



FLIGHT CREW OPERATING MANUAL

A32N

Revision 7
ISSUE DATE: 04 Dec 24

**PRELIMINARY PAGES
TABLE OF CONTENTS**

PRELIMINARY PAGES	1
TABLE OF CONTENTS	1
RECORD OF AMENDMENTS.....	13
INTRODUCTION.....	17
LIM – LIMITATIONS.....	18
AIRCRAFT GENERAL	18
FLIGHT MANOEUVRING LOAD ACCELERATION LIMITS	18
AIRPORT OPERATIONS AND WIND LIMITATIONS	18
COCKPIT WINDOW OPEN MAXIMUM SPEED	22
MAXIMUM FLAPS/SLATS SPEEDS	23
MAXIMUM OPERATING SPEED VMO/MMO.....	23
MAXIMUM SPEEDS WITH THE LANDING GEAR EXTENDED	23
MAXIMUM TYRE SPEED	23
MINIMUM CONTROL SPEEDS.....	24
TAXI SPEED.....	26
WIPERS MAXIMUM OPERATING SPEED	27
WEIGHT LIMITATIONS	27
AIR BLEED/COND/PRESS/VENT	30
GENERAL.....	30
APU BLEED USE WITH HP AIR START UNIT	30
AVIONICS VENTILATION	30
CABIN PRESSURE	30
PACKS USE WITH LP AIR CONDITIONING UNIT	30
AUTO FLIGHT SYSTEM	31
AUTOPILOT FUNCTION	31
FLIGHT MANAGEMENT FUNCTION	31
USE OF NAV MODE.....	32
NON-PRECISION APPROACHES WITH ENGINE-OUT	33
NAVIGATION DATABASE VALIDATION	33
LTS CATEGORY I	33
ILS CATEGORY II.....	33
OTHER THAN STANDARD CAT II (OTS CAT II)	34
ILS CATEGORY III FAIL PASSIVE (SINGLE)	34
ILS CATEGORY III FAIL OPERATIONAL (DUAL).....	34

ENGINE-OUT	35
MAXIMUM WIND CONDITIONS FOR ILS/MLS CAT II OR CAT III AND FOR GLS CAT I	36
AUTOMATIC LANDING	37
AUTOMATIC LANDING IN JOHANNESBURG	39
AUTOLAND DATABASES WITH HONEYWELL ADIRU	40
USE OF FLS	40
AUXILIARY POWER UNIT	42
GENERAL	42
APU START/SHUTDOWN DURING REFUELING/DEFUELING	42
OPERATIONAL ENVELOPE	43
ENGINES	46
THRUST SETTING/EGT LIMITS	46
SHAFT SPEEDS	47
OIL	47
STARTER	49
REVERSE THRUST	49
REDUCED THRUST TAKEOFF	50
CROSSWIND OPERATION ON GROUND	51
SOFT GO-AROUND	51
FLIGHT CONTROLS	52
MAXIMUM ALTITUDE FLAPS/SLATS EXTENDED	52
USE OF FLIGHT CONTROLS	52
FUEL	53
FUEL TEMPERATURE	53
MAXIMUM ALLOWED FUEL IMBALANCE	54
MINIMUM FUEL QUANTITY FOR TAKEOFF	57
ICE AND RAIN PROTECTION	58
DEFINITION OF ICING CONDITIONS	58
DEFINITION OF SEVERE ICE ACCRETION	58
DEFINITION OF THIN HOARFROST	58
RAIN REPELLENT	58
LANDING GEAR	59
BRAKING SYSTEM	59
BRAKE TEMPERATURE	59
TAXI WITH DEFLATED OR DAMAGED TYRES	59
NAVIGATION	60
INERTIAL REFERENCE SYSTEM (IRS)	60

OXYGEN	61
MINIMUM FLIGHT CREW OXYGEN PRESSURE	61
SURVEILLANCE	63
GPWS/PREDICTIVE GPWS.....	63
PRO – PROCEDURES.....	64
PRO-ABN – ABNORMAL PROCEDURES	64
PRO-ABN-01 Introduction	64
FCOM PROCEDURE LAYOUT	64
TITLE	64
TITLE	64
TITLE	64
TITLE	64
OPERATIONAL RECOMMENDATIONS	67
PRO-NOR – NORMAL PROCEDURES	71
PRO-NOR-SOP – Standard Operating Procedures.....	71
General Information	71
PF AND PM TASKS.....	71
ALTIMETER SETTING PROCEDURES	72
AUTOTHRUST	73
BANK ANGLE	73
DESCENT ENERGY MANAGEMENT	74
FLIGHT DIRECTORS	74
NOISE ABATEMENT, ACCELERATION ALTITUDES AND THRUST REDUCTION	74
MCDU PROCEDURES	75
BRIEFINGS.....	76
USE OF NORMAL CHECKLIST	76
Flight Preparation.....	78
WEATHER BRIEFING	78
NOTAMS.....	78
FLIGHT PLAN AND OPERATIONAL REQUIREMENTS	78
OPTIMUM FLIGHT LEVEL	78
FUEL REQUIREMENTS	79
GENERAL	80
CREW ASSEMBLY	80
PRELIMINARY COCKPIT PREP	80
COCKPIT PREPARATION	81
BEFORE PUSHBACK OR START	83

ENGINE START	83
AFTER START	84
TAXI	84
BEFORE TAKEOFF	85
TAKEOFF	86
AFTER TAKEOFF	86
CLIMB	87
CRUISE	87
DESCENT PREPARATION	88
DESCENT	88
AIRCRAFT CONFIGURATION FOR APPROACH	89
APPROACH USING LOC G/S GUIDANCE	90
APPROACH USING FINAL APP GUIDANCE	91
APPROACH USING F-LOC F-G/S GUIDANCE	92
APPROACH USING FPA GUIDANCE	93
LANDING	94
GO AROUND	94
AFTER LANDING	95
PARKING	96
SECURING THE AIRCRAFT	96
PRO-NOR-EXP – EXPANDED NORMAL PROCEDURES	97
Preliminary Cockpit Preparation	97
GENERAL	97
AIRCRAFT POWER UP	97
APU FIRE TEST/APU START	98
AIR COND	99
CARGO HEAT	99
COCKPIT LIGHTS	99
ECAM	99
ECAM	100
ECAM	101
BEFORE WALKAROUND	101
Cockpit Preparation	103
INTRODUCTION	103
PANEL SCAN SEQUENCE	103
OVERHEAD PANEL	103
CTR INSTRUMENT PANEL	107
PEDESTAL	108

RMP	109
AIRFIELD DATA	109
ATC DATALINK COMMUNICATION	109
ACARS	110
FMGS PREPARATION	110
GLARESHIELD	112
INSTRUMENT PANELS	112
ECAM CONTROL PANEL	113
FMGS DATA CONFIRMATION	113
FMGS CRITICAL DATA ENTRY	115
CHARTS/CHART APP	117
TAKEOFF BRIEFING	117
Before Pushback or Start	118
BEFORE START CLEARANCE	118
Engine Start	121
AUTOMATIC ENGINE START	121
AUTOMATIC ENGINE START	122
AUTOMATIC ENGINE START	123
After Start	125
AFTER START	125
Taxi	130
TAXI	130
VISUAL GROUND GEOMETRY	134
180 DEG TURN ON RUNWAY	134
Before Takeoff	136
BEFORE TAKEOFF	136
Takeoff	138
TAKEOFF	138
After Takeoff	146
AFTER TAKEOFF	146
Climb	147
CLIMB	147
Cruise	150
CRUISE	150
Descent Preparation	152
DESCENT PREPARATION	152
Descent	157
DESCENT INITIATION	157

DESCENT MONITORING.....	157
DESCENT ADJUSTMENT	158
Approach.....	160
INTRODUCTION.....	160
CROSS-REFERENCE TABLE.....	160
CROSS-REFERENCE TABLE.....	161
FLYING REFERENCE	162
STABILIZATION CRITERIA.....	162
APPROACH SPEED TECHNIQUE.....	162
DISCONTINUED APPROACH.....	163
INITIAL APPROACH.....	164
INTERMEDIATE/FINAL APPROACH	165
APPROACH USING LOC G/S GUIDANCE	170
APPROACH USING F-LOC F-G/S GUIDANCE	172
APPROACH USING FINAL APP GUIDANCE	176
APPROACH USING FPA GUIDANCE.....	180
CIRCLING APPROACH.....	183
RNAV VISUAL APPROACH	185
VISUAL APPROACH	186
Landing	188
ILS/MLS FINAL APPROACH AND LANDING GEOMETRY	188
ILS FINAL APPROACH AND LANDING GEOMETRY	189
ILS FINAL APPROACH AND LANDING GEOMETRY	190
ILS FINAL APPROACH AND LANDING GEOMETRY	191
MINIMUM VISUAL GROUND SEGMENTS (FLARE PHASE)	192
MINIMUM VISUAL GROUND SEGMENTS (FLARE PHASE)	193
MINIMUM VISUAL GROUND SEGMENTS (FLARE PHASE)	194
MINIMUM VISUAL GROUND SEGMENTS (FLARE PHASE)	195
LANDING	196
AUTOLAND	202
Go-Around	205
GO AROUND WITH FD	205
After Landing.....	208
AFTER LANDING	208
Parking.....	212
PARKING.....	212
Securing the Aircraft.....	217
SECURING THE AIRCRAFT	217

Standard Callouts	219
COMMUNICATIONS AND STANDARD TERMS	219
CHECKLIST CALLOUTS	219
ACTIONS COMMANDED BY PF	219
FMA	220
ALTITUDE.....	220
FLAPS OR GEAR CALLOUTS	221
FLIGHT PARAMETERS IN APPROACH	221
FLIGHT PARAMETERS IN APPROACH	222
FLIGHT PARAMETERS IN GO-AROUND.....	222
PF/PM DUTIES TRANSFER.....	222
ABNORMAL AND EMERGENCY CALL OUTS	222
SUMMARY FOR EACH PHASE	224
PRO-NOR-SRP – SYSTEMS RELATED PROCEDURES.....	233
PRO-NOR-SRP-01 – FMS	233
TASK SHARING DURING CAT I, CAT II AND CAT III APPROACH AND LANDING.....	233
TASK SHARING DURING CAT I, CAT II AND CAT III APPROACH AND LANDING.....	234
TASK SHARING DURING CAT I, CAT II AND CAT III APPROACH AND LANDING.....	235
TASK SHARING FOR CAT I APPROACH (OR BETTER).....	236
TASK SHARING FOR LTS CAT I AND CAT II APPROACH	237
TASK SHARING FOR CAT III APPROACH WITH DH	238
TASK SHARING FOR CAT III APPROACH/LANDING WITHOUT DH.....	239
LANDING CATEGORIES.....	240
WARNING FOR ILS/MLS APPROACH	241
FAILURES AND ASSOCIATED ACTIONS ABOVE 1 000 FT FOR CAT II OR CAT III	242
FAILURES AND ASSOCIATED ACTIONS BELOW 1 000 FT DURING AN LTS CAT I AND CAT II APPROACH	243
FAILURES AND ASSOCIATED ACTIONS BELOW 1 000 FT CAT III WITH DH	244
FAILURES AND ASSOCIATED ACTIONS BELOW 1 000 FT FOR CAT III WITHOUT DH	245
BACK-COURSE LOCALIZER APPROACH - PROCEDURE.....	246
PRO-SPO – SPECIAL OPERATIONS	247
PRO-SPO-40 – EXTENDED RANGE OPERATIONS	247
General	247
ETOPS ENGINEERING REQUIREMENTS	247
Operational Limitations	249
DEFINITIONS	249
AREA OF OPERATION	249
Dispatch Consideration	250

ETOPS FUEL SCENARIOS.....	250
COMMUNICATION AND NAVIGATION FACILITIES	251
FUEL AND OIL SUPPLY	251
ETOPS CRITICAL FUEL RESERVES.....	251
Diversion During Extended Range Operations	253
DIVERSION DECISION MAKING.....	253
DIVERSION PERFORMANCE DATA.....	254
GUIDELINES FOR DIVERSION PROCEDURE	254
Procedures.....	255
GENERAL.....	255
COCKPIT PREPARATION	255
NORMAL PROCEDURES	255
ABN AND EMER PROCEDURES	256
Performance	257
GENERAL.....	257
MAXIMUM DIVERSION DISTANCE.....	257
ETOPS FUEL FROM CRITICAL POINT TO LANDING - ALL ENGINES - CRUISE AT LRC	258
ETOPS FUEL FROM CRITICAL POINT TO LANDING - ONE ENGINE OUT - CRUISE AT 350KT	259
ETOPS FUEL FROM CRITICAL POINT TO LANDING - ONE ENGINE OUT - CRUISE AT 320KT	260
ETOPS FUEL REQUIREMENT FROM CRITICAL POINT TO LANDING - EXAMPLE.....	261
PRO-SPO-51 – Required Navigation Performance (RNP)	262
GENERAL.....	262
RNP APCH / RNAV(GNSS).....	266
PRO-SPO-60 – Operations on Narrow Runways	267
GENERAL.....	267
LIMITATIONS	267
PROCEDURES.....	267
PERFORMANCE.....	268
PRO-SPO-70 – High / Hot Airport Operations	269
GENERAL.....	269
PROCEDURES.....	269
SPEED DETERMINATION	270
APPROACH CLIMB LIMITED WEIGHT	271
PRO-SPO-80 – Steep Approach and Landing.....	273
GENERAL.....	273
LIMITATIONS	273
PROCEDURES.....	274
OPERATIONS IN ICING CONDITIONS	275

