**
- **"GO AROUND - FLAPS"** **ANNOUNCE PF**
- **ROTATION** **PERFORM PF**
 - Rotate the aircraft to get a positive rate of climb, and establish the required pitch attitude, as directed by the SRS pitch command bar.
 - Check and announce the FMA: **"MAN TOGA, SRS, GA TRK"**.
- **FLAPS** **RETRACT ONE STEP PNF**
- **"POSITIVE CLIMB"** **ANNOUNCE PNF**
- **"GEAR UP"** **ORDER PF**
- **L/G UP** **SELECT PNF**
- **"GEAR UP-FLAPS"** **CONFIRM/ANNOUNCE PNF**

Note: Consider retarding to CL detent, if TOGA thrust is not required.
- **NAV or HDG mode** **SELECT PF**

Reselect NAV or HDG, as required (minimum height 100 feet).

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

AT GO-AROUND THRUST REDUCTION ALTITUDE:

(LVR CLB flashing on FMA)

- **THRUST LEVERS** **CL PF**

AT GO-AROUND ACCELERATION ALTITUDE:

- **FCU ALT** **CHECK and PULL PF**
- **Monitor target speed increases to green dot** **BOTH**
- If target speed does not increase to green dot:
 - **GREEN DOT SPEED** **SET PF**

AT F SPEED:

- **"FLAPS 1"** **ORDER PF**
- **"SPEED CHECKED"** **CONFIRM PNF**
- **FLAPS 1** **SELECT PNF**
- **"FLAPS 1"** **ANNOUNCE PNF**

AT S SPEED:

- **"FLAPS ZERO"** ORDER PF
 - **"SPEED CHECKED"** CONFIRM PNF
 - **FLAPS ZERO** SELECT PNF
 - **"FLAPS ZERO"** ANNOUNCE PNF
- Prepare for a second approach by selecting the ACTIVATE APP PHASE, and CONFIRM on the PERF page.*
- **AFTER TAKE OFF CHECKLIST** PERFORM BOTH

GO-AROUND FROM AN INTERMEDIATE APPROACH ALTITUDE

To interrupt the approach, or to perform a go-around from an intermediate altitude in the approach, proceed as follows:

- **V/S or FPA selector knob**..... PUSH PF
- If both autopilots were engaged, only AP1 remains engaged. Aircraft will remain VERTICAL SPEED "0" mode on FMA*
- **ATC** COMMUNICATE PNF
- Communicate with ATC to determine what altitude should be used for go-around.*

● **If aircraft is below go-around altitude:**

- **GO-AROUND ALTITUDE** SET/CHECK PF/BOTH
- **NORMAL GO-AROUND** PERFORM PF

SET the THR levers to TOGA detent, then retard the THR levers to CLB detent. This will engage FMGS GO-AROUND phase.

If aircraft is above go-around altitude proceed as follows:

- **GO-AROUND ALTITUDE** SET/CHECK PF/BOTH
 - **VERTICAL SPEED** SET PF
- Set V/S as appropriate to start descent.*
- **ALT *, THEN ALT (green) mode on FMA**..... CHECK PF
 - **AUTOPILOT** OFF PF
- Continue flight manually, maintaining G/A altitude.*
- **"GO AROUND - FLAPS"** ANNOUNCE PF

- **SET the THR levers to TOGA detent, then retard the THR levers as required** **PF**
This will engage FMGS GO-AROUND phase. Maintain GO-AROUND altitude, disregard FD's SRS command.
Note: If the thrust levers are not set briefly to TOGA detent, the FMGS does not engage the GO AROUND phase, and flying over, or close to the airport (less than 7 NM) will sequence the Destination waypoint in the F-PLN.
- **FLAPS** **RETRACT ONE STEP PNF**
- **"PUSH TO LEVEL OFF"** **ORDER PF**
PNF should precisely push V/S or FPA selector knob to disengage SRS mode.
- **V/S or FPA selector knob** **PUSH PNF**
Aircraft will maintain vertical speed "0". PF should follow FD command.
- **"GEAR UP"** **ORDER PF**
- **L/G UP** **SELECT PNF**
- **"GEAR UP-FLAPS"** **CONFIRM/ANNOUNCE PNF**
- **AUTOPILOT** **ON PF**
- **NAV or HDG mode** **SELECT PF**
Reselect NAV or HDG, as required to disengage "G/A TRACK" mode.
- **Check target speed increases to green dot** **BOTH**
 - If target speed does not increase to green dot:
 - **GREEN DOT SPEED** **SET PF**

AT F SPEED:

- **"FLAPS 1"** **ORDER PF**
- **"SPEED CHECKED"** **CONFIRM PNF**
- **FLAPS 1** **SELECT PNF**
- **"FLAPS 1"** **ANNOUNCE PNF**

AT S SPEED:

- **"FLAPS ZERO"** ORDER PF
- **"SPEED CHECKED"** CONFIRM PNF
- **FLAPS ZERO** SELECT PNF
- **"FLAPS ZERO"** ANNOUNCE PNF
 - *Prepare for a second approach by selecting the ACTIVATE APP PHASE, and CONFIRM on the PERF page.*
- **AFTER TAKE OFF CHECKLIST** PERFORM BOTH

NOTE:

FOLLOWING THIS PROCEDURE, BE AWARE, THAT AIRCRAFT WILL REMAIN VERTICAL SPEED "0" MODE ON FMA. ENGAGE ALT (GREEN) MODE ON FMA AS APPROPRIATE.

5 РУЛЕНИЕ НА СТОЯНКУ И ПОСЛЕПОЛЕТНЫЕ РАБОТЫ

5.1 AFTER LANDING

When clear of the runway:

- **STROBE LIGHTS** **AUTO CM1**
- **LAND LIGHTS** **RETRACT CM1**
 - *Retract landing lights, unless they are needed.*
- **CHR counter** **START CM2**

Start CHR counter on the clock to ensure that the engines have had not less than 3 min cooldown period before shutdown, even if the idle reverses used for landing.
- **"AFTER LANDING PROCEDURE"** **CALL CM1**
- **RADAR** **OFF CM2**
- **PREDICTIVE WINDSHEAR SYSTEM** **OFF CM2**

Switching the radar and predictive windshear system OFF after landing avoids risk of radiating persons at the gate area.
- **GROUND SPOILERS** **DISARM CM2**
- **ENG MODE selector** **NORM CM2**
- **FLAPS** **AS RQRD CM2**
 - *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 and slats until after engine shutdown and after the ground crew has confirmed that flaps and slats are clear of obstructing ice. When the mechanism is clean, use the following procedure to retract the flaps/slats before the aircraft electric network is de-energized:*
 - *select ON the YELLOW and BLUE ELEC PUMP;*
 - *retract the FLAPS and monitor retraction on ECAM page;*
 - *select OFF the YELLOW and BLUE ELEC PUMP and resume with normal procedure.*
 - *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 CONFIG 1 when the OAT is above 30°C.*
- **ATC/TCAS mode selector** **STBY / XPNDR CM2**

Set XPNDR if Mode S required for taxi.
- **ANTI ICE** **AS RQRD CM2**

If engine anti-ice is used, take care to control taxi speed, especially on wet or slippery surfaces. (N1 ground idle is increased).
- **APU** **START CM2**

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

- **BRAKE TEMPERATURE CHECK CM2**
*Check BRAKE TEMP on the ECAM WHEEL page for discrepancies and high temperature.
Refer to 3.04.32 FCOM for the brake temperature limitations requiring maintenance actions.*
- **"AFTER LANDING CHECKLIST" CALL CM1**
- **AFTER LANDING CHECKLIST COMPLETE CM2**

5.2 PARKING

Prior to performing this check, consideration should be given to "GROUND OPERATIONS IN HEAVY RAIN" (Refer to 3.04.30 FCOM) or "COLD WEATHER" (Refer to 3.04.91 FCOM).

- PARKING BRAKE ACCU PRESSCHECK CM1

The ACCU PRESS indication must be in the green band. In case of low accumulator pressure, chocks are required before engine 1 shutdown.

- PARKING BRK ON CM1

- *When one brake temperature is above 500°C, avoid applying the parking brake, unless operationally necessary.*
- *Check the brake pressure on the Triple Indicator for the left and right brakes.*

CAUTION

If the aircraft starts to move with the parking brake ON: Immediately release the PARKING BRAKE handle, to restore braking with the pedals.

- ANTI-ICE OFF CM1

- APU BLEED ON CM2

Select APU bleed ON if applicable just before engine shutdown to prevent engine exhaust fumes from entering the air conditioning. If APU is not available, set EXT PWR at ON before setting ENG MASTERS OFF.

- ENG MASTER switch 1 and 2 OFF CM1

- *Following high thrust operation, such as maximum reverse thrust during landing, operate the engine at idle for 3 minutes prior to shutdown to thermally stabilize the engine's hot section. Operating time at idle, as during taxiing, is included in this 3-minute period. If operational requirements dictate, the engine may be shut down after a one-minute cooling period.*
- *Check that engine parameters decrease.*

Note: *If the engine fails to shut down, switch the affected master lever ON then OFF. If the engine still fails to shut down, press the affected ENG FIRE pushbutton (Engine will shut down after about 1 minute, during which it uses the fuel between the LP valve and the nozzles).*

- *The DOOR page is displayed on the lower ECAM display.*

CAUTION

If JP4 fuel is used at ambient temperatures higher than 10°C, dry motor the engines for 2 minutes after engine shutdown. This dry motor period should start approximately 90 seconds after the master lever is selected off.

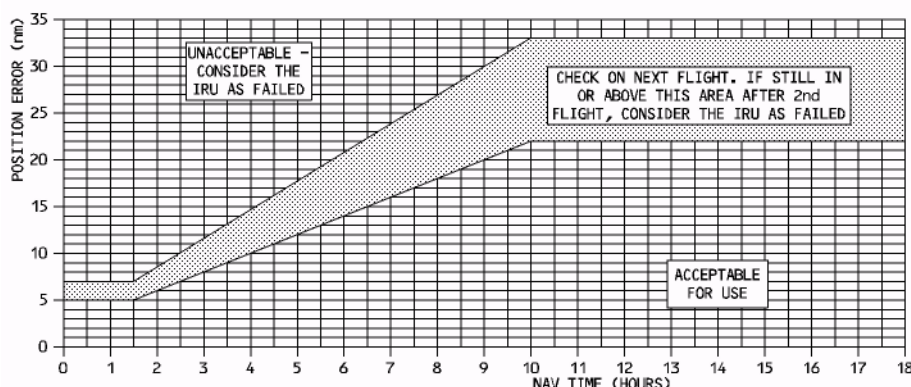
- CHR counterSTOP CM2

- ELAPSED TIMESTOP CM2

- **EXTERIOR LIGHTS** **AS RQRD CM1**
Switch off the BEACON switch, when all engines have obviously spooled down ($N1 < 7\%$).
- **SLIDE DISARMED** **CHECK CM1**
Check slides disarmed on the ECAM DOOR page. Warn the cabin crew, if any slide is not disarmed.
- **SEAT BELTS** **OFF CM1**
- **FUEL PUMPS** **OFF CM1**
- **ATC/TCAS mode selector** **STBY CM2**
Set STBY if Mode S was required for taxi.
- **IRS PERFORMANCE** **CHECK CM2**

Drift check:

- - Call up the POSITION MONITOR page. Check that the drift does not exceed the following:



Residual ground speed check:

- CAPT and F/O NDs display the IRS 1 and 2 residual ground speeds respectively. The IRS 3 residual ground speed can be read on the CAPT ND by switching the ATT HDG selector to CAPT ON 3.
 - If ground speed > 15 knots: Report (The IR part of the ADIRU must be considered as failed, if the excessive deviation occurs after two consecutive flights).
 - If ground speed > 21 knots: Report (The IR part of the ADIRU must be considered as failed).
- **FUEL QUANTITY** **CHECK CM2**
Check that the sum of the fuel on board and the fuel used is consistent with the fuel on board at departure. If an unusual discrepancy is found, maintenance action is due.
 - **STATUS (ECAM Control panel)** **PRESS CM1**
 - Check the STATUS page.

If maintenance status messages are displayed:

- At transit: Disregard, unless AIR BLEED maintenance status.
- 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.

- **PARKING BRAKEAS RQRD CM1**
 - *The parking brake should be released after chocks are in place, if the "BRAKES HOT" ECAM caution is displayed.*
 - *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.*
 - *When parking with a flat tire on the nose gear, keep the parking brake on, to avoid aircraft yawing at parking brake release.*
- **DUs.....DIM BOTH**

Dim EFIS, ECAM and MCDU display units.
- **"PARKING CHECKLIST"CALL CM1**
- **PARKING CHECKLISTCOMPLETE BOTH**
- **REPORT SEVERE ICING CONDITIONSCM1**

Report severe icing conditions in the log book, requiring inspection of the fan acoustic panels of the engines during the walkaround.