PRO-SPO-94 – Positioning Ferry Flights.....	276
GENERAL.....	276
PRO-SUP – SUPPLEMENTARY PROCEDURES	277
PRO-SUP-10 – Operating Speeds Definition	277
GENERAL.....	277
CHARACTERISTIC SPEEDS	277
CHARACTERISTIC SPEEDS	279
CHARACTERISTIC SPEEDS	281
CHARACTERISTIC SPEEDS	283
PROTECTION SPEEDS.....	285
LIMIT SPEEDS	286
OTHER SPEEDS	287
OTHER SPEEDS.....	288
PRO-SUP-27 – Flight Controls (Flying Conditions)	290
General	290
GENERAL.....	290
Normal Operations.....	291
GENERAL.....	291
AIRCRAFT ON THE GROUND.....	292
IN FLIGHT.....	293
Abnormal Operations	295
ENGINE FAILURE AT TAKEOFF	295
ENGINE-OUT LANDING.....	295
BOUNCE AT LANDING	295
TRAINING TOUCH-AND-GO.....	295
PRO-SUP-30 – Ice and Rain Protection	296
ICING CONDITIONS.....	296
OPERATIONS IN ICING CONDITIONS	296
GROUND OPERATIONS IN HEAVY RAIN	297
PRO-SUP-70 – Power Plant.....	298
THRUST CONTROL	298
MANUAL ENGINE START.....	300
ENGINE START WITH EXTERNAL PNEUMATIC POWER.....	304
ENGINE START WITH EXTERNAL PNEUMATIC POWER.....	305
CROSSBLEED ENGINE START	306
CROSSBLEED ENGINE START	307
ENGINE VENTILATION (DRY CRANKING).....	308

PRO-SUP-91 – Adverse Weather.....	309
Severe Turbulence.....	309
GENERAL.....	309
SIGNS.....	309
AUTOPILOT/AUTOTHROST.....	309
THRUST AND AIRSPEED.....	310
THRUST AND AIRSPEED.....	311
THRUST AND AIRSPEED.....	312
THRUST AND AIRSPEED.....	313
THRUST SETTING (N1) FOR RECOMMENDED SPEED.....	314
ALTITUDE.....	315
LANDING.....	315
Operations in Windshear or Downburst.....	317
PRECAUTIONS FOR SUSPECTED WINDSHEAR.....	317
RECOVERY TECHNIQUE AT TAKEOFF.....	318
RECOVERY TECHNIQUE AT LANDING.....	318
Cold Weather.....	319
GENERAL.....	319
EXTERIOR INSPECTION.....	319
DEICING/ANTI-ICING PROCEDURE ON GROUND.....	320
SECURING THE AIRCRAFT FOR COLD SOAK.....	321
PRO-SUP-93 – Green Operating Procedures.....	323
Flight Phases.....	323
GENERAL.....	323
PRELIMINARY COCKPIT PREPARATION.....	323
COCKPIT PREPARATION.....	323
BEFORE PUSHBACK OR START.....	324
AFTER START.....	324
TAXI.....	325
BEFORE TAKEOFF.....	325
TAKEOFF.....	325
CLIMB.....	326
CRUISE.....	326
DESCENT PREPARATION.....	327
DESCENT.....	327
HOLDING.....	327
APPROACH.....	328
AFTER LANDING.....	328

One Engine Taxi	330
GENERAL	330
DEPARTURE	330
ARRIVAL	332
PRO-TRG – TRAINING NOTES	334
PRO-TRG-10 – Flow Patterns	334
GENERAL	334
MCDU SETUP	335
AFTER START FLOW PATTERN	336
TAXI FLOW PATTERN	337
FL100 (CLIMB) FLOW PATTERN	338
FL100 (DESCENT)	339
AFTER LANDING	340
PRO-TRG-20 -- Briefings.....	341
TAKE OFF BRIEFING.....	341
DEPARTURE BRIEF	342
APPROACH BRIEFING	343
PRO-TRG-30 – Crew Resource Management.....	344
GENERAL	344
COMMUNICATION	345
PRO-TRG-40 – NORMAL PROCEDURES	346
STANDARD OPERATING PROCEDURES	346
USE OF NORMAL CHECKLIST	346
BEFORE START.....	347
AFTER START	348
BEFORE TAKEOFF	349
AFTER TAKEOFF/CLIMB.....	350
APPROACH.....	350
LANDING	350
AFTER LANDING	351
PARKING.....	351
SECURE	352
APPROACH USING FLS FUNCTION	353
PRO-TRG-50 – ABNORMAL AND EMERGENCY PROCEDURES	361
MISC	361
REJECTED TAKEOFF.....	361
PRO-CFD – CONNECTED FLIGHT DECK PROCEDURES.....	365

PRO-CFD-10 – Connected Flight Deck Recommendations	365
GENERAL	365
NAVDATA	365
SYNC SETTINGS	365
PUSHBUTTON/TOGGLE SWITCH USAGE	365
VATSIM/IVAO NETWORK CONNECTION	366
COMPANY ROUTE USAGE	366
CONNECTED FLIGHT DECK CONNECTION CHECKLIST	367

RECORD OF AMENDMENTS

Change	Subject/Section	Change	Date
Rev 2	New format		9/3/16
Rev 3	New format in line with Airbus standard documentation All procedures updated in line with BA SOPs		17/11/16
Rev 4	Added section PRO-SRP Systems Related Procedures including information regarding task sharing for approach & landing.	BACK COURSE LOCALIZER APPROACH procedure added	16/1/16
Rev 5	PRO-NOR-EXP – COCKPIT PREPARATION – AIR COND	Update of the number of occupants for the use of LO/ECON flow. The number of occupants includes passengers and cabin crew.	11/1/19
	PRO-NOR-EXP – COCKPIT PREPARATION - PEDESTAL	Update of the content to clarify ACCU PRESS check	11/1/19
	PRO-NOR-EXP – COCKPIT PREPARATION – INSTRUMENT PANEL	Removal of requirement to check IRS ground speed	11/1/19
	PRO-NOR-EXP – COCKPIT PREPARATION – FMGS DATA CONFIRMATION	Addition of chart preparation	11/1/19
	PRO-NOR-EXP – BEFORE START CLEARANCE – EXT PWR	Caution regarding external power disconnection upgraded to warning	11/1/19
	PRO-NOR-EXP – TAKEOFF	Updated procedure – landing lights now retracted after acceleration	11/1/19
	PRO-NOR-EXP – AFTER TAKEOFF – ANTI-ICE PROTECTION	Revision of the comment in order to clarify the use of engine anti-ice Addition of the use of wing anti-ice.	11/1/19
	PRO-NOR-EXP – CLIMB	Revision of the comment to clarify the use of engine anti-ice	11/1/19
	PRO-NOR-EXP – DESCENT PREPARATION – ANTI-ICE PROTECTION	Revision of the comment to clarify the use of engine and wing anti-ice	11/1/19
	PRO-NOR-EXP – DESCENT – AT 10 000 FT	Landing lights no longer switched ON at 10 000 ft Addition of the identification check on the PFD.	11/1/19

Change	Subject/Section	Change	Date
Rev 5	PRO-NOR-EXP – APPROACH – INTERMEDIATE/FINAL APPROACH	Added a caution to emphasise not to fly for prolonged periods in icing conditions with slats extended	11/1/19
	PRO-NOR –EXP – AFTER LANIDNG	GRND SPOILERS item moved to the beginning of the procedure as per the Airbus SOP standardisation flow pattern	11/1/19
	PRO-NOR-EXP – STANDARD CALLOUTS	Change of “Sink Rate” callout from 1,200fpm to 1,000fpm to comply with new Minimum Use Height of AP.	11/1/19
	PRO-SUP-ADVERSE WEATHER	Revision to highlight that it is recommended to wait 5 minutes after completion of spraying operation before setting APU BLEED ON if required. This is to avoid ingestion of de-icing fluid by the APU air intake.	11/1/19
Rev 6	LIM-LIMITATIONS	Added section LIM	4/3/20
	PRO-NOR-SOP – APPROACH USING LOC/GS GUIDANCE	Formatting changes	4/3/20
	PRO-NOR-SOP – APPROACH USING FINAL APP GUIDANCE	Formatting changes	4/3/20
	PRO-NOR-SOP – APPROACH USING FPA GUIDANCE	Formatting changes	4/3/20
	PRO-NOR-SOP-LANDING	Changed allocation of duties – PF now handles thrust reversers	4/3/20
	PRO-NOR-EXP-COCKPIT PREPARATION	Added NEO ECAM oil quantity check	4/3/20
	PRO-NOR-EXP-COCKPIT PREPARATION-OVERHEAD PANEL	Added ENG 1 – ENG 2 FIRE TEST results	4/3/20
	PRO-NOR-EXP-COCKPIT PREPARATION-PEDESTAL	Added GSX notes for FSLabs	4/3/20
	PRO-NOR-EXP-COCKPIT PREPARATION-FMGS CRITICAL DATA ENTRY	Updated list of approved takeoff performance calculators	4/3/20
	PRO-NOR-EXP-BEFORE PUSHBACK OR START	Added transponder operating instructions relevant to TOLISS and FlightFactor models	4/3/20
	PRO-NOR-EXP-AUTOMATIC ENGINE START	Added NEO engine start procedure	4/3/20

Change	Subject/Section	Change	Date
Rev 6	PRO-NOR-EXP-AFTER START	Added CAUTION note instructing crews to turn on engine anti-ice as soon as icing conditions are encountered. Updated engine ice-shedding procedure. Added NEO after start procedure.	4/3/20
	PRO-NOR-EXP-TAKEOFF	Added NEO thrust setting procedure.	4/3/20
	PRO-NOR-EXP-INTERMEDIATE/FINAL APPROACH	Amended flight parameter callouts IAW current BA FCOM	4/3/20
	PRO-NOR-EXP-APPROACH USING FINAL APP GUIDANCE	Clarified that both FDs must be set OFF at the MDA.	4/3/20
	PRO-NOR-EXP-AUTOLAND	New information.	4/3/20
	PRO-NOR-EXP-GO AROUND WITH FD	Added NEO go around procedure	4/3/20
	PRO-SUP-GREEN OPERATING PROCEDURES-ONE ENGINE TAXI-GENERAL	Updated wording for OETO recommendations.	4/3/20
	PRO-SUP-GREEN OPERATING PROCEDURES-ONE ENGINE TAXI-DEPARTURE	Rationalised in to NEO and CEO procedures. Updated procedure to reflect NWS on Yellow hydraulic system per currently available FS models.	4/3/20
	PRO-SUP-GREEN OPERATING PROCEDURES-ONE ENGINE TAXI-ARRIVAL	Added procedure for aircraft with SETWA capability (NEOs, G-DBCA) Removed Taxi-In with Engine 1 Shutdown procedure IAW current BA FCOM.	4/3/20
	PREO-NOR-EXP-STANDARD CALLOUTS-PF-PM DUTIES TRANSFER	Removed statement regarding handover of control being implicit in LAND call	4/3/20

Change	Subject/Section	Change	Date
Rev 6	PRO-NOR-EXP-STANDARD CALLOUTS-SUMMARY FOR EACH PHASE-TAXI	Added PM "PRESSURE ZERO" call in response to brake check	4/3/20
	PRO-NOR-EXP-STANDARD CALLOUTS-SUMMARY FOR EACH PHASE-MALFUNCTION BEFORE V1 AT TAKEOFF	Removed "SEVENTY KNOTS" and "REVERSE IDLE" calls to reflect that PF now handles thrust reversers	4/3/20
	PRO-NOR-EXP-STANDARD CALLOUTS-SUMMARY FOR EACH PHASE-APPROACH	"BARO CHECK" call replaced with "POSITION CHECK".	4/3/20
	PRO-NOR-EXP-STANDARD CALLOUTS-SUMMARY FOR EACH PHASE-MANUAL LANDING	"LAND" call changed to "CONTINUE, I HAVE CONTROL".	4/3/20
	PRO-NOR-EXP-STANDARD CALLOUTS-SUMMARY FOR EACH PHASE-AUTOMATIC LANDING	"LAND" call changed to "CONTINUE"	4/3/20
Rev 7	PRO-SUP-GREEN OPERATING PROCEDURES-ONE ENGINE TAXI-DEPARTURE	Added note clarifying that takeoff flap is still selected prior to taxi when conducting OETO	4/12/24
	PRO-SUP-GREEN OPERATING PROCEDURES-ONE ENGINE TAXI-DEPARTURE	Removed X-BLEED operation IAW current BA FCOM	4/12/24
	PRO-SUP-GREEN OPERATING PROCEDURES-BEFORE TAKEOFF	Removed Packs OFF advice for CEO aircraft	4/12/24
	PRO-NOR-EXP-APPROACH	"LAND" call amended to "CONTINUE, I HAVE CONTROL"	4/12/24
	PRO-NOR-EXP-APPROACH	Added APPROACH USING F-LOC F-G/S GUIDANCE	4/12/24
	PRO-NOR-EXP-APPROACH	Updated CROSS REFERENCE TABLE	4/12/24
	PRO-LIM-AUTOFLIGHT-USE OF FLS	Added USE OF FLS section	4/12/24
	PRO-NOR-SOP-STANDARD CALLOUTS	Added PM "Flight Control Check Complete" call for when PM has checked their flight controls	4/12/24
	PRO-LIM-AUTOFLIGHT-AUTOPILOT FUNCTION	Added FLS minimum use height	4/12/24
	PRO-TRG-40 NORMAL PROCEDURES	Added Use of Normal Checklist Added FLS section	4/12/24
	PRO-TRG-50 ABNORMAL AND EMERGENCY PROCEDURES - REJECTED TAKEOFF	Added RTO information	4/12/24

INTRODUCTION

The Aerosoft Airbus Connected Flight Deck feature is an excellent addition to the world of flying in FS and within BAVirtual, and provides scope for extremely realistic operations. However, as most of us are used to flying alone, the experience of working with another pilot can feel quite challenging at first: suddenly we have to take in to consideration task-sharing on the flight deck, the impact of our actions and decisions on our colleague, co-ordinating who does what and when and making sure that we both have the same mental picture of the flight.