5.3 SECURING THE AIRCRAFT

Prior to performing this check consideration should be given to COLD WEATHER (Refer to 3.04.91 FCOM).

- **PARKING BRAKE** **CHECK ON CM1**
Keep the parking brake on to reduce hydraulic leak rate in the brake accumulator.
- **OXYGEN CREW SUPPLY** **OFF CM2**
- **ADIRS (1 + 2 + 3)** **OFF CM1**
ADIRS should not be switched off during transits at latitudes above 82°N (70°N for A-320 only), in order to avoid their requiring excessive alignment time.
After having switched 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 CM2**
- **MAINT BUS switch** **AS RQRD CM2**
Should electrical power be required for crew or servicing personnel consider selecting the MAINT BUS switch (overhead in the forward cabin) to the ON position prior to selecting aircraft power off.
- **FOOT WARMER (if installed)** **OFF BOTH**
- **APU BLEED** **OFF CM2**
- **APU MASTER switch** **OFF CM2**
Switch off the APU after the passengers have disembarked.
- **EMER EXIT LT** **OFF CM2**
- **NO SMOKING** **OFF CM2**
Switching off the NO SMOKING signs permits the emergency batteries to be charged (provide2 external power is supplying the aircraft network).
- **EXT PWR** **AS RQRD CM2**
- **BAT 1 and 2** **OFF CM2**
Wait until the APU flap is fully closed (about 2 minutes after the APU AVAIL light goes out) before switching off the batteries. Switching the batteries off before the APU flap is closed may cause smoke in the cabin during the next flight.
If the batteries are off while the APU is running, there is no APU fire extinguishing.
- **"SECURING THE A/C C/L"** **CALL CM1**
- **SECURING THE A/C C/L** **COMPLETE BOTH**

6 ПРИЛОЖЕНИЯ

6.1 COMMUNICATIONS

Standard phraseology is essential to ensure effective crew communication. The phraseology should be concise and exact. The following Chapter lists the calls that should be used as standard. They supplement the callouts identified in the SOP.

These standard callouts are also designed to promote situational awareness, and to ensure crew understanding of systems and their use in line operation.

SUMMARY FOR EACH PHASE

TO REMOVE GROUND SUPPLY		
EVENT	CM1	GND Mech
Initial ground contact	GROUND (from) COCKPIT	COCKPIT (from) GROUND
External disconnection	REMOVE EXTERNAL _	EXTERNAL _ REMOVED
Safety check	CHECK ALL PINS	SAFETY PINS REMOVED TO BOX, STEERING NORMAL

BEFORE ENGINE START / PUSH BACK		
EVENT	CM1	CM2
Before start up clearance received	BEFORE START C/L DOWN TO THE LINE	BEFORE START C/L DOWN TO THE LINE COMPLETED
After start up clearance received	BEFORE START C/L BELOW THE LINE	BEFORE START C/L BELOW THE LINE COMPLETED

PUSH BACK / ENGINE START		
EVENT	CM1	GND Mech
When ready for push back and push back clearance received from ATC	GROUND (from) COCKPIT, CLEARED FOR PUSH	COCKPIT (from) GROUND, RELEASE BRAKES
Start of push	BRAKES RELEASED CLEAR TO PUSH	
When ready to start engines	CLEAR TO START? STARTING ENGINE	ALL ENGINES CLEAR
When push back completed	BRAKES SET	SET BRAKES
When ready to disconnect (after engine started and parameters are stabilized)	REPORT AIRPLANE READY FOR TAXIING, GIVE VISUAL SIGNAL ON LEFT (RIGHT) SIDE	AIRPLANE READY FOR TAXIING, WAIT FOR SIGNAL ON LEFT (RIGHT) SIDE

AFTER ENGINE START		
EVENT	CM1	CM2
All engines started and stabilized and GND is disconnected	AFTER START PROCEDURE	
Flight controls check in following sequence:	FLIGHT CONTROLS CHECK	
1. Elevators		FULL UP, FULL DOWN, NEUTRAL
2. Ailerons		FULL LEFT, FULL RIGHT, NEUTRAL
3. Rudder*		FULL LEFT, FULL RIGHT, NEUTRAL
All engines started and stabilized and GND is disconnected	AFTER START C/L	AFTER START C/L COMPLETED

Note: *The CM2 should follow pedal movement with his/her feet.

TAXI		
EVENT	CM1	CM2
When taxi clearance obtained	LEFT SIDE CLEAR	RIGHT SIDE CLEAR
Brake transfer check	BRAKE CHECK	PRESSURE ZERO
During taxi	BEFORE TAKE-OFF C/L DOWN TO THE LINE	BEFORE TAKE-OFF C/L DOWN TO THE LINE COMPLETED
Lining up on the runway	LINE UP PROCEDURE BEFORE TAKE-OFF C/L BELOW THE LINE	BEFORE TAKE-OFF C/L COMPLETED

TAKE-OFF		
EVENT	CM1	CM2
Setting thrust levers to initial stabilization value	TAKE-OFF	
	PF	PNF
When thrust levers set to FLEX/TOGA	ANNOUNCE FMA	CHECKED
Before passing 80 kts		POWER SET
At 100 kts	CHECKED	HUNDRED KNOTS
At V1		V1
At VR		ROTATE
When climbing clear of the ground (positive increase of V/S, BARO and RAD ALT)	GEAR UP	POSITIVE CLIMB GEAR UP
If AP is engaged by PNF If AP is engaged by PF	AP1 (2) ON AP1 (2)	CHECKED
When F Speed and accelerating	FLAPS ONE	SPEED CHECKED FLAPS ONE
When S Speed and accelerating	FLAPS ZERO	SPEED CHECKED FLAPS ZERO
After T/O check (not normally requested before flap retraction completed)	AFTER TAKE-OFF C/L	AFTER TAKE-OFF C/L COMPLETED

ALTIMETER SETTING CHANGES TO / FROM QNH / QFE - STD

EVENT	PF	PNF
500 ft before reaching transition altitude (transition level)		APPROACHING TRANSITION
At transition altitude (transition level)		TRANSITION
Barometric setting change and subsequent altimeter cross-check	SET STANDARD (QNH/QFE) CHECKED	STANDARD (QNH/QFE__) SET, CROSS-CHECKED, PASSING FL__ (__FT) NOW
After altimeter setting (in climb)	CLIMB C/L	CLIMB C/L COMPLETED

APPROACH AND LANDING

EVENT	PF	PNF
After altimeter setting when cleared below transition level, or when appropriate	APPROACH C/L	APPROACH C/L COMPLETED
Activation of approach Phase (approx 15 nm from touchdown; automatic, if in managed nav)	ACTIVATE APPROACH PHASE	APPROACH PHASE ACTIVATED
Beginning of radio altimeter indication (could be auto callout of 2500 ft)	CROSS-CHECKED	RADIO ALTIMETER ALIVE (see Note 1 below)
LOC index movement on PFD	LOC ALIVE	CHECKED
G/S index movement on PFD	GLIDESLOPE ALIVE	CHECKED
FMA "LOC*"	LOC STAR	CHECKED
At green dot speed or less than VFE	FLAPS ONE	SPEED CHECKED FLAPS ONE
FMA "GS*"	GS STAR	CHECKED
"GS*", "FINAL APP", or "FAF"	GA ALTITUDE __ FT SET	CHECKED
2000ft AGL min (ILS); or S speed (non-precision)	FLAPS TWO	SPEED CHECKED FLAPS TWO
When flaps at two	GEAR DOWN	GEAR DOWN
When gear is down	FLAPS THREE	SPEED CHECKED FLAPS THREE

EVENT	PF	PNF
When flaps at three (unless landing with Flaps 3)	FLAPS FULL	SPEED CHECKED FLAPS FULL
FAF	CHECKED	PASSING__ (Fix Name) __FT
When landing flaps set, and landing memo is displayed on ECAM	LANDING C/L	LANDING C/L COMPLETED
1000 ft above TDZE	CHECKED	ONE THOUSAND STABILIZED
FMA "LAND GREEN" (ILS approach)	LAND GREEN	CHECKED
100 ft above MDA/DH	CHECKED	ONE HUNDRED ABOVE (if no Auto Callout)
MDA/DH visual reference	LANDING	MINIMUM
MDA/DH no visual reference	GO AROUND - FLAPS	MINIMUM
PNF monitors pin-programmed auto callout, or announces if inoperative		ONE HUNDRED FIFTY
After touchdown		GROUND SPOILERS, REVERSE GREEN (See Note 2 below)
If autobrake armed		DECEL (See Note 3 below)
If autobrake is not used and manual brake applied	BRAKING	
At 70 knots		SEVENTY KNOTS
Notes: 1. Crew awareness, crew should now keep RA in scan to landing. 2. If reverse deployment is not as expected, call NO REVERSE ENGINE__ or NO REVERSE , as appropriate. 3. If autobrake is armed, and no positive deceleration is observed, call NO DECEL .		

AFTER LANDING		
EVENT	CM1	CM2
When clear of the runway	AFTER LANDING PROCEDURE	
When AFTER LANDING PROCEDURE completed	AFTER LANDING C/L	AFTER LANDING C/L COMPLETED

6.2 NORMAL PROCEDURES

SAFETY EXTERIOR INSPECTION

CM1	CM2
	* WHEEL CHOCKS.....CHECK IN PLACE * L/G DOORS.....CHECK POS * APU AREA.....CHECK

PRELIMINARY COCKPIT PREPARATION

CM1	CM2
* EXT WALK AROUND.....PERFORM * UPPER WING SURFACE CONDITION.....CHECK	WHEATHER RADAR.....CHECK OFF PWS.....CHECK OFF ENG MASTERSCHECK OFF ENG MODE SEL.....CHECK NORM L/G lever.....CHECK DOWN WIPERS.....OFF BAT.....CHECK/AUTO EXT PWR.....ON APU FIRE.....CHECK/TEST APU.....START EXT PWR.....AS RQRD * COCKPIT LIGHTS.....AS RQRD * PARKING BRAKE.....ON * ACCU/BRAKES PRESS.....CHECK SPD BRK lever.....CHECK RET FLAPS.....CHECK POS PROBE/WINDOW HEAT.....AS RQRD APU BLEED.....ON AIR COND panel.....CHECK CARGO HEAT.....AS RQRD ELEC panel.....CHECK VENT panel.....CHECK * ECAM RECALL.....PRESS * ECAM OXY PRESS.....CHECK * ECAM HYD QTY.....CHECK * ECAM ENG OIL QTY.....CHECK EMER EQPT.....CHECK RAIN REPELENT.....CHECK C/B PANELS.....CHECK * GEAR PINS & COVERS.....CHECK STAFF PAPERS.....CHECK

SECURITY COCKPIT PREPARATION

CM1	CM2
	FLIGHT DECK SECURITY CHECK.....COMPLETE

COCKPIT PREPARATION	
CM1	CM2
	OVERHEAD PANEL: * ALL WHITE LIGHTS.....EXINGUISH * RCDR GND CTL.....ON CVR.....TEST EVAC.....PURS/CAPT * ADIRS.....NAV EXT LT.....AS RQRD * SIGNS.....SET LDG ELEV.....AUTO * PACK FLOW.....AS RQRD BAT.....CHECK * FUEL TK PUMPS.....ON * FUEL MODE SEL.....AUTO * X FEED.....CHECK CLOSED ENG FIRE.....CHECK/TEST AUDIO SWITCH.....NORM PA (3 rd occupant).....RECEPT RMP 3.....SET MAINT PANEL.....CHECK RMP 1+2.....SET * AIRFIELD DATA.....OBTAIN * FMGS INITIALIZATION: * DATA BASE VALID.....CHECK * NAVAID DESELECTION.....AS RQRD * F-PLN INITIALIZATION.....COMPLETE * ALIGN IRS.....PRESS * F-PLN A.....COMPLETE/CHECK * F-PLN.....CHECK * WINDS.....AS APPROPRIATE * SEC F-PLN.....AS APPROPRIATE * RAD NAV.....CHECK * ACARS.....INITIALIZE
COCKPIT DOOR.....TEST	

WHEN BOTH PILOTS SEATED	
CM1	CM2
* ALIGN IRS.....CHECK * ALL WHITE LIGHTS EXTINGUISHED.....CHECK * ATIS.....OBTAIN * DATA BASE VALID.....CHECK * NAVAID DESELECTION.....AS RQRD * INIT PAGE "A".....CHECK * F-PLN.....CHECK * SEC F-PLN.....CHECK * RAD NAV.....CHECK * INIT PAGE "B".....SELECT	* F-PLN.....CHECK * INIT PAGE "B".....SELECT