In an airline the size of British Airways – which employs more than three thousand pilots – it is quite possible that the crew on any given flight will never have met before, even if they have all been working for the airline for decades. Yet they must work together seamlessly to deal with any situation. For this reason, a set of **Standard Operating Procedures (SOPs)** are established for each fleet, detailing standard words and phrases to be used on the flight deck to ensure that communication is clear and unambiguous, and ensuring that each pilot knows exactly which duties they are expected to carry out – and which duties their colleague is expected to carry out – at any given moment during the flight.

This document draws on the real British Airways Airbus Standard Operating Procedures to provide the same framework for use within BAVirtual. By learning and following these procedures during your Connected Flight Deck flights – and with a little practice – you too will be able to work seamlessly with fellow BAVirtual pilots, even though you may never have met in real life or flown together before.

**LIM – LIMITATIONS
AIRCRAFT GENERAL**

FLIGHT MANOEUVRING LOAD ACCELERATION LIMITS

Applicable to: ALL

Clean configuration -1 g to +2.5g

Other configurations 0g to +2g

AIRPORT OPERATIONS AND WIND LIMITATIONS

Applicable to: ALL except G-GATU

RUNWAY SLOPE

Runway slope (mean) ±2%

Applicable to: G-GATU

RUNWAY SLOPE

Runway slope (mean) ±3%

Applicable to: G-GATH – GATS

RUNWAY ALTITUDE

Runway altitude 14 100 ft

Applicable to: A318, A319, G-EUUA – EUUZ, G-EUYA – EUYY, G-MIDO – MIDY, G-MEDK, G-TTOB – G-TTOE, A321

Runway altitude 9 200 ft

Applicable to: G-GATU

Runway altitude 12 000 ft

Applicable to: ALL

NOMINAL RUNWAY WIDTH

Nominal runway width 45 m

Minimal runway width 30 m

Applicable to: A320NEO and A321NEO

WIND FOR TAKEOFF AND LANDING

Maximum certified crosswind for takeoff 35 kt (gust included)

Note: The maximum certified crosswind for takeoff is an Airplane Flight Manual (AFM) limitation: it is an engine limitation. Airbus recommends that operators should not intentionally operate in crosswinds that exceed this value.

Maximum demonstrated crosswind for landing 38 kt (gust included)

Note: The maximum demonstrated crosswind value at landing is not an Airplane Flight Manual (AFM) limitation: it is the maximum crosswind condition experienced during the aircraft certification campaign. Airbus recommends that operators should not intentionally operate in crosswinds that exceed this value.

Applicable to: A318

WIND FOR TAKEOFF AND LANDING

Maximum demonstrated crosswind for takeoff..... 39 kt (gust included)

Maximum demonstrated crosswind for landing 38 kt (gust included)

Note: The maximum demonstrated crosswind value at landing is not an Airplane Flight Manual (AFM) limitation: it is the maximum crosswind condition experienced during the aircraft certification campaign. Airbus recommends that operators should not intentionally operate in crosswinds that exceed this value.

Applicable to: A319, A320CEO and A321CEO

WIND FOR TAKEOFF AND LANDING

Maximum demonstrated crosswind (takeoff and landing) 38 kt (gust included)

Note: The maximum demonstrated crosswind value is not an Airplane Flight Manual (AFM) limitation: it is the maximum crosswind condition experienced during the aircraft certification campaign. Airbus recommends that operators should not intentionally operate in crosswinds that exceed this value.

Applicable to: A318, G-EUPA – EUPZ, G-EUOA – EUOI, G-EUUA – EUUZ, G-EUYA – EUYI, G-GATH – GATU, G-TTOB – TTOE, G-EUXC – EUXM, G-MEDK

TAILWIND TAKEOFF

Maximum tailwind for takeoff..... 15 kt

Applicable to: G-DBCA – DBCK, G-MIDO – MIDY, G-MEDF – MEDU, A320NEO, A321NEO

TAILWIND TAKEOFF

Maximum tailwind for takeoff..... 10 kt

Applicable to: A318, A319, G-EUUA – EUUZ, G-EUYA – EUYI, G-TTOB – TTOE, G-MIDO – MIDY, G-MEDK, A320NEO, A321

TAILWIND LANDING

Maximum tailwind for landing 10 kt

Note: For maximum tailwind for automatic landing and rollout, refer to Maximum Wind Conditions for ILS/MLS, CATII or CATII and for GLS (if installed) CAT I.

Applicable to: G-GATH – GATU

TAILWIND LANDING

Maximum tailwind for landing 15 kt

Note: For maximum tailwind for automatic landing and rollout, refer to Maximum Wind Conditions for ILS/MLS, CATII or CATII and for GLS (if installed) CAT I.

Note: For landing with a tailwind greater than 10 kt, FLAPS FULL is recommended.

Applicable to: ALL

PASSENGER AND CARGO DOORS OPERATION

The following are the wind limitations for passenger and cargo door operation:

- The maximum wind for passenger door operation is 65 kt
- The maximum wind for FWD and AFT cargo door operation is 40 kt (or 50 kt, if the aircraft nose is in to the wind, or if the FWD and AFT cargo doors are on the leeward side)
- The FWD and AFT cargo doors must be closed before the wind speed exceeds 65 kt

Applicable to: A318

MAXIMUM RECOMMENDED CROSSWIND ON WET AND CONTAMINATED RUNWAYS

Runway Surface Conditions		Maximum Crosswind for Takeoff (Gust included)	Maximum Crosswind for Landing (Gust included)
Runway State and / or Runway Contaminant	ESF⁽¹⁾ or PIREP⁽²⁾		
Damp Wet Up to 3 mm (1/8") of water Slush Up to 3 mm (1/8") Dry snow Up to 3 mm (1/8") Wet snow Up to 3 mm (1/8") Frost	Good	39 kt	38 kt
Compacted snow OAT at or below -15 °C	Good to Medium	29 kt	29 kt
Dry snow More than 3 mm (1/8"), up to 100 mm (4") Wet snow More than 3 mm (1/8"), up to 30 mm (6/5") Compacted snow OAT above -15 °C Dry snow over compacted snow Wet snow over compacted snow Slippery when wet	Medium	25 kt	25 kt
Water More than 3 mm (1/8") up to 13 mm (1/2") Slush More than 3 mm (1/8") up to 13 mm (1/2")	Medium to Poor	20 kt	20 kt
Ice (cold & dry)	Poor	15 kt	15 kt

(1) ESF: Estimated Surface Friction

(2) PIREP: Pilot Report of Braking Action

Note: The maximum crosswind values given in the above table are recommended values based on computations.

Applicable to: A320NEO and A321NEO

MAXIMUM RECOMMENDED CROSSWIND ON WET AND CONTAMINATED RUNWAYS

Runway Surface Conditions		Maximum Crosswind for Takeoff (Gust included)	Maximum Crosswind for Landing (Gust included)
Runway State and / or Runway Contaminant	ESF ⁽¹⁾ or PIREP ⁽²⁾		
Damp Wet Up to 3 mm (1/8") of water Slush Up to 3 mm (1/8") Dry snow Up to 3 mm (1/8") Wet snow Up to 3 mm (1/8") Frost	Good	35 kt	38 kt
Compacted snow OAT at or below -15 °C	Good to Medium	29 kt	29 kt
Dry snow More than 3 mm (1/8"), up to 100 mm (4") Wet snow More than 3 mm (1/8"), up to 30 mm (6/5") Compacted snow OAT above -15 °C Dry snow over compacted snow Wet snow over compacted snow Slippery when wet	Medium	25 kt	25 kt
Water More than 3 mm (1/8") up to 13 mm (1/2") Slush More than 3 mm (1/8") up to 13 mm (1/2")	Medium to Poor	20 kt	20 kt
Ice (cold & dry)	Poor	15 kt	15 kt

(1) ESF: Estimated Surface Friction

(2) PIREP: Pilot Report of Braking Action

Note: The maximum crosswind values given in the above table are recommended values based on computations.

Applicable to: A319, A320CEO and A321CEO

MAXIMUM RECOMMENDED CROSSWIND ON WET AND CONTAMINATED RUNWAYS

Runway Surface Conditions		Maximum Crosswind for Takeoff (Gust included)	Maximum Crosswind for Landing (Gust included)
Runway State and / or Runway Contaminant	ESF⁽¹⁾ or PIREP⁽²⁾		
Damp Wet Up to 3 mm (1/8") of water Slush Up to 3 mm (1/8") Dry snow Up to 3 mm (1/8") Wet snow Up to 3 mm (1/8") Frost	Good	38 kt	38 kt
Compacted snow OAT at or below -15 °C	Good to Medium	29 kt	29 kt
Dry snow More than 3 mm (1/8"), up to 100 mm (4") Wet snow More than 3 mm (1/8"), up to 30 mm (6/5") Compacted snow OAT above -15 °C Dry snow over compacted snow Wet snow over compacted snow Slippery when wet	Medium	25 kt	25 kt
Water More than 3 mm (1/8") up to 13 mm (1/2") Slush More than 3 mm (1/8") up to 13 mm (1/2")	Medium to Poor	20 kt	20 kt
Ice (cold & dry)	Poor	15 kt	15 kt

(1) ESF: Estimated Surface Friction

(2) PIREP: Pilot Report of Braking Action

Note: The maximum crosswind values given in the above table are recommended values based on computations.

Applicable to: ALL

TAKEOFF LIMITATIONS ON CONTAMINATED RUNWAYS

Takeoff is not recommended on the following runway conditions:

- Wet ice
- Water on top of Compacted Snow
- Dry Snow or Wet Snow over Ice

COCKPIT WINDOW OPEN MAXIMUM SPEED

Applicable to: ALL

Maximum speed..... 200 kt

MAXIMUM FLAPS/SLATS SPEEDS

Applicable to: A318, A319, A320CEO and A320NEO

Flaps Lever Position	Configuration on Slat/Flap Display	Max Speed	Flight Phase
0		VMO/MMO	CRUISE
1	1	230 kt	HOLDING
	1 + F	215 kt	TAKEOFF
2	2	200 kt	TAKEOFF/APPROACH
3	3	185 kt	TAKEOFF/APPROACH/LANDING
FULL	FULL	177 kt	LANDING

Applicable to: A321CEO

Flaps Lever Position	Configuration on Slat/Flap Display	Max Speed	Flight Phase
0		VMO/MMO	CRUISE
1	1	230 kt	HOLDING
	1 + F	215 kt	TAKEOFF
2	2	215 kt	TAKEOFF/APPROACH
3	3	195 kt	TAKEOFF/APPROACH/LANDING
FULL	FULL	190 kt	LANDING

Applicable to: A321NEO

Flaps Lever Position	Configuration on Slat/Flap Display	Max Speed	Flight Phase
0		VMO/MMO	CRUISE
1	1	243 kt	HOLDING
	1 + F	225 kt	TAKEOFF
2	2	215 kt	TAKEOFF/APPROACH
3	3	195 kt	TAKEOFF/APPROACH/LANDING
FULL	FULL	186 kt	LANDING

MAXIMUM OPERATING SPEED VMO/MMO

Applicable to: ALL

VMO 350 kt
MMO M 0.82

MAXIMUM SPEEDS WITH THE LANDING GEAR EXTENDED

Applicable to: ALL

Maximum speed with the landing gear extended (VLE) 280 kt /M 0.67
Maximum speed at which the landing gear may be extended (VLO extension) 250 kt /M 0.60
Maximum speed at which the landing gear may be retracted (VLO retraction) 220 kt /M 0.54

MAXIMUM TYRE SPEED

Applicable to: ALL

Maximum ground speed 195 kt

MINIMUM CONTROL SPEEDS

Applicable to: A318

MINIMUM CONTROL SPEED FOR LANDING (VMCL)

VMCL 111 kt

MINIMUM CONTROL SPEEDS IN THE AIR (VMCA) AND ON THE GROUND (VMCG)

Altitude (ft)	VMCA (KT IAS)	VMCG (KT IAS)		
		CONF 1 + F	CONF 2	CONF 3
-2 000	107	107	106	107
0	107	107	106	107
2 000	107	107	106	106
4 000	105	105	104	105
6 000	104	104	103	103
8 000	101	102	101	101
10 000	99	99	99	99
12 000	96	97	97	97
14 100	93	95	94	94

Applicable to: A319

MINIMUM CONTROL SPEED FOR LANDING (VMCL)

VMCL 106 kt

MINIMUM CONTROL SPEEDS IN THE AIR (VMCA) AND ON THE GROUND (VMCG)

Altitude (ft)	VMCA (KT IAS)	VMCG (KT IAS)		
		CONF 1 + F	CONF 2	CONF 3
-2 000	106	104	104	104
0	105	104	104	104
2 000	104	103	103	103
4 000	102	101	101	101
6 000	100	100	100	100
8 000	98	98	98	98
10 000	96	96	96	96
12 000	95	95	95	95
14 100	93	93	93	93

Applicable to: A320CEO

MINIMUM CONTROL SPEED FOR LANDING (VMCL)

VMCL 109 kt

MINIMUM CONTROL SPEEDS IN THE AIR (VMCA) AND ON THE GROUND (VMCG)

Altitude (ft)	VMCA (KT IAS)	VMCG (KT IAS)		
		CONF 1 + F	CONF 2	CONF 3
-2 000	114	113	111	11
0	112	112	110	109
2 000	111	111	109	108
4 000	108	108	106	106
6 000	105	105	103	103
8 000	103	103	101	101
10 000	100	101	99	98
12 000	97	98	96	95
14 100	94	95	93	93

Applicable to: A320NEO

MINIMUM CONTROL SPEED FOR LANDING (VMCL)

VMCL 116 kt

MINIMUM CONTROL SPEEDS IN THE AIR (VMCA) AND ON THE GROUND (VMCG)

Altitude (ft)	VMCA (KT IAS)	VMCG (KT IAS)		
		CONF 1 + F	CONF 2	CONF 3
-2 000	115	117	117	117
0	114	116	116	116
2 000	114	116	116	116
4 000	113	115	115	115
6 000	112	114	114	114
8 000	109	112	112	112
10 000	106	109	109	109
12 000	103	106	106	106
14 100	99	102	102	102
15 100	97	101	101	101

Applicable to: A321CEO

MINIMUM CONTROL SPEED FOR LANDING (VMCL)

VMCL 114 kt

MINIMUM CONTROL SPEEDS IN THE AIR (VMCA) AND ON THE GROUND (VMCG)

Altitude (ft)	VMCA (KT IAS)	VMCG (KT IAS)		
		CONF 1 + F	CONF 2	CONF 3
-2 000	114	110	110	109
0	114	110	110	109
2 000	111	107	107	106
4 000	107	104	104	102
6 000	103	100	100	98
8 000	100	96	96	95
10 000	96	93	93	91
12 000	92	93	93	92
14 100	89	87	87	90

Note: Consider VMCA / VMCG defined in this table regardless of Thrust Bump used or not.