PF	PNF
<u>GLARESHIELD:</u> INTEGRAL & FLOOD LTS.....AS RQRD * BARO REF.....SET * FD.....ON * LS.....AS RQRD * CSTR.....ON * ND mode & range.....AS RQRD * VOR/ADF sel.....AS RQRD * FCU.....CHECK/SET <u>LATERAL CONSOLE:</u> OXY MASK.....TEST * ATC HIJACKING ALERT LIGHT.....CHECK OFF <u>INSTRUMENT PANEL:</u> PFD/ND brightness.....ADJUST LOUDSPEAKER.....SET FOOT WARMER (if installed).....ON * PFD/ND.....CHECK <u>CTR INSTRUMENT PANEL:</u> * STBY INSTRUMENTS.....CHECK * CLOCK.....CHECK/ADJUST * A/SKID N/W STRG.....ON <u>PEDESTAL:</u> ACP.....CHECK * WEATHER RADAR/PWS...CHECK/SET SWITCHING PANEL.....NORM * ECAM STATUS.....CHECK * LDG ELEV (ECAM).....CHECK AUTO * FUEL QTY.....CHECK * THRUST LEVERS.....CHECK IDLE * ENG MASTERS.....CHECK OFF * ENG MODE sel.....CHECK NORM * PRK BRAKE PRESS.....CHECK GRAVITY GEAR EXT.....CHECK ATC/TCAS.....CHECK/SET * T/O BRIEFING.....PERFORM BEFORE START C/L DOWN TO THE LINE	<u>GLARESHIELD:</u> * BARO REF.....SET * FD.....ON * LS.....AS RQRD * CSTR.....ON * ND mode & range.....AS RQRD * VOR/ADF sel.....AS RQRD <u>LATERAL CONSOLE:</u> OXY MASK.....TEST * ATC HIJACKING ALERT LIGHT.....CHECK OFF <u>INSTRUMENT PANEL:</u> PFD/ND brightness.....ADJUST LOUDSPEAKER.....SET FOOT WARMER (if installed).....ON * PFD/ND.....CHECK <u>PEDESTAL:</u> ACP.....CHECK

CM1	CM2
* <u>FMGS DATA INSERTION:</u> * LOADSHEET.....CHECK * ZFCG/ZFW.....READ * GROSS WEIGHT CALCUL.....CHECK * T/O DATA.....PREP. AND CHECK * V1, VR, V2.....READ * V2 and green dot speed bags on stand by ASI.....SET * PRESET SPEEDS.....AS RQRD * COCKPIT DOOR.....CHECK CLOSED * ATC CLEARANCE....MONITOR/CHECK	* <u>FMGS DATA INSERTION:</u> * LOADSHEET.....CHECK * ZFCG/ZFW.....INSERT * FUEL PLANNING.....CHECK * BLOCK FUEL.....INSERT * GROSS WEIGHT CALCUL.....CHECK * T/O DATA.....PREP. AND CHECK * V1, VR, V2.....INSERT * THR RED/ACC ALT.....SET or CHECK * T/O SHIFT.....AS RQRD * FLAPS/THS, FLEX TEMPERATURE.....INSERT * ENG OUT ACC ALT.....SET or CHECK * PRESET SPEEDS.....AS RQRD * ATC CLEARANCE.....OBTAIN * ATC CODE.....SET

BEFORE PUSH BACK or START	
CM1	CM2
SEATS, SEAT BELTS, HARNESSSES, PEDALS.....ADJUST MCDU.....T/O CONFIG EXT PWR.....CHECK OFF WINDOWS/DOORS.....CHECK CLOSED NW STRG DISC.....CHECK AS RQRD BEACON.....ON THR LEVERS.....IDLE PRK BRAKE ACCU PRESS.....CHECK PARKING BRAKE.....AS RQRD <u>ALTERNATE BRAKING:</u> COMM (GROUND).....ESTABLISH Y ELEC PUMP.....CHECK OFF BRK PEDALS.....PRESS and HOLD PRK BRK.....OFF BRK PRESSURE.....CHECK PRK BRK.....ON BRK PEDALS.....RELEASE BEFORE START C/L BELOW THE LINE PUSH/START UP (GROUND).....OBTAIN	SEATS, SEAT BELTS, HARNESSSES, PEDALS.....ADJUST MCDU.....T/O CONFIG WINDOWS/DOORS.....CHECK CLOSED PUSH/START UP CLEAR.....OBTAIN A/SKID & N/W STRG.....AS RQRD ATC/TCAS.....AS RQRD

ENGINE START	
CM1	CM2
ENG MODE SEL.....IGN/START “STARTING ENG 2”.....ANNOUNCE MASTER SW 2.....ON CHECK: START VALVE N2 IGNITER FUEL FLOW EGT N1 OIL PRESS START VLV CLOSED 50% N2 ENG IDLE PARAMETERS.....CHECK N1 about 19.5% N2 about 58,5% EGT about 390°C FF about 275 kg/h “STARTING ENG 1”.....ANNOUNCE <i>REPEAT THE START SEQUENCE</i>	ELAPSED TIME.....START ENGINE PARAMETERS.....MONITOR

AFTER START	
CM1	CM2
ENG MODE SEL.....NORM “AFTER START PROC”.....ANNOUNCE APU BLEED.....OFF ECAM DOOR page.....CHECK ECAM STATUS.....CHECK “CLEAR TO DISCONNECT”..ANNOUNCE FLT CTL.....CHECK <i>AFTER START C/L</i>	GND SPLRS.....ARM RUD TRIM.....ZERO FLAPS.....SET PITCH TRIM.....SET ENG ANTI ICE.....AS RQRD WING ANTI ICE.....AS RQRD APU MASTER SW.....OFF A/SKID & N/W STRG.....ON FLT CTL.....CHECK AUTO BRK.....MAX

TAXI	
CM1	CM2
• Taxi clearance obtained: NOSE LIGHT.....TAXI GROUND CLEARANCE.....RECEIVE "LEFT SIDE CLEAR".....ANNOUNCE PRK BRAKE.....OFF THR LEVERS.....AS RQRD "BRAKE CHECK".....ANNOUNCE BRAKES.....CHECK • If take off data have changed by ATC: FD.....CHECK ON FMA & FLT INSTR.....CHECK DEPARTURE BRIEFING (PF)...CONFIRM CABIN REPORT.....CHECK TO MEMO.....CHECK NO BLUE BEFORE TO C/L DOWN TO THE LINE	TAXI CLEARANCE.....OBTAIN "RIGHT SIDE CLEAR".....ANNOUNCE "PRESS ZERO".....CHECK/ANNOUNCE T/O DATA.....CHECK/REVISE FMGS F-PLN/SPD.....CHECK/REVISE FCU ALT/HDG.....SET FD.....CHECK ON FMA & FLT INSTR.....CHECK RADAR.....AS RQRD PWS.....AUTO ATC CODE.....CONFIRM/SET TO CONFIG.....PRESS TO MEMO.....CHECK NO BLUE

BEFORE TAKE OFF	
CM1	CM2
APPR PATH CLEAR OF TRAFFIC "LINE UP PROCEDURE".....ANNOUNCE EXT LTS.....SET SLIDING TABLE.....STOW AIRBORNE FRQ (VHF1).....CHECK BEFORE TO C/L BELOW THE LINE	BRAKE TEMP.....CHECK TO/LINE UP CLEAR.....OBTAIN APPR PATH CLEAR OF TRAFFIC CABIN CREW.....ADVISE ENG MODE SEL.....AS RQRD ATC/TCAS MODE SEL.....TA or TA/RA TERR on ND (PNF side).....ON PACKS 1+2.....AS RQRD SLIDING TABLE.....STOW AIRBORNE FRQPRESEL/CHECK

TAKE OFF	
CM1	CM2
"TAKE OFF".....ANNOUNCE BRAKESRELEASE CHRONO.....START THR LEVERS.....FLEX/TOGA PFD/ND.....SCAN	CHRONO.....START PFD/ND.....SCAN
PF	PNF
FMA.....ANNOUNCE • Before reaching 80 kt: • At 100 kt: "CHECKED".....ANNOUNCE • At V1:..... • At VR:..... • When airborne: "GEAR UP".....ORDER AP.....AS RQRD FMA.....ANNOUNCE • At thrust reduction alt: THR LEVERS.....CL FMA.....ANNOUNCE • At acceleration alt: FMA.....ANNOUNCE • At F speed: "FLAPS 1".....ORDER • At S speed: "FLAPS 0".....ORDER	"CHECKED".....ANNOUNCE TAKE OFF N1.....CHECK "POWER SET".....ANNOUNCE PFD/ENG parameters.....SCAN "HUNDRED KNOTS".....ANNOUNCE "V1".....ANNOUNCE "ROTATE".....ANNOUNCE "POSITIVE CLIMB".....ANNOUNCE LDG GEAR.....UP GRND SPLRS.....DISARM EXT LTS.....SET "GEAR UP".....ANNOUNCE PACK 1 (if applicable).....ON "SPEED CHECKED".....CONFIRM "FLAPS 1".....SET/ANNOUNCE "SPEED CHECKED".....CONFIRM "FLAPS 0".....SET/ANNOUNCE PACK 2 (if applicable).....ON

AFTER TAKE OFF	
PF	PNF
	APU BLEED.....AS RQRD APU MASTER SW.....AS RQRD ENG MODE SEL.....AS RQRD ATC/TCAS MODE SEL.....TA/RA
AFTER TAKE OFF C/L	

CLIMB	
PF	PNF
MCDU.....PERF	MCDU.....F-PLN
FCU/FMGS.....SET IF AP ON	FCU/FMGS.....SET IF AP OFF
• 500ft before transition alt:	“APPROACHING TRANS”...ANNOUNCE
• At transition alt:	“TRANSITION”.....ANNOUNCE
“SET STANDARD”.....ORDER	
BARO REF.....SET	BARO REF.....SET
	“STD SET. X-CHECK
	PASSING FL__ NOW”.....CALL
“CHECKED”.....ANNOUNCE	
CLIMB C/L	
• At FL 100:	
“FL 100 PROCEDURE”.....ANNOUNCE	LAND LTS.....OFF
	ECAM MEMO.....REVIEW
	RAD NAV page.....CHECK
	OPT/MAX FL.....ANNOUNCE

CRUISE	
PF	PNF
SEAT BELTS (CM1).....AS RQRD	
EFIS.....ARPT	EFIS.....ARPT
METRIC ALT P/B.....AS RQRD	
ALTIMETERS.....CHECK	ALTIMETERS.....CHECK
ECAM MEMO.....REVIEW	TERR on ND.....OFF
ECAM SYS PAGES.....REVIEW	
SEC F-PLN.....AS RQRD	
VHF 2 (121,5).....SET/MONITOR	VHF 2 (121,5).....MONITOR
ATC/TCAS.....SET BLW	
	FLIGHT PROGRESS.....CHECK
	NAV ACCURACY.....CHECK
	CABIN TEMP.....MONITOR
OXY MASK.....CHECK	OXY MASK.....CHECK

DESCENT PREPARATION	
PF	PNF
LDG ELEV.....CHECK WEATHER & LDG INFORM.....OBTAIN ECAM STATUS.....CHECK FMGS.....PREPARE F-PLN A PAGE DES WIND RAD NAV PAGE PROG PAGE RERF CRUISE PAGE PERF DES PAGE PERF APPR PAGE GO-AROUND PAGE FUEL PRED PAGE SEC F-PLN PAGE STAND BY ASI.....SET GPWS LDG FLAP 3.....AS RQRD AUTO BRK.....AS RQRD APPROACH BRIEFING.....PERFORM	WEATHER & LDG INFORM.....OBTAIN FMGS PREPARATION.....CHECK DES CLEARANCE.....OBTAIN

DESCENT	
PF	PNF
SEAT BELTS (CM1).....ON EFIS.....CSTR DESCENT.....INITIATE MCDU.....PROG/PERF DES DESCENT.....MONITOR SPDBRK.....AS RQRD • At FL 100: “FL 100 PROCEDURE”.....ANNOUNCE ILS pb.....AS RQRD • At 500 ft before transition level: • At TL or when cleared to an altitude: “SET QNH/QFE___”.....ANNOUNCE BARO REF.....SET “CHECKED”.....ANNOUNCE APPROACH C/L	EFIS.....CSTR TERR ON ND.....ON MCDU.....F-PLN LAND LTS.....ON ILS pb.....AS RQRD RAD NAV.....CHECK/IDENT NAV ACCURACY.....CHECK “APPROACHING TRANS”....ANNOUNCE “TRANSITION”.....ANNOUNCE BARO REF.....SET “QNH/QFE___SET. X-CHECKED. PASSING___FT NOW”.....CALL

ILS APPROACH	
PF	PNF
• Initial approach: “ACTIV. APPR PHASE”.....ORDER POSITIONING.....MONITOR MANAGED SPEED.....CHECK SPDBRK.....AS RQRD	ENG MODE SEL.....AS RQRD “APPR PHASE ACTIV.”.....ANNOUNCE NAV ACCURACY.....MONITOR
• Intermediate/Final approach: When cleared for ILS approach: APPR pb on FCU.....PRESS BOTH AP.....ENGAGE FMA.....ANNOUNCE At green dot speed: “FLAPS 1”.....ORDER FMA.....CHECK LOC CAPTURE.....MONITOR “LOC STAR”.....ANNOUNCE G/S CAPTURE.....MONITOR “G/S STAR”.....ANNOUNCE “GO-AROUND ALT...SET”...ANNOUNCE At 2000 ft AGL (MINIMUM): “FLAPS 2”.....ORDER When FLAPS 2: “GEAR DOWN”.....ORDER When L/G down, below V_{FE}: “FLAPS 3”.....ORDER ECAM WHEEL PAGE.....CHECK “FLAPS FULL”.....ORDER A/THR.....CHECK SLIDING TABLE.....STOW LDG MEMO.....CHECK NO BLUE LINE LANDING C/L	 “SPEED CHECKED”.....CONFIRM FLAPS 1.....SELECT “FLAPS 1”.....ANNOUNCE ATC/TCAS.....TA or TA/RA LOC CAPTURE.....MONITOR G/S CAPTURE.....MONITOR “SPEED CHECKED”.....CONFIRM FLAPS 2.....SELECT “FLAPS 2”.....ANNOUNCE L/G DOWN.....SELECT GND SPLRS.....ARM EXT LTS.....SET CABIN CREW.....ADVISE “GEAR DOWN”...CONFIRM/ANNOUNCE “SPEED CHECKED”.....CONFIRM FLAPS 3.....SELECT “FLAPS 3”.....ANNOUNCE ECAM WHEEL PAGE.....CHECK “SPEED CHECKED”.....CONFIRM FLAPS FULL.....SELECT “FLAPS FULL”.....ANNOUNCE WING ANTI ICE.....OFF SLIDING TABLE.....STOW LDG MEMO.....CHECK NO BLUE LINE FLT PARAMETERS.....CHECK

PF	PNF
At minimum stabilization height: If A/C not stabilized: "GO-AROUND/FLAPS"ANNOUNCE At DH + 100ft (or MDA + 100): AT DH or MDA: "LANDING" or "GO-AROUND/FLAPS"ANNOUNCE LANDING.....PERFORM	"ONE THOUSAND / FIVE HUNDRED"ANNOUNCE "STABILIZED"ANNOUNCE "NOT STABILIZED, GO-AROUND"ANNOUNCE "ONE HUNDRED ABOVE"...ANNOUNCE "MINIMUM"ANNOUNCE

CAT II / CAT III APPROACH	
CM1	CM2
Approach should be performed using standard ILS APPR techniques till 1000 ft. The crew shall perform a stabilized approach, so that LANDING C/L to be accomplished before reaching FAF. As a general rule, if a failure occurs above 1000 ft AGL the approach may continued reverting to a higher DH, providing the appropriate conditions are met.	
At 1000 ft:	
“CHECKED”.....ANNOUNCE RA CALL OUT.....MONITOR	“ONE THOUSAND STABILIZED”.....ANNOUNCE RA CALL OUT.....MONITOR/ANNOUNCE
At 350 ft RA:	
“LAND GREEN”.....ANNOUNCE <i>If “NO LAND GREEN” a go-around must be performed, if insufficient visual references</i>	“CHECKED”.....ANNOUNCE
At 200 ft and below: If AUTOLAND warning appears on the glareshield, if insufficient visual references:	
“GO-AROUND. FLAPS”.....ANNOUNCE	
At DH + 100 ft:	
OUTSIDE SCAN.....COMMENCE	“HUNDRED ABOVE”.....ANNOUNCE
At DH: If external visual references are not sufficient:	
“GO-AROUND. FLAPS”.....ANNOUNCE GO-AROUND.....PERFORM	
If external visual references are sufficient:	
“LANDING”.....ANNOUNCE	
At 40 ft RA:	
	FLARE on FMA.....CHECK <i>If FLARE does not come up on FMA CM2 must announce “NO FLARE” and a go-around must be performed. If visual references are sufficient and a manual landing is possible, the CM1 may decide to complete the landing.</i>

CM1	CM2												
• <u>At 30 ft RA:</u> <table> <tr> <td>THR REDUCTION.....MONITOR</td><td></td></tr> <tr> <td>AUTO CALL.....MONITOR/ANNOUNCE</td><td></td></tr> </table> • <u>At 10 ft RA:</u> <table> <tr> <td>Both THR LEVERS.....RETARD TO IDLE</td><td>"RETARD".....MONITOR/ANNOUNCE</td></tr> <tr> <td>Lateral guidance.....MONITOR</td><td>ENG PARAMETERS.....MONITOR</td></tr> </table> • <u>At TOUCH DOWN:</u> <table> <tr> <td></td><td>ROLL OUT on FMA.....CHECK</td></tr> <tr> <td></td><td><i>If ROLL OUT does not come up on FMA CM2 must announce "<u>NO ROLL OUT</u>", CM1 will disconnect the AP immediately and take manual control.</i></td></tr> </table> <i>Note: In case of ANTI SKID or NWS failure, disconnect AP and take manual control at touch down.</i> Continue standard landing procedure and disengage the APs at the end of rollout (when leaving the runway at the latest).		THR REDUCTION.....MONITOR		AUTO CALL.....MONITOR/ANNOUNCE		Both THR LEVERS.....RETARD TO IDLE	"RETARD".....MONITOR/ANNOUNCE	Lateral guidance.....MONITOR	ENG PARAMETERS.....MONITOR		ROLL OUT on FMA.....CHECK		<i>If ROLL OUT does not come up on FMA CM2 must announce "<u>NO ROLL OUT</u>", CM1 will disconnect the AP immediately and take manual control.</i>
THR REDUCTION.....MONITOR													
AUTO CALL.....MONITOR/ANNOUNCE													
Both THR LEVERS.....RETARD TO IDLE	"RETARD".....MONITOR/ANNOUNCE												
Lateral guidance.....MONITOR	ENG PARAMETERS.....MONITOR												
	ROLL OUT on FMA.....CHECK												
	<i>If ROLL OUT does not come up on FMA CM2 must announce "<u>NO ROLL OUT</u>", CM1 will disconnect the AP immediately and take manual control.</i>												

NON PRECISION APPROACH	
PF	PNF
• Approach preparation: INTENDED APPR (F-PLN).....SELECT V_{APP} (SPD CSTR AT FAF).....ENTER NAV AID.....SELECT/CHECK • Initial approach: “ACTIV. APPR PHASE”.....ORDER POSITIONING.....MONITOR MANAGED SPEED.....CHECK SPDBRK.....AS RQRD • Intermediate/Final approach: ND MODE/RAW DATA.....SELECT TRK/FPA display.....SELECT A/THR.....KEEP ACTIVE When cleared for approach: NAV & FPA (TRK & FPA).....CHECK At green dot speed: “FLAPS 1”.....ORDER At S speed: “FLAPS 2”.....ORDER When FLAPS 2: “GEAR DOWN”.....ORDER When L/G down, below V_{FE}: “FLAPS 3”.....ORDER ECAM WHEEL PAGE.....CHECK “FLAPS FULL”.....ORDER A/THR.....CHECK SPEED MODE SLIDING TABLE.....STOW LDG MEMO.....CHECK NO BLUE LINE LANDING C/L	ENG MODE SEL.....AS RQRD “APPR PHASE ACTIV.”.....ANNOUNCE NAV ACCURACY.....CHECK ND MODE/RAW DATA.....SELECT “SPEED CHECKED”.....CONFIRM FLAPS 1.....SELECT “FLAPS 1”.....ANNOUNCE ATC/TCAS.....TA or TA/RA “SPEED CHECKED”.....CONFIRM FLAPS 2.....SELECT “FLAPS 2”.....ANNOUNCE L/G DOWN.....SELECT GND SPLRS.....ARM EXT LTS.....SET CABIN CREW.....ADVISE “GEAR DOWN”...CONFIRM/ANNOUNCE “SPEED CHECKED”.....CONFIRM FLAPS 3.....SELECT “FLAPS 3”.....ANNOUNCE ECAM WHEEL PAGE.....CHECK “SPEED CHECKED”.....CONFIRM FLAPS FULL.....SELECT “FLAPS FULL”.....ANNOUNCE WING ANTI ICE.....OFF SLIDING TABLE.....STOW LDG MEMO.....CHECK NO BLUE LINE

PF	PNF
Upon reaching the FAF: Final APPR TRACK (FCU).....SET FPA for final approach.....SET/PULL GO-AROUND ALT.....SET After the FAF: POSITION/FLT PATH.....CHECK/ADJUST At minimum stabilization height: If A/C not stabilized: “GO-AROUND/FLAPS”ANNOUNCE At MDA/MDH + 100 ft: AT MDA/MDH: “LANDING” or “GO-AROUND/FLAPS”ANNOUNCE If landing is going to be performed: AP.....DISCONNECT “FD’s OFF”ANNOUNCE “SET RWY TRACK”ANNOUNCE LANDING.....PERFORM	VERT.DEVIATION...CHECK/ANNOUNCE “ONE THOUSAND / FIVE HUNDRED”ANNOUNCE “STABILIZED”ANNOUNCE “NOT STABILIZED, GO-AROUND”ANNOUNCE “HUNDRED ABOVE”ANNOUNCE “MINIMUM”ANNOUNCE FD’s on both side.....OFF

LANDING	
PF	PNF
At about 30 feet: FLARE.....PERFORM THR LEVERS.....IDLE At touchdown: REV.....AS RQRD Directional control.....ENSURE BRAKES.....AS RQRD At 70 kt: THR LEVERS.....REV IDLE At taxi speed: THR levers.....FWD IDLE Before 20 kt: AUTO BRK.....DISENGAGE CHRONO.....STOP	ATTITUDE.....MONITOR GRND SPLRS.....CHECK “GRND SPLRS, REV GREEN, DECEL ”.....ANNOUNCE “SEVENTY KNOTS”.....ANNOUNCE CHRONO.....STOP

GO AROUND	
PF	PNF
THR LEVERS.....TOGA “GO AROUND-FLAPS”.....ANNOUNCE ROTATION.....PERFORM FMA.....ANNOUNCE “GEAR UP”.....ORDER NAV or HDG MODE.....SELECT At GA thrust reduction alt: THR LEVERS.....CL At GA acceleration alt: FCU ALT.....CHECK and PULL SPEED.....MONITOR If target speed does not increase to green dot: GREEN DOT SPEED.....SET AFTER TAKE OFF C/L	FLAPS.....RETRACT ONE STEP “POSITIVE CLIMB”.....ANNOUNCE L/G UP.....SELECT “GEAR UP, FLAPS”.....CONFIRM/ANNOUNCE FLAPS.....RETRACT ON SCHEDULE

AFTER LANDING	
CM1	CM2
When clear of the runway: STROBE LTS.....AUTO LAND LTS.....RETRACT “AFTER LANDING PROC”.....CALL AFTER LANDING C/L	CHR counter.....START RADAR.....OFF PWS.....OFF GRND SPLRS.....DISARM ENG MODE SEL.....NORM FLAPS.....AS RQRD ATC/TCAS.....STBY/XPNDR ANTI ICE.....AS RQRD APU.....START BRAKE TEMP.....CHECK

PARKING	
CM1	CM2
PRK BRAKE ACCU PRESS.....CHECK PRK BRAKE.....ON ANTI ICE.....OFF ENG MASTER SW 1 & 2.....OFF EXT LTS.....AS RQRD SLIDE DISARMED.....CHECK SEAT BELTS.....OFF FUEL PUMPS.....OFF ECAM STATUS.....PRESS PRK BRAKE.....AS RQRD DUs.....DIM PARKING C/L	APU BLEED.....ON CHR counter.....STOP ELAPSED TIME.....STOP ATC/TCAS.....STBY IRS PERFORMANCE.....CHECK FUEL QTY.....CHECK DUs.....DIM