Applicable to: A321NEO

MINIMUM CONTROL SPEED FOR LANDING (VMCL)

VMCL 116 kt

MINIMUM CONTROL SPEEDS IN THE AIR (VMCA) AND ON THE GROUND (VMCG)

Altitude (ft)	VMCA (KT IAS)	VMCG (KT IAS)		
		CONF 1 + F	CONF 2	CONF 3
-2 000	110	118	118	119
0	110	118	118	118
2 000	107	115	115	115
4 000	105	113	113	113
6 000	101	109	109	109
8 000	98	106	106	106
9 200	96	105	105	105
10 000	95	104	104	104
12 000	92	101	101	102
14 100	88	98	98	98
15 100	87	96	96	97

TAXI SPEED

Applicable to: A320CEO

When the taxi weight is higher than 76 000 kg (167 550 lb):

CAUTION

Do not exceed a taxi speed of 20 kt during a turn.

WIPERS MAXIMUM OPERATING SPEED

Applicable to: ALL

Maximum speed..... 230 kt

Note: This limitation is applicable when the wipers are sweeping. It is not applicable if the wipers are not sweeping for any reason.

WEIGHT LIMITATIONS

Applicable to: A318

Maximum taxi weight..... 68 400 kg (150 796 lb)
Maximum takeoff weight (brake release) 68 000 kg (149 914 lb)
Maximum landing weight..... 57 500 kg (126 765 lb)
Maximum zero fuel weight 54 500 kg (120 151 lb)
Minimum weight 34 500 kg (76 060 lb)

In exceptional cases (in flight turn back or diversion) an immediate landing at weight above maximum landing weight is permitted, provided the pilot follows the overweight landing procedure.

Applicable to: A319

Maximum taxi weight..... 64 400 kg (141 977 lb)
Maximum takeoff weight (brake release) 64 000 kg (141 095 lb)
Maximum landing weight..... 61 000 kg (134 481 lb)
Maximum zero fuel weight 57 000 kg (125 663 lb)
Minimum weight 35 400 kg (78 044 lb)

In exceptional cases (in flight turn back or diversion) an immediate landing at weight above maximum landing weight is permitted, provided the pilot follows the overweight landing procedure.

Applicable to: G-GATH – G-GATS, G-MEDK

Maximum taxi weight..... 77 400 kg (170 637 lb)
Maximum takeoff weight (brake release) 77 000 kg (169 755 lb)
Maximum landing weight..... 64 500 kg (142 198 lb)
Maximum zero fuel weight 61 000 kg (134 481 lb)
Minimum weight 37 230 kg (82 079 lb)

In exceptional cases (in flight turn back or diversion) an immediate landing at weight above maximum landing weight is permitted, provided the pilot follows the overweight landing procedure.

Applicable to: G-MIDO – G-MIDY, G-GATU

Maximum taxi weight..... 73 900 kg (162 921 lb)
Maximum takeoff weight (brake release) 73 500 kg (162 039 lb)
Maximum landing weight..... 64 500 kg (142 198 lb)
Maximum zero fuel weight 62 500 kg (137 788 lb)
Minimum weight 37 230 kg (82 079 lb)

In exceptional cases (in flight turn back or diversion) an immediate landing at weight above maximum landing weight is permitted, provided the pilot follows the overweight landing procedure.

Applicable to: G-EUUA – G-EUZZ, G-EUYA – G-EUYN, G-TTOB – G-TTOE
Pre-Densification:

Maximum taxi weight.....	73 900 kg (162 921 lb)
Maximum takeoff weight (brake release)	73 500 kg (162 039 lb)
Maximum landing weight.....	64 500 kg (142 198 lb)
Maximum zero fuel weight	61 000 kg (134 481 lb)
Minimum weight	37 230 kg (82 079 lb)

Post-Densification:

Maximum taxi weight.....	73 000 kg (160 937 lb)
Maximum takeoff weight (brake release)	72 600 kg (160 055 lb)
Maximum landing weight.....	66 000 kg (145 505 lb)
Maximum zero fuel weight	62 500 kg (137 788 lb)
Minimum weight	37 230 kg (82 079 lb)

In exceptional cases (in flight turn back or diversion) an immediate landing at weight above maximum landing weight is permitted, provided the pilot follows the overweight landing procedure.

Applicable to: G-EUYO – G-EUYY

Maximum taxi weight.....	75 900 kg (167 330 lb)
Maximum takeoff weight (brake release)	75 500 kg (166 448 lb)
Maximum landing weight.....	66 000 kg (145 505 lb)
Maximum zero fuel weight	62 500 kg (137 788 lb)
Minimum weight	37 230 kg (82 079 lb)

In exceptional cases (in flight turn back or diversion) an immediate landing at weight above maximum landing weight is permitted, provided the pilot follows the overweight landing procedure.

Applicable to: A320NEO

Maximum taxi weight.....	75 400 kg (166 228 lb)
Maximum takeoff weight (brake release)	75 000 kg (165 346 lb)
Maximum landing weight.....	67 400 kg (148 591 lb)
Maximum zero fuel weight	64 300 kg (141 757 lb)
Minimum weight	40 600 kg (89 508 lb)

In exceptional cases (in flight turn back or diversion) an immediate landing at weight above maximum landing weight is permitted, provided the pilot follows the overweight landing procedure.

Applicable to: A321NEO

Maximum taxi weight.....	89 400 kg (197 093 lb)
Maximum takeoff weight (brake release)	89 000 kg (196 211 lb)
Maximum landing weight.....	77 300 kg (170 417 lb)
Maximum zero fuel weight	73 300 kg (161 598 lb)
Minimum weight	46 600 kg (102 736 lb)

In exceptional cases (in flight turn back or diversion) an immediate landing at weight above maximum landing weight is permitted, provided the pilot follows the overweight landing procedure.

Applicable to: G-MEDF – G-MEDJ, G-MEDU

Maximum taxi weight.....	89 400 kg (197 093 lb)
Maximum takeoff weight (brake release)	89 000 kg (196 211 lb)
Maximum landing weight.....	75 500 kg (166 449 lb)
Maximum zero fuel weight	71 500 kg (157 630 lb)
Minimum weight	47 500 kg (104 720 lb)

In exceptional cases (in flight turn back or diversion) an immediate landing at weight above maximum landing weight is permitted, provided the pilot follows the overweight landing procedure.

Applicable to: G-EUXC – G-EUXM, G-MEDL – G-MEDN

Maximum taxi weight.....	83 400 kg (183 865 lb)
Maximum takeoff weight (brake release)	83 000 kg (182 983 lb)
Maximum landing weight.....	75 500 kg (166 449 lb)
Maximum zero fuel weight	71 500 kg (157 630 lb)
Minimum weight	47 500 kg (104 720 lb)
In exceptional cases (in flight turn back or diversion) an immediate landing at weight above maximum landing weight is permitted, provided the pilot follows the overweight landing procedure.	

AIR BLEED/COND/PRESS/VENT
GENERAL
Applicable to: ALL

With passengers on board, it is not recommended to exceed 20 min without air conditioning supply. The lack of fresh air supply will significantly reduce the cabin's air quality.

APU BLEED USE WITH HP AIR START UNIT
Applicable to: ALL

The flight crew must not use bleed air from the APU BLEED and from the HP Air Start Unit at the same time, to prevent any adverse effect on the Bleed Air System.

AVIONICS VENTILATION
Applicable to: ALL

During ground operations and depending on the Outside Air Temperature (OAT), the flight crew must limit the time that the aircraft electric power supply is used, in normal avionics ventilation system configuration, as follows:

OAT $\leq$ 49 °C	No limitation
49 °C < OAT $\leq$ 55 °C	2 h
55 °C < OAT $\leq$ 60 °C	1 h
60 °C < OAT $\leq$ 64 °C	0.5 h

CABIN PRESSURE
Applicable to: ALL

Maximum positive differential pressure 9.0 PSI
Maximum negative differential pressure -1.0 PSI
Safety relief valve setting 8.6 PSI

PACKS USE WITH LP AIR CONDITIONING UNIT
Applicable to: ALL

The flight crew must not use conditioned air from the packs and from the LP Air Conditioning Unit at the same time, to prevent any adverse effect on the Air Conditioning system.

AUTO FLIGHT SYSTEM

AUTOPILOT FUNCTION

Applicable to: ALL

The autopilot can be used with the following minimum values:

At takeoff	100 ft AGL and at least 5 s after liftoff
In approach with F-G/S mode	200 ft AGL
In approach with FINAL APP, V/S or FPA mode	250 ft AGL
In circling approach	500 ft AGL for aircraft category C (600 ft AGL for aircraft category D)
ILS/MLS approach when CAT1 is displayed on the FMA	160 ft AGL
GLS approach when AUTOLAND is not displayed on the FMA	160 ft AGL
ILS/MLS approach when CAT2 or CAT3 (single or dual) is displayed on the FMA	0 ft AGL if autoland.
PAR approach (Precision Approach Radar)	250 ft AGL
<i>Note: The use of the AP and/or FD is authorised in PAR approach, with HDG V/S or TRK FPA. PAR approaches may be subject to operational approval.</i>	
After a manual go-around	100 ft AGL

Applicable to: A318, A319, A320CEO and A320NEO

In all other phases	500 ft AGL

Applicable to: A321

In all other phases	900 ft AGL
The AP or FD in OP DES or DES mode can be used in approach. However, its use is only permitted if the FCU selected altitude is set to, or above, the higher of the two: MDA/MDH or 900ft AGL.	

FLIGHT MANAGEMENT FUNCTION

Applicable to: ALL

FMGS lateral and vertical navigation is certified for:

- After takeoff, en route, and terminal area operations
- Navigation within RNAV/RNP airspace
- Instrument approach procedures (except ILS, LOC, LOC B/C, LDA, SDF, GLS, MLS and FLS final approaches)
- Missed approach procedures.

The FLS function is certified for:

- RNAV, RNAV (GNSS), GPS, VOR, VOR/DME, NDB, NDB/DME instrument approach procedures, using FMS navigation for lateral and vertical navigation
- LOC, ILS (GS out), or LOC B/C instrument approaches, using FMS navigation for vertical navigation, associated with LOC or LOC B/C for lateral navigation.

Approval of the FMGS is based on the assumption that the navigation database is validated for intended use.

Obstacle clearance and adherence to airspace constraints remains a flight crew responsibility.

Fuel, time predictions/performance information is provided for advisory purposes only.

NAVIGATION PERFORMANCE

The navigation accuracy depends on:

- IRS drift, or
- One of the following:
 - Radio navaid availability, or
 - Elapsed time since last computation of radio navaid position.

RNP accuracy with GPS PRIMARY is:

	With AP ON ⁽¹⁾	With AP OFF and FD ON ⁽¹⁾	With AP OFF and FD OFF
En route	1 NM	1 NM	1.1 NM
In terminal area	0.5 NM	0.51 NM	0.51 NM
In approach	0.3 NM	0.3 NM	0.3 NM with F-LOC deviation. Not authorised without F-LOC deviation.

(1) *In NAV (all phases), or in F-LOC (approach phase)*

DEGRADED SITUATION

If GPS PRIMARY LOST is displayed on the ND and MCDU, the navigation accuracy remains sufficient for RNP operations provided that, the RNP value is checked or entered on the MCDU and HIGH ACCURACY is displayed.

USE OF NAV MODE

Applicable to: ALL

AFTER TAKEOFF

NAV mode may be used after takeoff provided that:

- GPS PRIMARY is available, or
- The flight crew checked the FMGS takeoff updating.

IN TERMINAL AREA

NAV mode may be used in terminal area provided that:

- GPS PRIMARY is available, or
- the appropriate RNP is checked or entered on the MCDU, and HIGH accuracy is displayed, or
- FMS navigation is crosschecked with navaid raw data.