SECURING THE AIRCRAFT	
CM1	CM2
PRK BRAKE.....CHECK ON ADIRS (1+2+3).....OFF FOOT WARMER.....OFF SECURING THE A/C C/L	OXY CREW SUPPLY.....OFF EXT LTS.....OFF MAIN BUS SW.....AS RQRD FOOT WARMER.....OFF APU BLEED.....OFF APU MASTER SW.....OFF EMER EXIT LT.....OFF NO SMOKING.....OFF EXT PWR.....AS RQRD BAT 1 & 2.....OFF

6.3 BRIEFING ITEMS

TAKE OFF BRIEFING		
a. A/C type, status, MEL (operation proc.)	e. THR RED/ACC, TA	
b. RWY condition; SIG WX (WS, turbulence, icing, CBs); alternate for TO	f. Radio aids, FIX INFO (if applicable)	
c. TO configuration, TO speeds, thrust setting (if avail.); packs, APU.	g. CM1 RTO briefing inc. duties and wind	
d. SID name, first cleared altitude, airborne FREQ.	h. Continued EO TO profile, EO ACCEL altitudes, MSA (SSA), return or divert route. Consider overweight landing.	
	i. SEC F-PLN page.	
	j. AP, A.ICE, radar/TERR on ND usage	
DEPARTURE BRIEFING		
a. RWY, configuration, speeds, thrust setting.		
b. SID name, Jeppesen chart index, date of issue, lateral & vertical profile, speed & altitude restrictions (if applicable), HDG or TRK, first cleared altitude, airborne FREQ.		
c. Radio aids, FIX INFO, (if applicable).		
d. EO TO profile, MSA (SSA).		
APPROACH BRIEFING		
a. A/C type, status.	e. Stabilized or decelerated approach, flaps setting, VAPP.	
b. SIG WX (WS, turbulence, icing, CBs), QNH/QFE preselect.	f. Reversers, brakes (A/BRK) usage. Turn-off taxiway.	
c. STAR (TRANS, VIA) Jeppesen chart index, date of issue, lateral & vertical profile, speed & altitude restrictions, TL, MSA (SSA).	g. RWY condition, dimension, light system.	
d. APPR title, Jeppesen chart index, date of issue; FAF altitude & distance, ILS (NDB, VOR) FREQ & ID, approach course, G/S angle, MDA (DH), GA proc. & altitude.	h. Radio aids, FIX INFO (if applicable).	
	i. Extra fuel/hold time. Alternate F-PLN. WX at alternate.	
	j. SEC F-PLN page.	
	k. AP, A.ICE, radar usage.	
BRIEFING for NPA or abnormal flight		
a. Stabilized approach. "Bird" on/off.	c. GA altitude ... FT. AP off or push to level off (for circle), at ... FT. GA flaps/slats/gear configuration ... and recommended speed ... KT.	
b. Decelerate point ... NM from ..., 1NM before FAF ... preselect FPA ... DEG, 0,3NM before FAF ... start descent. FMA check.	d. Divert flaps/slats/gear config. and max speed ... KT.	
CAT II/III APPROACH BRIEFING		
a. NOTAM – review	e. Flight deck lighting.	h. "Low visibility proc. in progress" reported (ATC/ATIS)
b. A/C status	f. Seat position.	i. Review standard callout & crew coordination.
c. Crew certification.	g. Use of landing lights.	
d. Airline approval.		

6.4 NORMAL CHECKLIST

BEFORE START	APPROACH
COCKPIT PREP COMPLETE BOTH GEAR PINS & COVERS REMOVED CM1 SINGS ON/AUTO CM1 ADIRS NAV CM1 FUEL KG CM1 BARO QFE/QNH _____ SET BOTH MOBILES OFF ALL	BRIEFING CONFIRMED PF ECAM STATUS CHECKED PF SEAT BELTS ON PF BARO QFE/QNH _____ SET BOTH MDA/MDH SET BOTH ENG MODE SEL NORM/IGN PF
AFTER START	LANDING
T.O. DATA SET BOTH WINDOWS/DOORS CLOSED BOTH BEACON ON CM1 THR LEVERS IDLE CM1 PARKING BRAKE ON/OFF CM1 A/SKID & NW STRG ON/OFF CM2 TRANSPONDER ON/STBY CM2	CABIN CREW ADVISED PNF A/THR SPEED/OFF PF ECAM MEMO LDG NO BLUE PF ▪ L/G DOWN ▪ SINGS ON ▪ CABIN READY ▪ SPLS ARM ▪ FLAPS SET
BEFORE TAKEOFF	AFTER LANDING
A/SKID & NW STRG ON CM1 ANTI ICE ON/OFF CM1 ECAM STATUS CHECKED CM1 PITCH TRIM % SET CM1 RUDDER TRIM ZERO CM1 FLIGHT CONTROLS CHECKED BOTH	RADAR OFF CM2 SPOILERS DISARMED CM2 FLAPS AS REQUIRED CM2 TRANSPONDER STBY/ON CM2 APU START CM2
AFTER TAKE OFF / CLIMB	PARKING
FLT INSTR CHECKED BOTH BRIEFING CONFIRMED CM1 FLAPS CONFIG _____ BOTH T.O. SPEEDS/FLEX BOTH ECAM MEMO T.O. NO BLUE CM1 ▪ AUTO BRAKE MAX ▪ SINGS ON ▪ CABIN READY ▪ SPLRS ARM ▪ FLAPS T.O. ▪ T.O. CONFIG NORM	APU BLEED ON CM1 ENGINES OFF CM1 SEAT BELTS OFF CM1 EXT LIGHTS AS REQUIRED CM1 FUEL PUMPS OFF CM1 PARK BRK/CHOCKS ON/OFF CM1 TRANSPONDER STBY CM2 Consider HEAVY RAIN / COLD WEATHER
ON GROUND EMER/EVACUATION	SECURING THE AIRCRAFT
AIRCRAFT/PARKING BRK STOP/ON ATC (VHF 1) NOTIFY ΔP (if MAN CAB PR has been used) CHECK ZERO <i>(If not zero, V/S CTL FULL UP)</i> ENG MASTER 1 and 2 OFF CABIN CREW (PA) NOTIFY FIRE P/Bs (ENG and APU) PUSH AGENTS (ENG and APU) AS REQUIRED EVACUATION INITIATE	ADIRS OFF CM1 OXYGEN OFF CM1 DISPLAYs/MCDUs DIM BOTH FOOT WARMER OFF CM1 APU BLEED OFF CM1 EMER EXIT LIGHTS OFF CM1 NO SMOKING OFF CM1 APU and BAT OFF CM1 Consider COLD WEATHER

6.5 MAXIMUM WIND CONDITIONS

- Wind for take off and landing:

- Maximum crosswind for take off **29 kt gusting up to 38 kt***
- Maximum crosswind for landing **33 kt gusting up to 38 kt***

Notes: 1. In case of the loss of 3 spoilers, or of a flaps or slats jam/fault, the crosswind limit is **15 kt**

2. Landing conditions, in case of a dual G + Y hydraulic system failure:

- Runway condition **Dry**
- Crosswind **No more than 10 kt (5m/s)**

- Maximum tailwind for take off **15 kt**
- Maximum tailwind for landing **10 kt**

* : Maximum crosswind values with flight controls in normal law, as well as in direct law with and without yaw damper.

- Wind for passenger/cargo door operation:

- Maximum wind for passenger door operation **65 kt**
- Maximum wind for cargo door opening **40 kt**
- The cargo door must be closed, before the wind speed exceeds **65 kt**

MAXIMUM WIND CONDITIONS FOR CAT II OR CAT III AUTOMATIC APPROACH LANDING AND ROLLOUT

Head wind **30 kt**

Tail wind **10 kt**

Cross wind **20 kt**

Note: Wind limitation is based on surface wind reported by the tower. If wind displayed on ND exceeds here-above limitations for autoland but the tower reports surface wind within the limitations then the autopilot can remain engaged. If the tower reports surface wind beyond limitations, only CAT I automatic approach without autoland can be performed.

- Maximum crosswind under different runway conditions:

- Runway covered with a layer of 1/2 in (12.7 mm) of water, slush, or wet snow **10kt (5 m/s)**
- Wet runway (with a layer no greater than 0.125 in (3 mm) with coefficient of friction μ :
 $\mu=0.3$ **15kt (8 m/s)**
 $\mu=0.4$ **25kt (13 m/s)**
 $\mu \geq 0.5$ **29kt (15 m/s) for take off, 33 kt (17 m/s) for landing**

Notes: 1. For intermediate values of friction coefficients μ , crosswind is to be estimated by interpolation.

2. Operation on runways covered with ice, or with a friction coefficient of $\mu < 0,3$ is forbidden.

6.6 PA ANNOUNCEMENT

перед запуском двигателей

Доброе утро (день, вечер) уважаемые пассажиры. Говорит командир корабля. От имени Аэрофлота мы рады приветствовать Вас на борту __, выполняющего рейс __ (Совместный рейс Аэрофлота __ и а/к Air France (Malev) __ по маршруту __. Наш полет будет проходить на высоте __ метров. Время в пути __. Напоминаю, что для создания благоприятной обстановки курение на борту нашего самолета запрещено в течение всего полета. Просьба пристегнуть привязные ремни. Желаю Вам приятного полета. Спасибо за внимание.	Good morning (afternoon, evening) Ladies and Gentlemen. This is Captain speaking. Aeroflot welcomes you aboard __ in flight __ (in codeshare flight Aeroflot __ and Air France (Malev) __ from __ to __. It will take us __ hours __ minutes to fly __ kilometers at __ thousand meters (feet). May I remind you that smoking is not allowed throughout the flight for the sake of comfort and convenience of all aboard. I hope you will enjoy your flight and now please fasten your seat belts; we will take off in a few minutes. Thank you.
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задержка при вылете

Уважаемые пассажиры. Говорит командир корабля. Наш вылет задерживается по метеоусловиям аэропорта __ (ожиданием очереди на вылет, по техническим причинам). Благодарю за внимание.	Ladies and Gentlemen. This is Captain speaking. I am sorry for the delay, but we need another __ minutes to wait due to bad weather at __ airport (sequence for our departure, technical reasons). Thank you.
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в полете

Уважаемые пассажиры. Говорит командир корабля. Наш полет проходит на высоте __ метров. Через __ мы будем пролетать (город, реку, горы и т.д.). Расчетное время прибытия в аэропорт __ в __. Спасибо за внимание.	Ladies and Gentlemen. This is Captain speaking. We are flying at __ thousand feet, in __ minutes we will be over __ (city, the __ river, mountains, etc.). We expect to arrive at __ airport at __. Thank you.
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турбулентность

Уважаемые пассажиры. Говорит командир корабля. В течение нескольких минут наш полет будет проходить в условиях турбулентности. Мы просим Вас занять свои места и пристегнуть привязные ремни. Спасибо за внимание.	Ladies and Gentlemen. This is Captain speaking. We are approaching rough weather area. Please take your seats and fasten your seat belts. We appreciate your cooperation. Thank you.
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перед снижением

Уважаемые пассажиры. Говорит командир корабля. Через ____ минут мы приступаем к снижению. Погода в ____ хорошая (дождливая, ненастная, облачно, идет снег, ветрено). Температура плюс (минус) ____ С. Просьба занять свои места и пристегнуть привязные ремни. Спасибо за внимание.	Ladies and Gentlemen. This is Captain speaking. In ____ minutes we'll start descending to ____ airport. The weather at (in) ____ is fine (rainy, nasty, cloudy, windy) and the temperature is plus (minus) ____ C. Please take your seats and fasten your seat belts. We appreciate your cooperation. Thank you.
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**изменение маршрута
посадка на запасном аэродроме**

Уважаемые пассажиры. Говорит командир корабля. Мы вынуждены совершить посадку в аэропорту ____, (вернуться) по метеоусловиям ____, (в связи с болезнью пассажира, по техническим причинам). Благодарю за внимание.	Ladies and Gentlemen. This is Captain speaking. We have to land at ____ airport (return to ____) due to bad weather at ____ (illness of passenger, technical reason). Thank you.
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после посадки

Уважаемые пассажиры. Говорит командир корабля. Наш самолет произвел посадку в аэропорту _____. Надеюсь, что полет доставил Вам удовольствие. Спасибо за внимание. До свидания.	Ladies and Gentlemen. This is Captain speaking. We have just landed at ____ airport. I hope you have enjoyed your flight with Aeroflot Russian Airlines. Thank you. Good bye.
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после посадки (при задержке вылета)

Уважаемые пассажиры. Говорит командир корабля. Наш самолет произвел посадку в аэропорту _____. Я приношу извинения за задержку вылета. Спасибо за внимание. До свидания.	Ladies and Gentlemen. This is Captain speaking. We have just landed at ____ airport. I am sorry for inconveniences during our departure. Thank you. Good bye.
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вынужденная посадка вне аэродрома

Уважаемые пассажиры. Говорит командир корабля. Самолет неисправен, возможна внеплановая посадка, на борту имеется необходимое аварийно-спасательное оборудование. Мы предупредили наземные спасательные службы и они принимают необходимые меры. Сохраняйте полное спокойствие, точно выполняйте все указания экипажа. За 1 минуту до приземления / приводнения. "Примите позу для аварийной посадки".	Ladies and Gentlemen. This is Captain speaking. We have serious technical problems and probably will make an emergency landing. We have all necessary safety equipment. Everything is under control. Fasten your seat belts and follow the cabin crew instructions. One minute before landing/ditching "Take safety position".
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ЗАРЕЗЕРВИРОВАНО

6.7 COLD WEATHER AND FLUID RUNWAY CONTAMINATED OPERATION

These references include basic A320 family aircraft fleet information

EXTERIOR INSPECTION

NORMAL PRELIMINARY COCKPIT PREPARATION.....COMPLETED
PROBE/WINDOW HEAT.....ON
SURFACES.....CHECKED FREE OF FROST, ICE AND SNOW

All surfaces of the aircraft (critical surfaces: leading edges and upper surfaces of wings, vertical and horizontal stabilizers, all control surfaces, slats and flaps) must be clear of snow, frost and ice, otherwise consider to perform de-/anti-icing.