APPROACH BASED ON RADIO NAVAIDS

A navaids approach may be performed in NAV, APP NAV or FINAL APP, with AP or FD engaged, provided that:

- GPS PRIMARY is available

RNAV APPROACH

An RNAV (GNSS), or RNAV (RNP) approach may be performed provided that

- GPS PRIMARY is available.

Refer to [Guidance Modes per Approach Types](#)

NON-PRECISION APPROACHES WITH ENGINE-OUT

Applicable to: A319

If one engine is inoperative, it is not permitted to use the autopilot to perform NPAs in the following modes: FINAL APP, NAV V/S, NAV/FPA.

Only FD use is permitted.

NAVIGATION DATABASE VALIDATION

Applicable to: ALL

RNAV(GNSS) APPROACHES AND APPROACHES BASED ON VOR/NDB

To fly an approach in lateral managed mode or lateral and vertical managed mode, the approach stored in the Navigation database must be either:

- Produced by an approved supplier compliant with ED76/DO200A requirements, or
- Validated and approved by the Operator.

For BAV operations, generally any procedure in Navigraph or Aerosoft navigation databases can be used, with the exception of RNP(AR) procedures. Individual unapproved approaches will be notified by Loreto/NOTAM.

Note: RNAV(GNSS) approaches lateral trajectories are geometrically based on waypoints coordinates. Thus, validating waypoints coordinate ensure no coding error on the approach and correct lateral trajectory. Observed lateral track degree of difference between MCDU F-PLN page display and charts may come from inconsistency between FMS MagVar and charted MagVar, which has no effect on lateral trajectory.

LTS CATEGORY I

Applicable to: ALL

Minimum decision altitude..... relevant DA

At least one autopilot must be engaged in APPR mode, and CAT 2, CAT 3 SINGLE or CAT 3 DUAL must be displayed on the FMA.

All other CAT II aircraft limitations apply to LTS CAT 1 operations.

ILS CATEGORY II

Applicable to: ALL

Minimum decision height..... 100 ft

At least one autopilot must be engaged in APPR mode, and CAT 2, CAT 3 SINGLE or CAT 3 DUAL must be displayed on the FMA.

OTHER THAN STANDARD CAT II (OTS CAT II)

Applicable to: ALL

Minimum decision height..... 100 ft

At least one autopilot must be engaged in APPR mode, and CAT 2, CAT 3 SINGLE or CAT 3 DUAL must be displayed on the FMA.

An automatic landing must be performed.

ILS CATEGORY III FAIL PASSIVE (SINGLE)

Applicable to: ALL

Minimum decision height..... 50 ft

A/THR must be used in selected or managed speed.

At least one autopilot must be engaged in APPR mode, and CAT 3 SINGLE or CAT 3 DUAL must be displayed on the FMA.

ILS CATEGORY III FAIL OPERATIONAL (DUAL)

Applicable to: A318, A319 and A320NEO

Alert height..... 100 ft AGL

A/THR must be used in selected or managed speed.

Both autopilots must be engaged in APPR mode, and CAT 3 DUAL must be displayed on the FMA.

■ **CAT III without DH:**

Minimum Runway Visual Range 75 m

Applicable to: A321NEO

Alert height..... 100 ft AGL

A/THR must be used in selected or managed speed.

Both autopilots must be engaged in APPR mode, and CAT 3 DUAL must be displayed on the FMA.

■ **CAT III with DH:**

Minimum Decision Height 18 ft

■ **CAT II without DH:**

Minimum Runway Visual Range 75 m

Applicable to: G-MIDO – G-MIDY, G-MEDK, G-GATH – G-GATU, G-TTOB – G-TTOE, G-EUUA – G-EUUZ, G-EUYA – G-EUYN

Alert height..... 100 ft AGL

A/THR must be used in selected or managed speed.

Both autopilots must be engaged in APPR mode, and CAT 3 DUAL must be displayed on the FMA.

■ **CAT III with DH:**

Minimum Decision Height 25 ft

- **CAT II without DH:**
Minimum Runway Visual Range 75 m

Applicable to: G-EUYO – G-EUYY, G-EUXC – G-EUXM, G-MEDF – G-MEDU

Alert height 100 ft AGL

A/THR must be used in selected or managed speed.

Both autopilots must be engaged in APPR mode, and CAT 3 DUAL must be displayed on the FMA.

- **CAT III with DH:**
Minimum Decision Height 22 ft
- **CAT II without DH:**
Minimum Runway Visual Range 75 m

ENGINE-OUT

Applicable to: A318

CAT II and CAT III fail passive autoland are only approved in configuration 3 and FULL, and if engine-out procedures are completed before reaching 1000ft in approach. In case of a go-around below 50ft, and with one engine inoperative, disconnect the autopilot after go-around initiation, and follow the FD bars.

Applicable to: A319, A320NEO, A321CEO and A321NEO

CAT II and CAT III fail passive autoland are only approved in configuration 3 and FULL, and if engine-out procedures are completed before reaching 1000ft in approach.

Applicable to: A320CEO

CAT II and CAT III fail passive autoland are only approved in configuration FULL, and if engine-out procedures are completed before reaching 1000ft in approach.

MAXIMUM WIND CONDITIONS FOR ILS/MLS CAT II OR CAT III AND FOR GLS CAT I

Applicable to: A318, G-MIDO – G-MIDY, G-MEDK, G-GATH – G-GATU, G-TTOB – G-TTOE, G-EUUA – G-EUUZ, G-EUYA – G-EUYN

Headwind : 30 kt

Tailwind : 10 kt

Crosswind: 20 kt

Note: Wind limitation is based on the surface wind reported by ATC. If the wind displayed on the ND exceeds the above-noted autoland limitations, but the tower reports a surface wind within the limitations, then the autopilot can remain engaged. If the tower reports a surface wind beyond limitations, only CAT I automatic approach without autoland can be performed.

Applicable to: A319

■ **CONF FULL with airport elevation at or below 5750 ft:**

Headwind : 20 kt (15 kt with One Engine Inoperative (OEI))

Tailwind : 10 kt

Crosswind: 20 kt (10 kt with One Engine Inoperative (OEI))

■ **CONF FULL with airport elevation above 5750 ft or CONF 3:**

Headwind : 20 kt (15 kt with One Engine Inoperative (OEI))

Tailwind : 5 kt

Crosswind: 20 kt (10 kt with One Engine Inoperative (OEI))

Note: Wind limitation is based on the surface wind reported by ATC. If the wind displayed on the ND exceeds the above-noted autoland limitations, but the tower reports a surface wind within the limitations, then the autopilot can remain engaged. If the tower reports a surface wind beyond limitations, only CAT I automatic approach without autoland can be performed.

Applicable to: G-EUYO – G-EUYY

Headwind : 30 kt

Tailwind : 10 kt

Crosswind: 20 kt without Automatic Rollout / 15 kt with Automatic Rollout

Note: Wind limitation is based on the surface wind reported by ATC. If the wind displayed on the ND exceeds the above-noted autoland limitations, but the tower reports a surface wind within the limitations, then the autopilot can remain engaged. If the tower reports a surface wind beyond limitations, only CAT I automatic approach without autoland can be performed.

Applicable to: A320NEO

Headwind : 30 kt

Tailwind : 10 kt

Crosswind: 20 kt (15 kt with One Engine Inoperative (OEI) and with Automatic Rollout)

Note: Wind limitation is based on the surface wind reported by ATC. If the wind displayed on the ND exceeds the above-noted autoland limitations, but the tower reports a surface wind within the limitations, then the autopilot can remain engaged. If the tower reports a surface wind beyond limitations, only CAT I automatic approach without autoland can be performed.

Applicable to: A321CEO

Headwind : 30 kt

Tailwind : 10 kt

Crosswind: 20 kt

Note: Wind limitation is based on the surface wind reported by ATC. If the wind displayed on the ND exceeds the above-noted autoland limitations, but the tower reports a surface wind within the limitations, then the autopilot can remain engaged. If the tower reports a surface wind beyond limitations, only CAT I automatic approach without autoland can be performed.

Applicable to: A321NEO

Headwind : 15 kt

Tailwind : 10 kt

Crosswind: 10 kt

Note: Wind limitation is based on the surface wind reported by ATC. If the wind displayed on the ND exceeds the above-noted autoland limitations, but the tower reports a surface wind within the limitations, then the autopilot can remain engaged. If the tower reports a surface wind beyond limitations, only CAT I automatic approach without autoland can be performed.

AUTOMATIC LANDING

Applicable to: ALL

ILS/MLS CAT II and CAT III autoland are approved in CONF 3 and CONF FULL.

Automatic landing is demonstrated:

- With CAT II and CAT III ILS/MLS beam.

Applicable to: A318

- With aircraft weight below the maximum landing weight

Note: Depending on the situation (e.g. emergency or other) and provided that the runway is approved for automatic landing, the flight crew can decide to perform an autoland up to 67t (147710lb).

Applicable to: A319, A320CEO, A320NEO, A321CEO and A321NEO

- With aircraft weight below the maximum landing weight

Applicable to: A318, A320CEO and A321CEO

- With a glide slope angle between -2.5° and -3.15°

Applicable to: A319, A320NEO and A321NEO

- With a glide slope angle between -2.5° and -3.25°

Applicable to: A318 and A321CEO

- With an airport elevation at or below 5 750 ft

Applicable to: A319 and A320NEO

- With an airport elevation at or below 9 200 ft

Applicable to: G-EUUA – G-EUZZ, G-EUYA – G-EUYY, G-GATH – G-GATJ, G-GATN – G-GATU, G-TTOB – G-TTOE

- With an airport elevation at or below 6 500 ft

Applicable to: G-MIDO – G-MIDY, G-GATK – G-GATM

- With an airport elevation at or below 2 500 ft

Applicable to: A320NEO

- With aircraft weight at or above 44 000 kg (97 004 lb)

Applicable to: A321NEO

- With aircraft weight at or above 52 500 kg (115 743 lb)

Applicable to: A318, A319, A320CEO and A321CEO

Automatic landing is not allowed below -1 000 ft pressure altitude.

Applicable to: A320NEO and A321NEO

Automatic landing is not allowed below -2 000 ft pressure altitude.

Applicable to: A318, G-EUYO – G-EUYY, A321NEO

Automatic rollout performance is approved on dry and wet runways, but performance on snow-covered or icy runways was not demonstrated.

During automatic rollout with one engine inoperative or one thrust reverser inoperative, the flight crew can use the remaining thrust reverser, provided that:

- No more than idle thrust is used
- The wind does not exceed the maximum wind conditions for automatic rollout.

Applicable to: A319

Automatic rollout performance is approved on dry and wet runways, but performance on snow-covered or icy runways was not demonstrated. During automatic rollout with one engine inoperative or one thrust reverser inoperative, the flight crew can use the remaining thrust reverser, provided that:

AIRPORT ELEVATION AT OR BELOW 5 750 FT

- No more than idle thrust is used
- Headwind component not above 15kt
- Tailwind component not above 10kt
- Crosswind component not above 10kt.

AIRPORT ELEVATION ABOVE 5 750 FT OR CONF 3

- No more than idle thrust is used
- Headwind component not above 15kt
- Tailwind component not above 5kt
- Crosswind component not above 10kt.

Applicable to: G-EUUA – G-EUZZ, G-EUYA – G-EUYY, G-GATH – G-GATJ, G-GATN – G-GATU, G-TTOB – G-TTOE

Automatic rollout performance is approved on dry and wet runways, but performance on snow-covered or icy runways was not demonstrated.

During automatic rollout with one engine inoperative or one thrust reverser inoperative, the flight crew can use the remaining thrust reverser, provided that the wind does not exceed the maximum wind conditions for automatic rollout.

Applicable to: A320NEO

Automatic rollout performance is approved on dry and wet runways, but performance on snow-covered or icy runways was not demonstrated.

During automatic rollout with one engine inoperative or one thrust reverser inoperative, the flight crew can use the remaining thrust reverser, provided that:

- No more than idle thrust is used
- Headwind component not above 30kt
- Tailwind component not above 10kt
- Crosswind component not above 15kt.

Applicable to: ALL

Automatic landing system performance is demonstrated with CAT II or CAT III ILS/MLS airport installation. However, automatic landing in CAT I or better weather conditions is possible on CAT I ground installations or on CAT II/III ground installations when ILS/MLS sensitive areas are not protected, if the following precautions are taken:

- The airline checked that the ILS/MLS beam quality, and the effect of the terrain profile before the runway have no adverse effect on AP/FD guidance. Particularly, the effect of terrain profile within 300m before the runway threshold must be evaluated
- The flight crew is aware that LOC or G/S beam fluctuations, independent of the aircraft system, may occur. The PF is prepared to immediately disconnect the autopilot, and to take the appropriate action, should not satisfactory guidance occur
- At least CAT2 capability is displayed on the FMA and the flight crew uses CAT II/III procedures
- Visual references are obtained at an altitude appropriate for the CAT I approach. If not, a go-around must be performed.

AUTOMATIC LANDING IN JOHANNESBURG

Applicable to: A319, A320CEO, A320NEO, A321CEO and A321NEO

Automatic landing is not permitted on Johannesburg 03R/21L runways.

AUTOLAND DATABASES WITH HONEYWELL ADIRU

Applicable to: G-GATL, G-GATM

The below table provides for each concerned airport, the dates when the following limitations begin:

- AUTOLAND is not allowed
- ROLLOUT is not allowed

CAT II approaches without AUTOLAND are still allowed.