Note: Thin hoarfrost is acceptable on the upper surface of the fuselage and pilot can distinguish surface features (lines and markings) beneath it. Frost is acceptable on the underside of the wing tank area, a max layer of 3mm.

FOLLOWING EQUIPMENT.....CHECKED FREE OF FROST, ICE OR SNOW

Landing gear assemblies (lever locks), tires, L/G doors. Engine inlets, lips, fans (check for rotation). Drains, bleeds, probes, AOA sensors. Fuel tanks ventilation, commercial water supplies are not frozen and have been refilled (these should have been emptied prior to the cold soak), radome.

TO PERFORM DE-ICING/ANTI-ICING.....CONSIDER

Note: In all circumstances, it is Captain's responsibility to decide whether or not to perform de-icing/anti-icing of aircraft, or to order a repeated treatment.

AFTER FIRST ENGINE START

PROBE/WINDOW HEAT.....AUTO

AFTER START

ENGINE OIL PRESSURE/TEMPERATURE.....CHECK

CAUTION: When $OAT \leq -40^\circ$, the engine oil pressure may be in amber "XX". This indication can be ignored, either:

1. Until the oil T° has stabilized within limits, if the oil T° stabilizes before the end of the engine start sequence (max of 120 sec), or
2. Until the end of the engine start sequence (max of 120 sec), if the oil T° has not yet stabilized.

FLIGHT CONTROLS.....CHECK 3 TIMES

With $OAT \leq -40^\circ$ repeat every 15 min before take-off and check full deflection on the ECAM F/CTL page.

PITCH TRIM.....FULL NOSE DOWN THEN UP

PITCH TRIM.....SET

CAUTION:

1. When OAT is very low, the brake T° may be unreliable, and must be disregarded. Trying to warm up the brakes, by re lying on the temperature indication, may result in a brake overheat.
2. When $OAT \leq -40^\circ$, the tire pressure indication may also be unreliable, and must be disregarded. However, if it indicates deflated tires, perform a visual check of the tire.

ENGINE ANTI-ICE (in icing conditions).....ON

TAXING

FOLLOWING TAXI PROCEDURES.....CONSIDER

Avoid high thrust settings. Stay well behind the preceding aircraft. Keep speed to taxi straight ≤ 20 knots, for turns ≤ 10 knots. Note that antiskid does not operate at ground speed ≤ 20 knots. Avoid large nose wheel steering angles to prevent slipping sideways. If taxiing in icing conditions with precipitation RWY and TWY contaminated with slush or snow keep slats/flaps retracted until reaching holding point. Complete "**Before Take-off down to the line**" checklist **after flaps selected**. Establish whether either initial or additional de-/anti-icing is required and perform the following:





- ✓ Call for de-/anti-icing as appropriate, specifying the surfaces that required treatment.
- ✓ Configure the aircraft for de-/anti-icing (follow de/anti-icing checklist). Flaps/slats fully retracted.
- ✓ Insert details of the "Anti-icing Code" in the appropriate box of the TLB.
- ✓ Determine the "anticipated" holdover time (see 'Holdover Times' table).
- ✓ Update the "anticipated" holdover time, as required by changing weather conditions. Times refer to period of active precipitation.
- ✓ When significant freezing or frozen precipitation continues after the de-/anti-icing operation, representative surfaces, such as the aircraft wing, shall be checked, just prior to entering the active runway.

Notes:

1. On contaminated RWY and TWY the RA indications may fluctuate and auto callouts or GPWS warnings may be activated. Disregard them.
2. During taxi on snowy RWY the RA may not compute any data and the ECAM warnings "ENG DUAL ENG FAILURE" "ANTI ICE CAPT (F/O) TAT FAULT" "L/G SHOCK ABSORBER FAULT" may be triggered. Disregard these warnings.
3. If icing conditions last longer than 30 min, or if significant engine vibration occurs, accelerate to approx **70%N1 for 30 sec.** As surface conditions permits, no more than 70% N1 on both engines with parking brake ON. This run-up should also be performed **just prior take off.**
4. When operating in conditions of freezing rain, drizzle, fog or heavy snow, ice shedding may be enhanced by additional runups at intervals not exceed 10 min, advancing throttles to **70% N1 momentarily (no hold time).**

If the fuselage has been sprayed, there is a risk of de-icing fluid ingestion by the APU air intake, resulting in specific odors, or SMOKE warnings. Thus, consider APU BLEED OFF during takeoff.

TAKE OFF

FOLLOWING TAKE OFF PROCEDURES.....CONSIDER CPT

For contaminated RWY select TOGA. Do not abort take off for minor deficiencies even at low speeds.

CRUISE/DESCENT

ENGINE ANTI ICE must be ON during flight operations, when icing conditions exist, except during climb and cruise when SAT ≤ -40°, before and during descent, even if the SAT ≤ -40°. **WING ANTI ICE** should be ON, whenever there is an indication that airframe icing exists.

CAUTION:

1. Extended flight in icing conditions with slats extended should be avoided.
2. If there is evidence of significant ice accretion the min speed should be:
 - ✓ In CONF FULL, VLS+5knots, landing distance X 1.1
 - ✓ In CONF lower than FULL, VLS+10knots, landing distance in CONF3 X 1.15

LANDING/PARKING

FOLLOWING LANDING PROCEDURESCONSIDER CPT

- ✓ Avoid landing on contaminated RWY when ANTISKID is INOP. Use of AUTOBRAKE LOW or MED is recommended.
- ✓ Make a positive touchdown, as the aircraft has touched down, lower the nose wheel and select MAX REVERSE, which can be used until the aircraft is fully stopped.
- ✓ Maintain directional control with rudder, use nose wheel steering with care.
- ✓ When taxiing in do not retract the slats/flaps. After engine shutdown make a visual inspection flap/slat mechanism is free of contamination. When the mechanism is clean select ON the YELLOW and BLUE ELEC PUMP on MAINTANANCE PANEL.

6.8 DE-/ANTI-ICING, COLD SOAK SECURING, WATER DRAINING CHECKLISTS, TABLES OF HOLDOVER TIME
BEFORE DE-ICING/ANTI-ICING

FLAPS.....RETRACTED
 CAB PRESS MODE SEL CHECK AUTO
 ENG BLEED 1+2OFF
 APU BLEED.....OFF
 DITCHING pushbuttonON
 If the "VENT AVNCS SYS FAULT" warning appears, reset the circuit breaker at the end of the aircraft de-icing procedure:
 • AIR COND/AVNCS VENT/CTL D06 ON 49VU
 • AIR COND/AVNCS VENT/MONG Y17 ON 122VU
 THRUST LEVERSCHECK IDLE
 "AIRCRAFT PREPARED FOR SPRAYING"..... INFORM GROUND CREW

AFTER DE-ICING/ANTI-ICING

DITCHING pushbuttonOFF
 OUTFLOW VALVE CHECK OPEN
 ENG BLEED 1+2..... ON

 At least 60 seconds after APU start or on completion of spraying operation*:
 APU BLEED..... ON
 PITOTS AND STATICS (ground crew) CHECK
 GROUND EQUIPMENT..... REMOVE
 DE-ICING/ANTI-ICING REPORT..... RECEIVED
 Type of fluid, fluid mixtures, time, mechanic ID.
 TAKE OFF TIME (UTC)..... DETERMINE
 Sum up, when spraying began (UTC) and holdover time

* - To save time, it's recommended to start engines by setting ENG MODE selector to IGN/START before applying APU BLEED ON.

SECURING THE AIRCRAFT FOR COLD COAK

After switching off all bleeds, and before switching off AC power:
 DITCHING pushbutton.....ON
 PARKING BRAKE.....OFF

 After switching off the batteries:
 DITCHING pushbutton.....OFF
 PROTECTIVE COVERS.....INSTALL

WATER SYSTEM DRAINING

Drain the water system, if the OAT requires it, as shown below:

Configuration				Exposure time	Depres surization required	Water tank Drain required	Purge of System Required
Air Cond	Heating water Waste SYS	Cabin temperature	OAT				
ON	ON/OFF	Above 10° C	Between 0°and -15°C	Any	NO	NO	NO
	ON	Above 10° C	Below -15°C	1 hour 15min	YES		
OFF	ON		Between 0°and -7°C	1 hour 30min			
			Between -7°and -15°C	0 hour 30min			
			Below -15°C	Any			
OFF	OFF		Between 0°and -7°C	1 hour 30min	YES	YES	
			Between -7°and -15°C	0 hour 30min			
			Below -15°C	Any			

You must refill the tank with water **not more than 30 min** before you start the engines. If the temperature in the aircraft is below 4 °C, pre-condition the aircraft.

GUIDELINES FOR HOLDOVER TIMES ANTICIPATED FOR FLUID CONCENTRATIONS AS A FUNCTION OF WEATHER AND OAT

- The estimated holdover times for Type I, Type II, Type IV and Killfrost ABC II PLUS fluids are published in tables below. These tables provide an indication as to the protection that could reasonably be expected under condition during of freezing or frozen precipitation.
- The actual time of protection may be extended or reduced, depending upon the ambient conditions. The lower limit of the published time span approximates to the estimated time of protection during moderate precipitation and the upper limit to the estimated time of protection during light precipitation.

Caution1: The time of protection will be shortened in heavy weather conditions. High wind velocity may reduce holdover time below the lowest time stated in the range. Holdover time may also be reduced when aircraft skin temperature is lower than that of the OAT.

Caution2: No holdover time guidelines have been established for heavy snow, snow pellets, ice pellets, hail, moderate freezing rain and heavy freezing rain.