Airport Code	Airport Location	Month/Year
FAEL	EAST LONDON BEN SCHOEMAN SOUTH AFR REP	August 2018
PAFA	FAIRBANKS INTL AK USA	January 2015
PANC	ANCHORAGE INTL AK USA	October 2015
BIKF	KEFLAVIK ICELAND	January 2015
EGAA	BELFAST ALDERGROVE UNITED KINGDOM	September 2020
EGPF	GLASGOW UNITED KINGDOM	July 2020
EGPH	EDINBURGH UNITED KINGDOM	September 2020
EFRO	ROVANIEMI FINLAND	September 2019
EFOU	OULU FINLAND	August 2020

Note: This limitation is applicable until end of 2020. From 2021, without a revision of this limitation, AUTOLAND and ROLLOUT will not be allowed on any airport.

The above limitations do not apply if three new ADIRU with updated magnetic variation tables are installed and Operators ensure previous standards are not installed.

USE OF FLS

Applicable to: G-TTNV – G-TTSA, G-TNEA – G-TNEE

APPROACH BASED ON RADIO NAVAIDS

An approach based on radio aids (e.g. VOR/DME) may be flown with the FLS provided that:

- F-APP capability is displayed on FMA
In this case, the reference nav aids are not required to be serviceable, or the aircraft VOR/DME/ADF etc receiver may be inoperative or not installed, provided an operational approval is obtained.
- F-APP + RAW capability is displayed on FMA
In this case, the reference nav aids and corresponding airborne radio equipment must be serviceable, tuned and monitored during the approach.

An ILS (G/S out), ILS-B/C (G/S out), LOC, LOC-B/C approach may be flown with the lateral LOC (LOC B/C) mode and with the F-G/S mode of FLS function provided that:

- F-APP capability is displayed on FMA
In this case, the reference nav aids used for the vertical path validation must be tuned and checked at the final descent point
- F-APP + RAW capability is displayed on FMA
In this case, the reference nav aids used for the vertical path validation must be tuned and checked at the final descent point and monitored during the approach.

RNAV(GNSS) APPROACH

An RNAV(GNSS) approach with LNAV minimum may be flown with the FLS provided that the F-APP capability is displayed on the FMA.

An RNAV(GNSS) approach with LNAV/VNAV minimum must be flown with the FLS provided that the F-APP capability is displayed on FMA.

Note: The RNAV(GNSS) approach limitations must be used to perform an RNAV approach for which the GNSS is not required.

AUXILIARY POWER UNIT

GENERAL

Applicable to: ALL

APU START

After three consecutive APU start attempts, the crew must wait 60 min before a new start attempt.

ROTOR SPEED

Maximum N speed 107 %

Applicable to: A318, G-EUOA – G-EUPZ, G-EUOA – G-EUOI, G-EUUA – G-EUUZ, G-GATH – G-GATJ, G-GATN – G-GATU, G-TTOB – G-TTOE, G-EUYA – G-EUYY, G-MEDK, G-EUXC – G-EUXM, G-MEDF – G-MEDU, A320NEO, A321NEO

EGT

Maximum EGT for APU start (below 35 000 ft) 1 090 °C

Maximum EGT for APU start (above 35 000 ft) 1 120 °C

Maximum EGT for APU running (with 5 s confirmation for shutdown) 675 °C

Applicable to: G-DBCA – G-DBCK, G-MIDO – G-MIDY, G-GATK – G-GATM

EGT

Maximum EGT for APU start (below 25 000 ft) 900 °C

Maximum EGT for APU start (above 25 000 ft) 982 °C

Maximum EGT for APU running (with 5 s confirmation for shutdown) 682 °C

Maximum EGT for APU running (for immediate shutdown) 700 °C to 742 °C

APU START/SHUTDOWN DURING REFUELING/DEFUELING

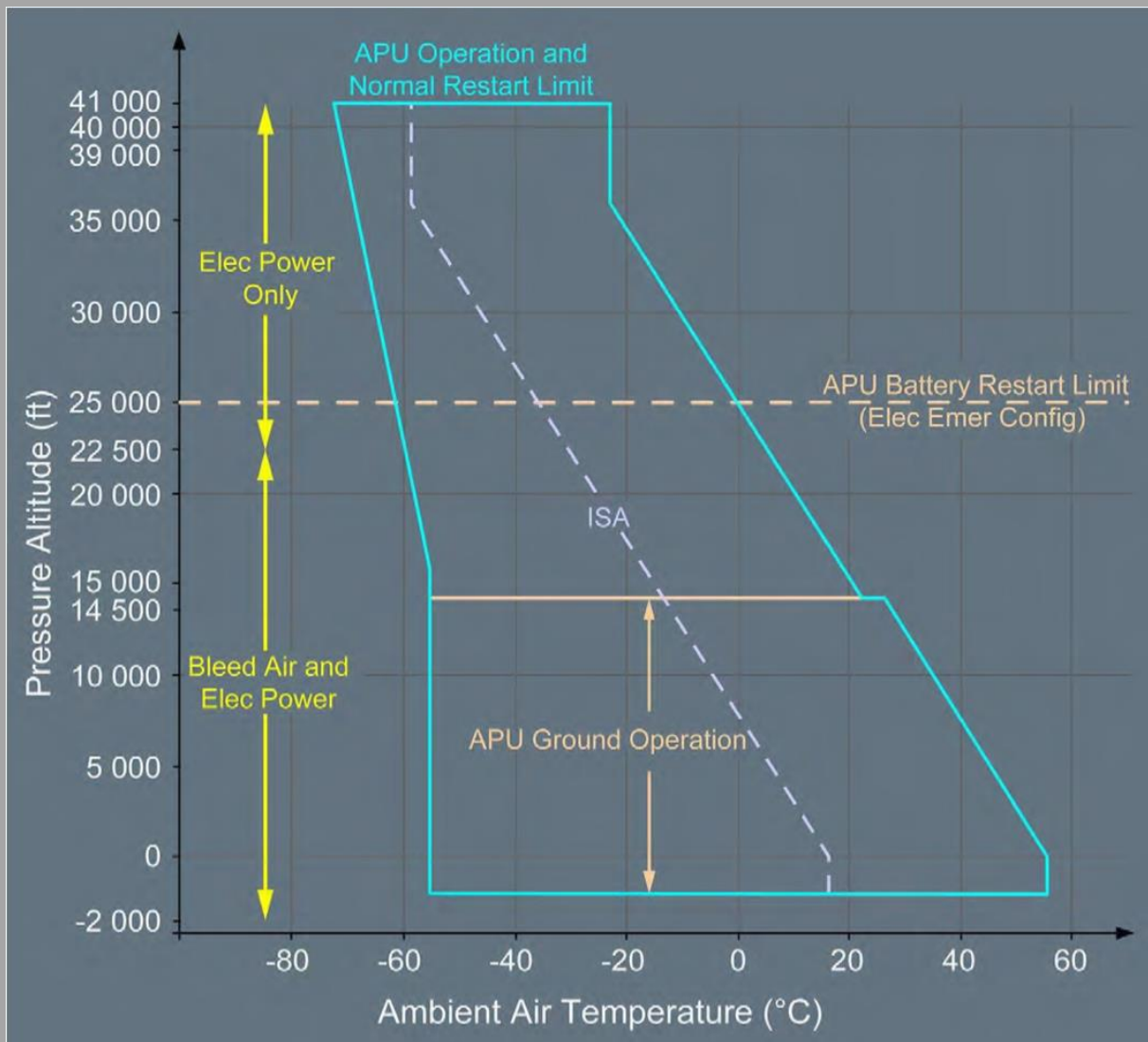
Applicable to: ALL

During refuel/defuel procedures, APU starts or shutdown are permitted with the following restrictions:

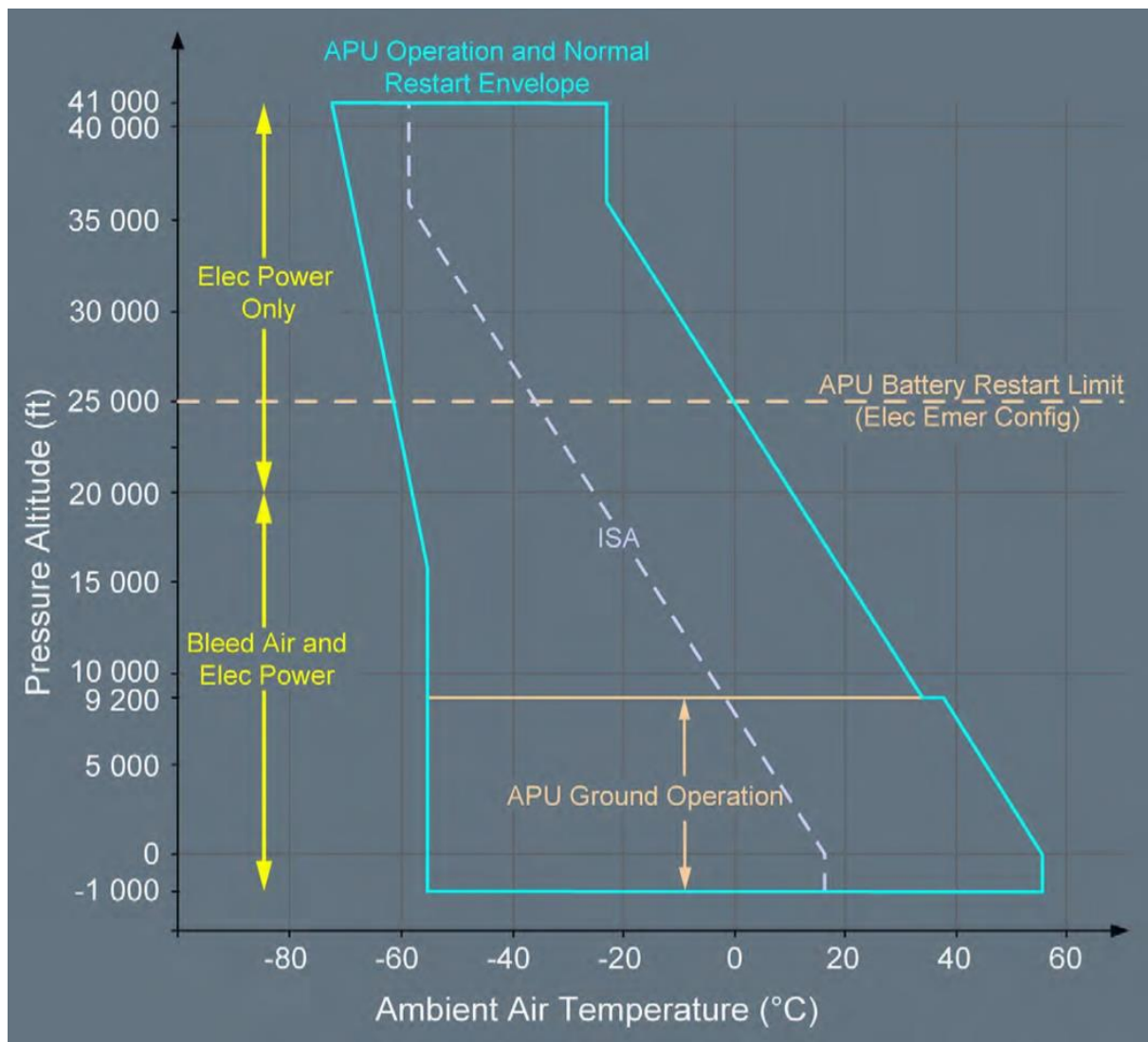
- If the APU failed to start or following an automatic APU shutdown, do not start the APU
- If a fuel spill occurs, perform a normal APU shutdown.