OAT (°C)	Neat Fluid/Water Concentration (%Vol./%Vol.)	Approximate Holdover Times Anticipated Under Various Weather Conditions (hours; minutes)					
		Active frost	Freezing Fog	Snow (snow grains)	Freezing Drizzle**	Light Freezing Rain	Rain on cold soaked wing
Above 0	100/0 Type II	12:00	0:35 – 1:30	0:20 – 0:55	0:30 – 0:55	0:15 – 0:30	0:05 – 0:40
	100/0 ABC II+	12:00	1:10 – 2:25	0:35 – 1:20	0:35 – 1:10	0:30 – 0:40	0:05 – 1:00
	100/0 Type IV	18:00	1:05 – 2:15	0:35 – 1:05	0:40 – 1:10	0:25 – 0:45	0:10 – 0:50
	72/25 Type II	6:00	0:25 – 1:00	0:15 – 0:40	0:20 – 0:45	0:10 – 0:25	0:05 – 0:25
	75/25 ABC II+	6:00	1:10 – 2:25	0:35 – 1:10	0:30 – 1:00	0:20 – 0:40	0:05 – 0:50
	75/25 Type IV	6:00	1:05 – 1:45	0:30 – 1:10	0:35 – 0:50	0:15 – 0:30	0:05 – 0:35
	50/50 Type II	4:00	0:15 – 0:30	0:05 – 0:15	0:05 – 0:15	0:05 – 0:10	
	50/50 ABC II+	5:00	0:15 – 0:45	0:20 – 0:40	0:05 – 0:25	0:05 – 0:15	
	50/50 Type IV	4:00	0:15 – 0:35	0:05 – 0:20	0:10 – 0:20	0:05 – 0:10	
0 to -3	100/0 Type II	8:00	0:35 – 1:30	0:20 – 0:45	0:30 – 0:55	0:15 – 0:30	
	100/0 ABC II+	8:00	1:10 – 2:25	0:25 – 0:55	0:35 – 1:10	0:30 – 0:40	
	100/0 Type IV	12:00	1:05 – 2:15	0:30 – 0:55	0:40 – 1:10	0:25 – 0:45	
	75/25 Type II	5:00	0:25 – 1:00	0:15 – 0:30	0:20 – 0:45	0:10 – 0:25	
	75/25 ABC II+	5:00	1:10 – 2:25	0:25 – 0:50	0:30 – 1:00	0:20 – 0:40	
	75/25 Type IV	5:00	1:05 – 1:45	0:25 – 0:50	0:35 – 0:50	0:15 – 0:30	
	50/50 Type II	3:00	0:15 – 0:30	0:05 – 0:15	0:05 – 0:15	0:05 – 0:10	
	50/50 ABC II+	5:00	0:15 – 0:45	0:15 – 0:35	0:05 – 0:25	0:05 – 0:15	
	50/50 Type IV	3:00	0:15 – 0:35	0:05 – 0:15	0:10 – 0:20	0:05 – 0:10	
Below -3 to -14	100/0 Type II	8:00	0:20 – 1:05	0:15 – 0:35	*0:15 – 0:45	*0:10 – 0:25	
	100/0 ABC II+	8:00	0:30 – 1:05	0:15 – 0:35	*0:15 – 0:45	*0:10 – 0:30	
	100/0 Type IV	12:00	0:20 – 1:20	0:20 – 0:40	*0:20 – 0:45	*0:10 – 0:25	
	75/25 Type II	5:00	0:20 – 0:55	0:15 – 0:25	*0:15 – 0:30	*0:10 – 0:20	
	75/25 ABC II+	5:00	0:20 – 0:55	0:15 – 0:35	*0:15 – 0:30	*0:10 – 0:20	
	75/25 Type IV	5:00	0:25 – 0:50	0:20 – 0:35	*0:15 – 0:30	*0:10 – 0:20	
	100/0 Type II	8:00	0:15 – 0:20	0:15 – 0:30			
	100/0 ABC II+	8:00	0:15 – 0:20	0:15 – 0:30			
	100/0 Type IV	12:00	0:15 – 0:40	0:15 – 0:30			
Below -14 to -25	100/0 Type II	8:00	0:15 – 0:20	0:15 – 0:30			
	100/0 ABC II+	8:00	0:15 – 0:20	0:15 – 0:30			
	100/0 Type IV	12:00	0:15 – 0:40	0:15 – 0:30			
	100/0 Type IV	12:00	0:15 – 0:40	0:15 – 0:30			

TYPE I (used only for de-icing)

-3 and above	Freezing point of mixture used shall be at least 10 °C below the ambient temperature	0:45	0:11 – 0:17	0:06 – 0:11	0:09 – 0:13	0:02 – 0:05	0:02 – 0:05
Below -3 to -6		0:45	0:08 – 0:13	0:05 – 0:08	0:05 – 0:09	0:02 – 0:05	
Below -6 to -10		0:45	0:06 – 0:10	0:04 – 0:06	0:04 – 0:07	0:02 – 0:05	
Below -10		0:45	0:05 – 0:09	0:02 – 0:04			

* - the lowest use temperature is limited to -10°C

** - Use Light Freezing Rain holdover times if positive identification of freezing drizzle is not possible.

MAXIMUM WIND (M/S) / KT VERSUS FRICTION COEFFICIENT

SWT cond / Wind dir		30°	38°	87°	70°	70°	80°	80°	50°	50°	07°	47°	40°	30°	28°	20°	10°
Wet runway	T/O	18.0/28.0	36.1/28.1	18.2/28.5	18.0/30.0	18.0/30.8	18.6/32.0	17.3/33.5	18.3/35.4	18.6/37.8	21.2/44.0	23.3/46.1	28.2/60.8	30.0/68.0			
	Land	19.6/28	37.0/33.0	17.3/33.5	17.8/34.2	18.1/35.1	18.8/36.4	18.6/38.1	18.8/40.3	22.2/46.1	24.0/48.7	28.0/61.3	28.8/67.5				
	T/O	18.0/28.0	36.1/28.1	18.2/28.5	18.0/30.0	18.0/30.8	18.6/32.0	17.3/33.5	18.3/35.4	18.6/37.8	21.2/44.0	23.3/46.1	28.2/60.8	30.0/68.0			
	Land	19.6/28	37.0/33.0	17.3/33.5	17.8/34.2	18.1/35.1	18.8/36.4	18.6/38.1	18.8/40.3	22.2/46.1	24.0/48.7	28.0/61.3	28.8/67.5				
	T/O	14.8/28.8	34.8/28.7	16.0/28.0	16.3/28.8	16.9/30.4	18.2/31.8	17.1/33.0	18.1/34.8	18.2/37.2	20.9/40.5	23.0/44.8	28.8/67.2				
	Land	16.5/28.2	36.7/28.3	16.9/28.7	17.2/28.8	17.7/30.4	18.3/31.5	18.3/33.1	18.3/35.3	19.1/36.8	21.7/42.0	23.9/48.5	28.9/68.1	30.2/64.4			
	T/O	14.6/28.2	34.7/28.3	14.8/28.8	16.1/28.8	16.9/30.0	18.1/32.2	18.1/33.8	18.1/35.4	18.1/38.8	20.1/42.8	22.1/46.8	28.8/68.8				
	Land	16.2/28.1	36.3/28.5	16.9/28.8	17.2/29.2	17.7/30.4	18.2/31.8	18.2/33.4	18.2/35.4	18.2/38.8	20.2/42.8	22.2/46.8	28.9/68.2	30.2/64.8			
	T/O	14.4/27.8	34.6/27.9	14.8/28.2	14.8/28.8	15.3/29.6	16.9/30.7	18.6/32.1	18.6/33.8	18.6/36.3	20.4/40.3	22.4/44.3	28.1/68.5				
	Land	16.8/30.8	36.9/30.7	18.0/31.1	18.4/31.7	18.8/32.8	17.4/33.8	18.2/35.3	18.2/37.4	18.2/39.4	20.8/44.0	22.4/48.3	24.6/52.8	31.5/61.2			
T/O	14.2/27.4	34.3/27.5	14.7/28.4	15.1/28.4	15.6/29.3	16.7/30.2	18.4/31.8	18.4/33.5	18.4/36.8	20.1/42.8	22.1/46.8	28.8/68.8					
Land	16.0/28.0	35.1/28.1	15.2/28.5	15.6/30.0	16.0/30.8	16.6/32.0	17.3/33.5	18.3/35.4	18.3/37.8	21.2/44.0	23.3/46.1	28.2/60.8	30.0/68.0				
T/O	13.8/28.6	33.9/28.7	14.0/27.0	14.3/27.6	14.7/27.8	16.2/29.4	18.0/30.7	18.0/32.5	18.0/34.4	18.0/38.8	20.1/42.8	22.1/46.8	28.8/68.8				
Land	14.6/28.2	34.7/28.3	14.8/28.8	15.1/28.2	15.6/29.0	16.1/30.1	16.8/31.1	16.8/32.6	16.8/34.4	18.1/38.8	20.1/42.8	22.1/46.8	28.8/68.8				
T/O	13.8/28.2	33.7/28.3	13.8/28.0	14.1/27.1	14.6/27.8	16.0/29.8	18.0/30.3	18.0/32.0	18.0/34.0	18.0/38.8	20.1/42.8	22.1/46.8	28.8/68.8				
Land	14.2/27.4	34.3/27.5	14.4/27.8	14.7/28.4	15.1/28.2	16.1/30.1	16.8/31.1	16.8/32.6	16.8/34.4	18.1/38.8	20.1/42.8	22.1/46.8	28.8/68.8				
T/O	13.4/28.8	33.5/28.9	13.8/28.2	14.3/27.5	14.7/28.3	16.2/29.4	18.0/30.7	18.0/32.5	18.0/34.4	18.0/38.8	20.1/42.8	22.1/46.8	28.8/68.8				
Land	13.2/28.4	33.3/28.5	13.7/28.3	14.1/27.0	14.6/27.8	16.0/29.8	18.0/30.3	18.0/32.0	18.0/34.0	18.0/38.8	20.1/42.8	22.1/46.8	28.8/68.8				
T/O	13.4/28.8	33.5/28.9	13.8/28.2	14.3/27.5	14.7/28.3	16.2/29.4	18.0/30.7	18.0/32.5	18.0/34.4	18.0/38.8	20.1/42.8	22.1/46.8	28.8/68.8				
Land	13.2/28.4	33.3/28.5	13.7/28.3	14.1/27.0	14.6/27.8	16.0/29.8	18.0/30.3	18.0/32.0	18.0/34.0	18.0/38.8	20.1/42.8	22.1/46.8	28.8/68.8				
T/O	13.0/28.0	33.1/28.1	13.2/28.4	13.6/28.8	14.0/29.2	15.4/30.6	17.8/33.0	17.8/34.4	17.8/35.8	18.2/37.2	20.6/40.6	23.0/44.6	28.4/67.6				
Land	12.6/28.0	32.8/28.1	12.7/28.4	13.1/28.8	13.5/29.2	14.9/30.6	17.3/32.6	17.3/34.0	17.3/35.4	17.7/36.8	20.1/41.8	22.5/45.8	27.8/65.8				
T/O	12.0/28.0	32.1/28.1	12.2/28.4	12.4/28.8	12.6/29.2	12.8/29.6	13.0/30.0	13.2/30.4	13.4/30.8	13.6/31.2	13.8/31.6	14.0/32.0	14.2/32.4				
Land	11.6/28.0	31.8/28.1	11.7/28.4	11.9/28.8	12.1/29.2	12.3/29.6	12.5/30.0	12.7/30.4	12.9/30.8	13.1/31.2	13.3/31.6	13.5/32.0	13.7/32.4				
T/O	11.0/28.0	31.1/28.1	11.2/28.4	11.4/28.8	11.6/29.2	11.8/29.6	12.0/30.0	12.2/30.4	12.4/30.8	12.6/31.2	12.8/31.6	13.0/32.0	13.2/32.4				
Land	10.6/28.0	30.8/28.1	10.7/28.4	10.9/28.8	11.1/29.2	11.3/29.6	11.5/30.0	11.7/30.4	11.9/30.8	12.1/31.2	12.3/31.6	12.5/32.0	12.7/32.4				
T/O	10.0/28.0	30.1/28.1	10.2/28.4	10.4/28.8	10.6/29.2	10.8/29.6	11.0/30.0	11.2/30.4	11.4/30.8	11.6/31.2	11.8/31.6	12.0/32.0	12.2/32.4				
Land	9.6/28.0	29.8/28.1	9.7/28.4	9.9/28.8	10.1/29.2	10.3/29.6	10.5/30.0	10.7/30.4	10.9/30.8	11.1/31.2	11.3/31.6	11.5/32.0	11.7/32.4				
T/O	9.0/28.0	29.1/28.1	9.2/28.4	9.4/28.8	9.6/29.2	9.8/29.6	10.0/30.0	10.2/30.4	10.4/30.8	10.6/31.2	10.8/31.6	11.0/32.0	11.2/32.4				
Land	8.6/28.0	28.8/28.1	8.7/28.4	8.9/28.8	9.1/29.2	9.3/29.6	9.5/30.0	9.7/30.4	9.9/30.8	10.1/31.2	10.3/31.6	10.5/32.0	10.7/32.4				
T/O	8.0/28.0	28.1/28.1	8.2/28.4	8.4/28.8	8.6/29.2	8.8/29.6	9.0/30.0	9.2/30.4	9.4/30.8	9.6/31.2	9.8/31.6	10.0/32.0	10.2/32.4				
Land	7.6/28.0	27.8/28.1	7.7/28.4	7.9/28.8	8.1/29.2	8.3/29.6	8.5/30.0	8.7/30.4	8.9/30.8	9.1/31.2	9.3/31.6	9.5/32.0	9.7/32.4				
T/O	7.0/28.0	27.1/28.1	7.2/28.4	7.4/28.8	7.6/29.2	7.8/29.6	8.0/30.0	8.2/30.4	8.4/30.8	8.6/31.2	8.8/31.6	9.0/32.0	9.2/32.4				
Land	6.6/28.0	26.8/28.1	6.7/28.4	6.9/28.8	7.1/29.2	7.3/29.6	7.5/30.0	7.7/30.4	7.9/30.8	8.1/31.2	8.3/31.6	8.5/32.0	8.7/32.4				
T/O	6.0/28.0	26.1/28.1	6.2/28.4	6.4/28.8	6.6/29.2	6.8/29.6	7.0/30.0	7.2/30.4	7.4/30.8	7.6/31.2	7.8/31.6	8.0/32.0	8.2/32.4				
Land	5.6/28.0	25.8/28.1	5.7/28.4	5.9/28.8	6.1/29.2	6.3/29.6	6.5/30.0	6.7/30.4	6.9/30.8	7.1/31.2	7.3/31.6	7.5/32.0	7.7/32.4				
T/O	5.0/28.0	25.1/28.1	5.2/28.4	5.4/28.8	5.6/29.2	5.8/29.6	6.0/30.0	6.2/30.4	6.4/30.8	6.6/31.2	6.8/31.6	7.0/32.0	7.2/32.4				
Land	4.6/28.0	24.8/28.1	4.7/28.4	4.9/28.8	5.1/29.2	5.3/29.6	5.5/30.0	5.7/30.4	5.9/30.8	6.1/31.2	6.3/31.6	6.5/32.0	6.7/32.4				
T/O	4.0/28.0	24.1/28.1	4.2/28.4	4.4/28.8	4.6/29.2	4.8/29.6	5.0/30.0	5.2/30.4	5.4/30.8	5.6/31.2	5.8/31.6	6.0/32.0	6.2/32.4				
Land	3.6/28.0	23.8/28.1	3.7/28.4	3.9/28.8	4.1/29.2	4.3/29.6	4.5/30.0	4.7/30.4	4.9/30.8	5.1/31.2	5.3/31.6	5.5/32.0	5.7/32.4				
T/O	3.0/28.0	23.1/28.1	3.2/28.4	3.4/28.8	3.6/29.2	3.8/29.6	4.0/30.0	4.2/30.4	4.4/30.8	4.6/31.2	4.8/31.6	5.0/32.0	5.2/32.4				
Land	2.6/28.0	22.8/28.1	2.7/28.4	2.9/28.8	3.1/29.2	3.3/29.6	3.5/30.0	3.7/30.4	3.9/30.8	4.1/31.2	4.3/31.6	4.5/32.0	4.7/32.4				
T/O	2.0/28.0	22.1/28.1	2.2/28.4	2.4/28.8	2.6/29.2	2.8/29.6	3.0/30.0	3.2/30.4	3.4/30.8	3.6/31.2	3.8/31.6	4.0/32.0	4.2/32.4				
Land	1.6/28.0	21.8/28.1	1.7/28.4	1.9/28.8	2.1/29.2	2.3/29.6	2.5/30.0	2.7/30.4	2.9/30.8	3.1/31.2	3.3/31.6	3.5/32.0	3.7/32.4				
T/O	1.0/28.0	21.1/28.1	1.2/28.4	1.4/28.8	1.6/29.2	1.8/29.6	2.0/30.0	2.2/30.4	2.4/30.8	2.6/31.2	2.8/31.6	3.0/32.0	3.2/32.4				
Land	0.6/28.0	20.8/28.1	0.7/28.4	0.9/28.8	1.1/29.2	1.3/29.6	1.5/30.0	1.7/30.4	1.9/30.8	2.1/31.2	2.3/31.6	2.5/32.0	2.7/32.4				
T/O	0.0/28.0	20.1/28.1	0.2/28.4	0.4/28.8	0.6/29.2	0.8/29.6	1.0/30.0	1.2/30.4	1.4/30.8	1.6/31.2	1.8/31.6	2.0/32.0	2.2/32.4				
Land	-0.4/28.0	19.8/28.1	-0.3/28.4	-0.1/28.8	0.1/29.2	0.3/29.6	0.5/30.0	0.7/30.4	0.9/30.8	1.1/31.2	1.3/31.6	1.5/32.0	1.7/32.4				
T/O	-0.8/28.0	19.1/28.1	-0.7/28.4	-0.5/28.8	-0.3/29.2	-0.1/29.6	0.1/30.0	0.3/30.4	0.5/30.8	0.7/31.2	0.9/31.6	1.1/32.0	1.3/32.4				
Land	-1.2/28.0	18.8/28.1	-1.1/28.4	-0.9/28.8	-0.7/29.2	-0.5/29.6	-0.3/30.0	-0.1/30.4	0.1/30.8	0.3/31.2	0.5/31.6	0.7/32.0	0.9/32.4				
T/O	-1.6/28.0	18.1/28.1	-1.5/28.4	-1.3/28.8	-1.1/29.2	-0.9/29.6	-0.7/30.0	-0.5/30.4	-0.3/30.8	-0.1/31.2	0.1/31.6	0.3/32.0	0.5/32.4				
Land	-2.0/28.0	17.8/28.1	-1.9/28.4	-1.7/28.8	-1.5/29.2	-1.3/29.6	-1.1/30.0	-0.9/30.4	-0.7/30.8	-0.5/31.2	-0.3/31.6	-0.1/32.0	0.1/32.4				
T/O	-2.4/28.0	17.1/28.1	-2.3/28.4	-2.1/28.8	-1.9/29.2	-1.7/29.6	-1.5/30.0	-1.3/30.4	-1.1/30.8	-0.9/31.2	-0.7/31.6	-0.5/32.0	-0.3/32.4				
Land	-2.8/28.0	16.8/28.1	-2.7/28.4	-2.5/28.8	-2.3/29.2	-2.1/29.6	-1.9/30.0	-1.7/30.4	-1.5/30.8	-1.3/31.2	-1.1/31.6	-0.9/32.0	-0.7/32.4				
T/O	-3.2/28.0	16.1/28.1	-3.1/28.4	-2.9/28.8	-2.7/29.2	-2.5/29.6	-2.3/30.0	-2.1/30.4	-1.9/30.8	-1.7/31.2	-1.5/31.6	-1.3/32.0	-1.1/32.4				
Land	-3.6/28.0	15.8/28.1	-3.5/28.4	-3.3/28.8	-3.1/29.2	-2.9/29.6	-2.7/30.0	-2.5/30.4	-2.3/30.8	-2.1/31.2	-1.9/31.6	-1.7/32.0	-1.5/32.4				
T/O	-4.0/28.0	15.1/28.1	-3.9/28.4	-3.7/28.8	-3.5/29.2	-3.3/29.6	-3.1/30.0	-2.9/30.4	-2.7/30.8	-2.5/31.2	-2.3/31.6	-2.1/32.0	-1.9/32.4				
Land	-4.4/28.0	14.8/28.1	-4.3/28.4	-4.1/28.8	-3.9/29.2	-3.7/29.6	-3.5/30.0	-3.3/30.4	-3.1/30.8	-2.9/31.2	-2.7/31.6	-2.5/32.0	-2.3/32.4				
T/O	-4.8/28.0	14.1/28.1	-4.7/28.4	-4.5/28.8	-4.3/29.2	-4.1/29.6	-3.9/30.0	-3.7/30.4	-3.5/30.8	-3.3/31.2	-3.1/31.6	-2.9/32.0	-2.7/32.4				
Land	-5.2/28.0	13.8/28.1	-5.1/28.4	-4.9/28.8	-4.7/29.2	-4.5/29.6	-4.3/30.0	-4.1/30.4	-3.9/30.8	-3.7/31.2	-3.5/31.6	-3.3/32.0	-3.1/32.4				
T/O	-5.6/28.0	13.1/28.1	-5.5/28.4	-5.3/28.8	-5.1/29.2	-4.9/29.6	-4.7/30.0	-4.5/30.4	-4.3/30.8	-4.1/31.2	-3.9/31.6	-3.7/32.0	-3.5/32.4				
Land	-6.0/28.0	12.8/28.1	-5.9/28.4	-5.7/28.8	-5.5/29.2	-5.3/29.6	-5.1/30.0	-4.9/30.4	-4.7/30.8	-4.5/31.2	-4.3/31.6	-4.1/32.0	-3.9/32.4				
T/O	-6.4/28.0	12.1/28.1	-6														