OPERATIONAL ENVELOPE

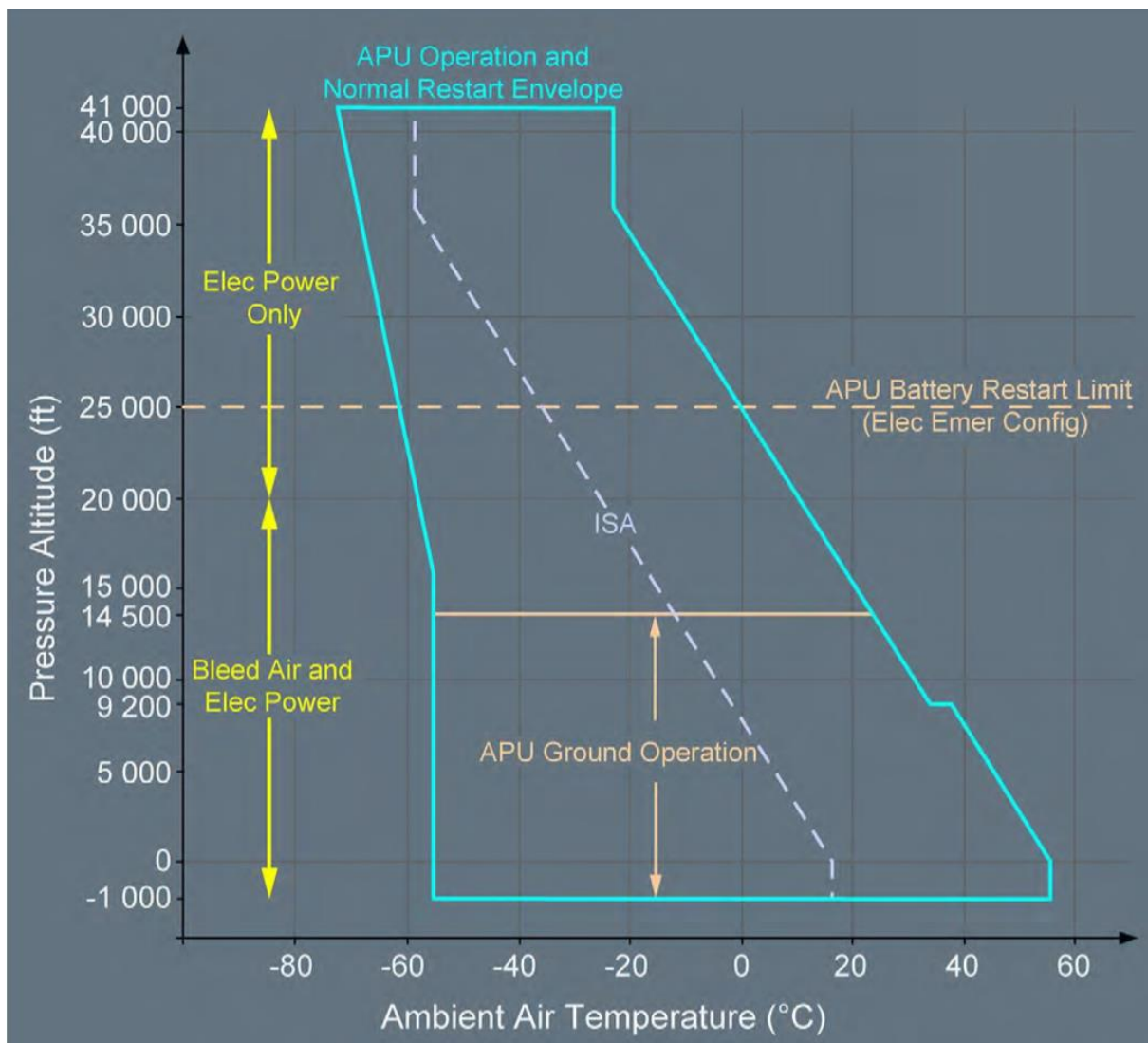
Applicable to: A318, G-EUOA – G-EUPZ, G-EUOA – G-EUOI, G-EUUA – G-EUUZ, G-GATH – G-GATJ, G-GATN – G-GATU, G-TTOB – G-TTOE, G-EUYA – G-EUYY, G-MEDK, G-EUXC – G-EUXM, G-MEDF – G-MEDU, A320NEO, A321NEO



Applicable to: G-DBCA – G-DBCK, G-MIDO – G-MIDY



Applicable to: G-GATK – G-GATM



Applicable to: A318, G-EUOA – G-EUPZ, G-EUOA – G-EUOI, G-EUUA – G-EUUZ, G-GATH – G-GATJ, G-GATN – G-GATU, G-TTOB – G-TTOE, G-EUYA – G-EUYU, G-MEDK, G-EUXC – G-EUXM, G-MEDF – G-MEDU, A320NEO, A321NEO

APU BLEED

Max altitude to assist engine start..... 20 000 ft
Max altitude for air conditioning and pressurisation (single pack operation)..... 22 500 ft
Max altitude for air conditioning and pressurisation (dual pack operation)..... 15 000 ft
Use of APU bleed air for wing anti-ice is not permitted.

Applicable to: G-DBCA – G-DBCK, G-MIDO – G-MIDY, G-GATK – G-GATM

APU BLEED

Max altitude to assist engine start..... 20 000 ft
Max altitude for air conditioning and pressurisation (single pack operation)..... 20 000 ft
Max altitude for air conditioning and pressurisation (dual pack operation)..... 15 000 ft
Use of APU bleed air for wing anti-ice is not permitted.

ENGINES
THRUST SETTING/EGT LIMITS
Applicable to: A318

Operating Conditions		Time Limit	EGT Limit
Takeoff(1) and Go-around	All engines operative	5 min	950 °C
	One engine inoperative	10 min	
Maximum Continuous Thrust (MCT)		Not limited	915 °C
Starting	On ground		725 °C
	In flight		

(1) Includes TOGA, FLEX and DERATE thrust modes.

Applicable to: A319 and A320CEO

Operating Conditions		Time Limit	EGT Limit
Takeoff(1) and Go-around	All engines operative	5 min	635 °C
	One engine inoperative	10 min	
Maximum Continuous Thrust (MCT)		Not limited	610 °C
Starting	On ground		635 °C
	In flight		

(1) Includes TOGA, FLEX and DERATE thrust modes.

Applicable to: A321CEO

Operating Conditions		Time Limit	EGT Limit
Takeoff(1) and Go-around	All engines operative	5 min	650 °C
	One engine inoperative	10 min	
Maximum Continuous Thrust (MCT)		Not limited	610 °C
Starting	On ground		635 °C
	In flight		

(1) Includes TOGA, FLEX and DERATE thrust modes.

Applicable to: A320NEO and A321NEO

Operating Conditions		Time Limit	EGT Limit
Takeoff(1) and Go-around	All engines operative	5 min	1 060 °C
	One engine inoperative	10 min	
Maximum Continuous Thrust (MCT)		Not limited	1 025 °C
Starting	On ground		750 °C
	In flight		875 °C

(1) Includes TOGA, FLEX and DERATE thrust modes.

SHAFT SPEEDS

Applicable to: A318

Maximum N1 104 %

Note: The N1 limit depends on the ambient conditions and on the configuration of the engine air bleed. These parameters may limit N1 to a value that is less than the above-mentioned N1 value.

Maximum N2 105 %

Applicable to: A319, A320CEO and A321CEO

Maximum N1 100 %

Note: The N1 limit depends on the ambient conditions and on the configuration of the engine air bleed. These parameters may limit N1 to a value that is less than the above-mentioned N1 value.

Maximum N2 116.5 %

Applicable to: A320NEO and A321NEO

Maximum N1 101 %

Note: The N1 limit depends on the ambient conditions and on the configuration of the engine air bleed. These parameters may limit N1 to a value that is less than the above-mentioned N1 value.

Maximum N2 100 %

OIL

Applicable to: A318

OIL TEMPERATURE

Maximum continuous temperature 140 °C

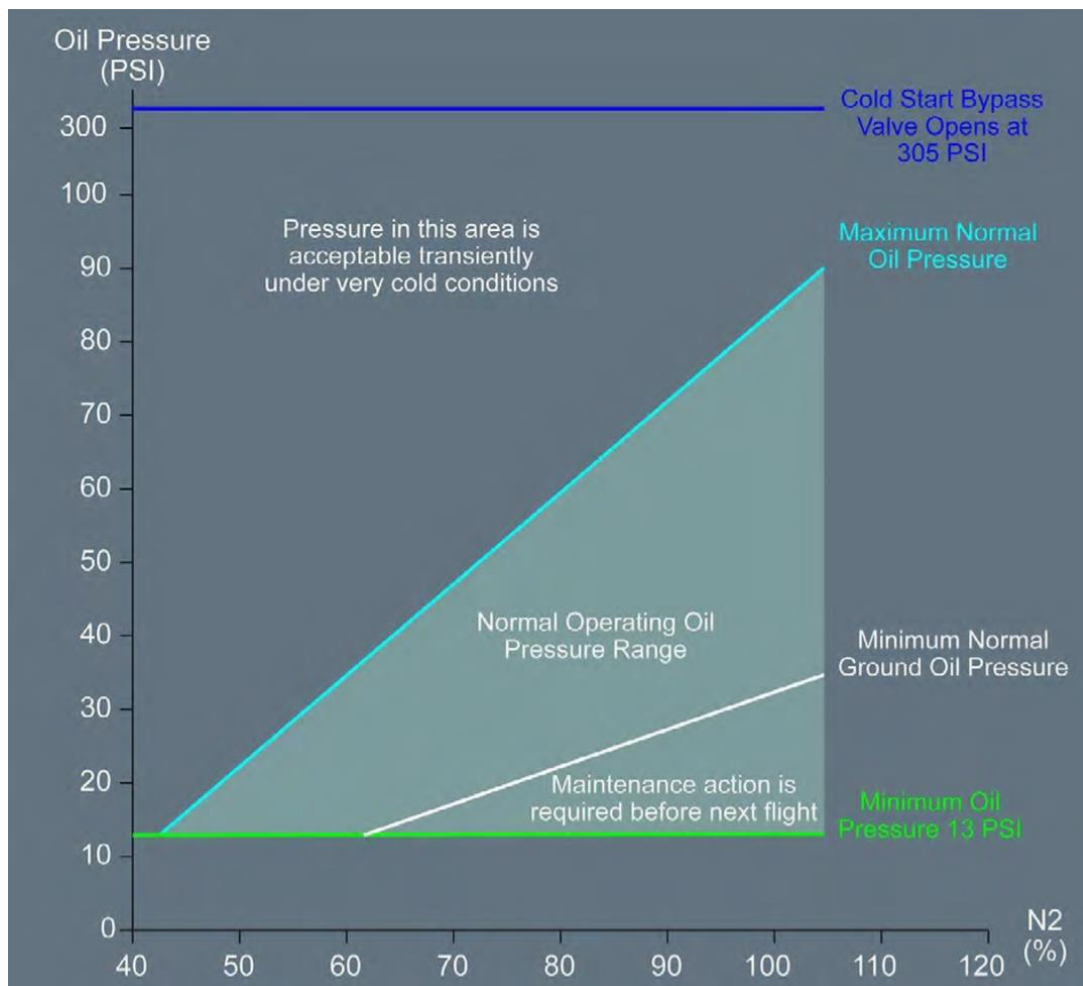
Maximum transient temperature (15 min) 155 °C

Minimum starting temperature -40 °C

Minimum temperature before takeoff -10 °C

OIL PRESSURE

MIN/MAX Oil Pressure (ECAM Indication)



Applicable to: A319, A320CEO and A321CEO

OIL TEMPERATURE

Maximum continuous temperature	155 °C
Maximum transient temperature (15 min)	165 °C
Minimum starting temperature	-40 °C
Minimum temperature before IDLE is exceeded	-10 °C
Minimum temperature before takeoff	50 °C

MINIMUM OIL PRESSURE

Minimum oil pressure	60 PSI

Applicable to: A320NEO and A321NEO

OIL TEMPERATURE

Maximum continuous temperature	140 °C
Maximum transient temperature (15 min)	155 °C
Minimum starting temperature	-40 °C
Minimum temperature before takeoff	19 °C

MINIMUM OIL PRESSURE

Minimum oil pressure	60 PSI

MAXIMUM OIL PRESSURE

Maximum oil pressure (when oil temperature is above 50 °C)	130.5 PSI
Maximum oil pressure (when oil temperature is below 50 °C)	145 PSI

STARTER

Applicable to: A318

- A standard automatic start that includes up to three start attempts, is considered one cycle
- For ground starts (automatic or manual), a 20s pause is required between successive cycles
- A 15min cooling period is required, subsequent to four failed cycles
- The starter must not be run when N2 is above 20%.

Applicable to: A319, A320CEO and A321CEO

- A standard automatic start that includes only one start attempt, is considered one cycle
- For ground starts (automatic or manual), a 15s pause is required between successive cycles
- A 30min cooling period is required, subsequent to three failed cycles or 5min of continuous crank
- For manual start, observe a two-minute maximum cycle time
- For crank, observe a 5min maximum cycle time
- The starter must not be run when N2 is above 10% on-ground and 18% in-flight.

Applicable to: A320NEO and A321NEO

- A standard automatic start that includes up to three start attempts, is considered one cycle
- For ground starts (automatic or manual), a 60s pause is required between successive cycles
- A 15min cooling period is required, subsequent to three failed cycles
- The starter must not be run when N2 is above 63%.

REVERSE THRUST

Selection of reverse thrust is prohibited in flight.

Backing the aircraft with reverse thrust is not permitted.

Maximum reverse should not be used below 70 kt. Idle reverse is permitted down to aircraft stop.

REDUCED THRUST TAKEOFF**Applicable to: A318****FLEX TAKEOFF**

Takeoff at reduced thrust, so-called as FLEX takeoff, is permitted only if the airplane meets all performance requirements at the takeoff weight, with the operating engines at the thrust available for the flexible temperature (TFLEX).

Takeoff at reduced thrust is permitted with any inoperative item affecting the performance only if the associated performance shortfall has been applied to meet the above requirements. FLEX takeoff is not permitted on contaminated runways.

TFLEX cannot be:

- Higher than TMAXFLEX, equal to ISA + 60 °C.
- Lower than the flat temperature (TREF).
- Lower than the actual OAT.

Applicable to: A319**FLEX TAKEOFF**

Takeoff at reduced thrust, so-called as FLEX takeoff, is permitted only if the airplane meets all performance requirements at the takeoff weight, with the operating engines at the thrust available for the flexible temperature (TFLEX).

Takeoff at reduced thrust is permitted with any inoperative item affecting the performance only if the associated performance shortfall has been applied to meet the above requirements. FLEX takeoff is not permitted on contaminated runways.

TFLEX cannot be:

- Higher than TMAXFLEX, equal to ISA + 65 °C.
- Lower than the flat temperature (TREF).
- Lower than the actual OAT.

Applicable to: A320**FLEX TAKEOFF**

Takeoff at reduced thrust, so-called as FLEX takeoff, is permitted only if the airplane meets all performance requirements at the takeoff weight, with the operating engines at the thrust available for the flexible temperature (TFLEX).

Takeoff at reduced thrust is permitted with any inoperative item affecting the performance only if the associated performance shortfall has been applied to meet the above requirements. FLEX takeoff is not permitted on contaminated runways.

TFLEX cannot be:

- Higher than TMAXFLEX, equal to ISA + 55 °C.
- Lower than the flat temperature (TREF).
- Lower than the actual OAT.