[illegible]

WEIGHT LIMITATIONS (kg)

A/C	MTOW	MLW	MZFW	MAX TAXI	MIN WEIGHT
A319	70000	62500	58500	70400	35400
A320	75500	66000	62500	75900	37230
A321	89000	75500	71500	89400	47500

OTHER AIRPORTS (except CIS)

Equivalent RW cond. 	ICAO Code	Braking Action	Reported RWY friction coefficient	JBI (James Braking Index)	RCR (Runway Condition Reading)	MAX X-wind (KT)	
						TO	Land
1	95	Good	0,4 & above	0,76 – 1,00	1,9 – 2,5	29	33
1	94	Good/Medium	0,39 – 0,36	0,75 – 0,66		29	29
2/3	93	Medium	0,35 – 0,30	0,65 – 0,56	1,8 – 1,3	25	
2/3	92	Medium/Poor	0,29 – 0,26			20	
3/4	91	Poor	0,25 & below	0,55 – 0,30	1,2 – 0,6	15	
4/5	99	Unreliable			0,5 – 0,2	5	

CIS AIRPORTS

SNOTAM Code	ICAO Code	Braking Action	Измеренный коэффициент сцепления (SFT)	Нормативный коэффициент сцепления (by ATC) 	MAX X-wind (KT)	
					TO	Land
5	95	Good	0,4 и выше	0,60 – 0,50	29	33
4	94	Good/Medium	0,39 – 0,36	0,49 – 0,45	29	29
3	93	Medium	0,35 – 0,30	0,44 – 0,40	25	
2	92	Medium/Poor	0,29 – 0,26	0,39 – 0,35	20	
1	91	Poor	0,25 – 0,17	0,34 – 0,30	15	
9	99	Unreliable	ниже 0,17	-	-	

 Equivalent runway condition (only valid for maximum crosswind determination) when braking action or coefficient unavailable.

1. Dry, damp or wet runway (less than 3 mm water depth)
2. Runway covered with slush
3. Runway covered with dry snow
4. Runway covered with standing water with risk of hydroplaning or wet snow
5. Icy runway or high risk of hydroplaning

 It is not permitted to operate on runways covered with ice, or with a friction coefficient of $\mu < 0,3$

ALTITUDE TEMPERATURE CORRECTION

QNH ALTITUDE MINUS TERRAIN ELEVATION (FT)		ΔZ CORRECTION (FT)					
		500	1000	1500	2000	2500	3000
ΔISA	-10 °C	-17	-34	-51	-68	-85	-102
	-20 °C	-35	-70	-105	-140	-175	-210
	-30 °C	-52	-104	-156	-208	-260	-312
	-40 °C	-70	-140	-210	-280	-350	-420

TRUE ALTITUDE = QNH ALTITUDE + ΔZ

Note: A constant ΔISA from ground to level has been assumed.

MAXIMUM DIFFERENCES BETWEEN ALTITUDE INDICATIONS

FL/SPEED	ALTITUDE (ft) COMPARISON BETWEEN		
	ADR1 and ADR2 (on PFD)	ADR3 and ADR1 or ADR3 and ADR2 on PFD	STBY ALTI and any ADR1 or 2 or 3
GND CHECK	20 (6 m)	20 (6 m)	
FL50/250 KT	50 (15 m)	65 (20 m)	130 (40m)
FL100/250 KT	55 (17 m)	80 (24 m)	185 (56 m)
FL200/300 KT	90 (27 m)	135 (41 m)	295 (90 m)
FL300/.78	130 (40 m)	195 (59 m)	390 (119 m)
FL390/.78	130 (40 m)	195 (59 m)	445 (136 m)

 On ground, the check is meaningless because the standby altimeter's vibrator is off.

→ **WET RUNWAY and EQUIVALENT**
(RWY covered with or less than)

- 2 mm (0,08 inch) slush
- 3 mm (0,12 inch) water
- 4 mm (0,16 inch) wet snow
- 15 mm (0,59 inch) dry snow

→ **CONTAMINATED RUNWAY**
(Use appropriate procedures FCOM 2.04.10 p12 – p13)
A linear equivalence between depth of slush and snow:

- 12,7 mm (0,5 inch) wet snow is equivalent to 6,3 (0,25 inch) slush
- 50,8 mm (2 inch) dry snow is equivalent to 6,3 mm (0,25 inch) slush

NOTE: 1. On damp runway no performance degradation should be considered.

2. It is not recommended to take off from a runway covered with more than 4 inch of dry snow or 1 inch of wet snow.

→ **ALLOWABLE RWY CONDITIONS**
(CIS airports)
RWY covered with a layer of

- Slush or wet snow, no more than 12 mm (0,5 inch)
- Dry snow, no more than 50 mm (2 inch)
- Water, no more than 10 mm (0,4 inch)