Applicable to: A321CEO

FLEX TAKEOFF

Takeoff at reduced thrust, so-called as FLEX takeoff, is permitted only if the airplane meets all performance requirements at the takeoff weight, with the operating engines at the thrust available for the flexible temperature (TFLEX).

Takeoff at reduced thrust is permitted with any inoperative item affecting the performance only if the associated performance shortfall has been applied to meet the above requirements. FLEX takeoff is not permitted on contaminated runways.

TFLEX cannot be:

- Higher than TMAXFLEX, equal to ISA + 42 °C.
- Lower than the flat temperature (TREF).
- Lower than the actual OAT.

Applicable to: A321NEO

FLEX TAKEOFF

Takeoff at reduced thrust, so-called as FLEX takeoff, is permitted only if the airplane meets all performance requirements at the takeoff weight, with the operating engines at the thrust available for the flexible temperature (TFLEX).

Takeoff at reduced thrust is permitted with any inoperative item affecting the performance only if the associated performance shortfall has been applied to meet the above requirements. FLEX takeoff is not permitted on contaminated runways.

TFLEX cannot be:

- Higher than TMAXFLEX, equal to ISA + 52 °C.
- Lower than the flat temperature (TREF).
- Lower than the actual OAT.

CROSSWIND OPERATION ON GROUND

Applicable to: A319, A320CEO and A321CEO

The engine is able to start in crosswind up to 35 kt.

Applicable to: A320NEO and A321NEO

ENGINE START

The engine is able to start in crosswind up to 45 kt.

TAKEOFF

Engine crosswind limit at takeoff..... 35 kt (gust included)

SOFT GO-AROUND

Applicable to: A320NEO and A321NEO

Use of GA SOFT mode is prohibited with one engine inoperative.

FLIGHT CONTROLS

MAXIMUM ALTITUDE FLATS/SLATS EXTENDED

Applicable to: ALL

Maximum operating altitude with slats and/or flaps extended 20 000 ft

USE OF FLIGHT CONTROLS

Applicable to: ALL

CAUTION

Rapid and large alternating control inputs, especially in combination with large changes in pitch, roll or yaw (e.g. large sideslip angles) may result in structural failures at any speed.

FUEL
FUEL TEMPERATURE
Applicable to: A318, A319 and A320CEO

	JET A1/JP8	JET A	JP5	RT	TS-1	JET B	JP4
MINI	-43 °C	-36 °C ⁽¹⁾	-42 °C	-45 °C	-45 °C	-46 °C	-54 °C
MAXI	54 °C					49 °C	

(1) For JET A only, if TAT reaches -34 °C, monitor the fuel temperature on the FUEL SD page, to ensure that it remains above -36 °C.

Note: The various types of fuel can be mixed in all proportions. However, in the case of fuel mixture, the minimum fuel specification values provided in the table above are no longer applicable.

Applicable to: A321CEO

	JET A1/JP8	JET A	JP5	RT	TS-1	JET B	JP4
MINI	-43 °C	-36 °C ⁽¹⁾	-42 °C	-45 °C	-45 °C	-46 °C	-54 °C
MAXI	54 °C						

(1) For JET A only, if TAT reaches -34 °C, monitor the fuel temperature on the FUEL SD page, to ensure that it remains above -36 °C.

Note: The various types of fuel can be mixed in all proportions. However, in the case of fuel mixture, the minimum fuel specification values provided in the table above are no longer applicable.

Applicable to: A320NEO and A321NEO

	JET A1/JP8	JET A	JP5	RT	TS-1
MINI	-43 °C	-36 °C ⁽¹⁾	-42 °C	-45 °C	-45 °C
MAXI	55 °C				

(1) For JET A only, if TAT reaches -34 °C, monitor the fuel temperature on the FUEL SD page, to ensure that it remains above -36 °C.

Note: The various types of fuel can be mixed in all proportions. However, in the case of fuel mixture, the minimum fuel specification values provided in the table above are no longer applicable.

MAXIMUM ALLOWED FUEL IMBALANCE

Applicable to: A318

The following tables indicate the maximum allowed wing imbalance at takeoff, in flight, and at landing.

FUEL IMBALANCE AT TAKEOFF, IN FLIGHT, AND AT LANDING
INNER TANKS (OUTER TANKS BALANCED)

Tank Fuel Quantity (Heavier Tank)	Maximum Asymmetry
Full	1 500 kg (3 306 lb)
4 300 kg (9 479 lb)	1 600 kg (3 527 lb)
2 250 kg (3 196 lb)	2 250 kg (4 960 lb)

The variation is linear between these values, and there is no limitation below 2 250 kg (4 960 lb).

OUTER TANKS

Maximum Asymmetry	690 kg (1 521 lb)⁽¹⁾

- (1) The maximum fuel imbalance in the outer wing fuel tanks (one full/one empty) is allowed provided that:
- The fuel quantity of the outer and inner wing fuel tanks of one side is equal to the fuel quantity of the outer and inner wing fuel tanks on the other side, or
 - On the side of the lighter outer tank, the fuel quantity of the inner tank is more than the fuel quantity of the opposite inner tank. The difference between the fuel quantity in the inner tanks should not be more than 3 000 kg (6 613 lb).

Note: In exceptional conditions (i.e. fuel system failure), the above-mentioned values for maximum fuel imbalance may be exceeded without significant effect to the aircraft handling qualities. The aircraft remains fully controllable in all flight phases.

Applicable to: A319, A320CEO and A320NEO

The following tables indicate the maximum allowed wing imbalance at takeoff, in flight, and at landing.

FUEL IMBALANCE AT TAKEOFF

INNER TANKS (OUTER TANKS BALANCED)

Tank Fuel Quantity (Heavier Tank)	Maximum Asymmetry
Full	500 kg (1 102 lb)
3 000 kg (6 613 lb)	1 050 kg (2 314 lb)
1 450 kg (3 196 lb)	1 450 kg (3 196 lb)

The variation is linear between these values.

OUTER TANKS (INNER TANKS BALANCED)

Maximum Asymmetry	370 kg (815 lb)

FUEL IMBALANCE IN FLIGHT AND AT LANDING

INNER TANKS (OUTER TANKS BALANCED)

Tank Fuel Quantity (Heavier Tank)	Maximum Asymmetry
Full	1 500 kg (3 306 lb)
4 300 kg (9 479 lb)	1 600 kg (3 527 lb)
2 250 kg (3 196 lb)	2 250 kg (4 960 lb)

The variation is linear between these values, and there is no limitation below 2 250 kg (4 960 lb).

OUTER TANKS

Maximum Asymmetry	690 kg (1 521 lb) ⁽¹⁾

- (2) The maximum fuel imbalance in the outer wing fuel tanks (one full/one empty) is allowed provided that:
- The fuel quantity of the outer and inner wing fuel tanks of one side is equal to the fuel quantity of the outer and inner wing fuel tanks on the other side, or
 - On the side of the lighter outer tank, the fuel quantity of the inner tank is more than the fuel quantity of the opposite inner tank. The difference between the fuel quantity in the inner tanks should not be more than 3 000 kg (6 613 lb).

Note: In exceptional conditions (i.e. fuel system failure), the above-mentioned values for maximum fuel imbalance may be exceeded without significant effect to the aircraft handling qualities. The aircraft remains fully controllable in all flight phases.

Applicable to: A321CEO

The following tables indicate the maximum allowed wing imbalance at takeoff, in flight, and at landing.

FUEL IMBALANCE AT TAKEOFF

Tank Fuel Quantity (Heavier Tank)	Maximum Asymmetry
Full	600 kg (1 323 lb)
3 400 kg (7 496 lb)	600 kg (1 323 lb)
1 200 kg (2 646 lb)	1 200 kg (2 646 lb)

The variation is linear between these values.

FUEL IMBALANCE IN FLIGHT AND AT LANDING

Tank Fuel Quantity (Heavier Tank)	Maximum Asymmetry
Full	1 320 kg (2 910 lb)
4 000 kg (9 479 lb)	1 450 kg (3 196 lb)
2 350 kg (5 180 lb)	2 350 kg (5 180 lb)

The variation is linear between these values, and there is no limitation below 2 350 kg (5 180 lb).

***Note:** In exceptional conditions (i.e. fuel system failure), the above-mentioned values for maximum fuel imbalance may be exceeded without significant effect to the aircraft handling qualities. The aircraft remains fully controllable in all flight phases.*

Applicable to: A321NEO

The following tables indicate the maximum allowed wing imbalance at takeoff, in flight, and at landing.

FUEL IMBALANCE AT TAKEOFF

Tank Fuel Quantity (Heavier Tank)	Maximum Asymmetry
Full	400 kg (882 lb)
3 000 kg (7 496 lb)	400 kg (882 lb)
700 kg (2 646 lb)	700 kg (1 543 lb)

The variation is linear between these values.

FUEL IMBALANCE IN FLIGHT AND AT LANDING

Tank Fuel Quantity (Heavier Tank)	Maximum Asymmetry
Full	1 320 kg (2 910 lb)
4 000 kg (9 479 lb)	1 450 kg (3 196 lb)
2 350 kg (5 180 lb)	2 350 kg (5 180 lb)

The variation is linear between these values, and there is no limitation below 2 350 kg (5 180 lb).

***Note:** In exceptional conditions (i.e. fuel system failure), the above-mentioned values for maximum fuel imbalance may be exceeded without significant effect to the aircraft handling qualities. The aircraft remains fully controllable in all flight phases.*

MINIMUM FUEL QUANTITY FOR TAKEOFF

Applicable to: ALL

Minimum fuel quantity for takeoff 1 500 kg (3 307 lb)

The ECAM alerts that are related to fuel low level in the wing tanks (**FUEL WING TK LO LVL**, etc.) must not appear for takeoff.

ICE AND RAIN PROTECTION**DEFINITION OF ICING CONDITIONS****Applicable to: ALL**

- Icing conditions exist when the OAT (on ground or after takeoff) or the TAT (in flight) is at or below 10°C and visible moisture in any form is present (such as clouds, fog with visibility of 1sm (1600m) or less, rain, snow, sleet or ice crystals).
- Icing conditions also exist when the OAT on the ground and for takeoff is at or below 10°C and operating on ramps, taxiways or runways where surface snow, standing water or slush may be ingested by the engines, or freeze on engines, nacelles or engine sensor probes.

DEFINITION OF SEVERE ICE ACCRETION**Applicable to: ALL**

Ice accretion is considered severe when the ice accumulation on the airframe reaches approximately 5mm (0.2in) thick or more.

DEFINITION OF THIN HOARFROST**Applicable to: ALL**

Thin hoarfrost is typically a white crystalline deposit which usually develops uniformly on exposed surfaces on cold and cloudless nights.

It is so thin that surface features (lines or markings) can be distinguished beneath it.

RAIN REPELLENT**Applicable to: ALL**

The flight crew should only use the rain repellent in the case of moderate to heavy rain.

LANDING GEAR

BRAKING SYSTEM

Applicable to: ALL

The braking system is not designed to hold the aircraft in a stationary position when a high thrust level is applied on at least one engine.

During ground procedures that require a thrust increase with braking, the flight crew must ensure that the aircraft remains stationary, and must be ready to immediately retard the thrust levers to IDLE.

BRAKE TEMPERATURE

Applicable to: ALL

Maximum brake temperature for takeoff (brake fans off) 300 °C

TAXI WITH DEFLATED OR DAMAGED TYRES

Applicable to: ALL

To vacate the runway or taxi at low speed with tire(s) deflated (not damaged), all of the following limitations apply:

- If maximum one tire per gear is deflated (consider three gears)
Maximum taxi speed during turn 7kt
- If two tires are deflated on the same main gear (maximum one main gear)
Maximum taxi speed 3kt
- For the nosewheel steering (NWS) angle
Maximum NWS angle 30°

In addition, if tire damage is suspected, the flight crew must ask for an aircraft inspection prior to vacate the runway or taxi. If the ground crew suspects that a tire burst may damage the landing gear, maintenance action is due.

NAVIGATION**INERTIAL REFERENCE SYSTEM (IRS)**

Applicable to: G-GATH – G-GATU, A320NEO, A321NEO

IR GROUND ALIGNMENT

Ground alignment of the IRS is possible in latitudes between 73° North and 73° South.

MAGNETIC (MAG) REFERENCE**■ If all ADIRUs have the same magnetic variation table:**

In NAV mode, the IR will not provide valid magnetic heading and magnetic track angle:

- North of 73° North, and
- South of 60° South.

Flying at latitudes beyond these limits is prohibited.

■ If one ADIRU has a different magnetic variation table:

In NAV mode, the IR will not provide valid magnetic heading and magnetic track angle:

- North of 60° North, between 30° West and 160° West, and
- North of 73° North, and
- South of 55° South.

Flying at latitudes beyond these limits is prohibited.

Applicable to: A318, A319, G-EUUA – G-EUUZ, G-EUYA – G-EUYY, G-MIDO – G-MIDY, G-MEDK, G-TTOB – G-TTOE, A321CEO

IR GROUND ALIGNMENT

Ground alignment of the IRS is possible in latitudes between 82° North and 82° South.

MAGNETIC (MAG) REFERENCE**■ If all ADIRUs have the same magnetic variation table:**

In NAV mode, the IR will not provide valid magnetic heading and magnetic track angle:

- North of 73° North, between 90° West and 120° West (magnetic polar region), and
- North of 82° North
- South of 60° South.

Flying at latitudes beyond these limits is prohibited.

■ If one ADIRU has a different magnetic variation table:

In NAV mode, the IR will not provide valid magnetic heading and magnetic track angle:

- North of 60° North, between 30° West and 160° West, and
- North of 75° North, and
- South of 55° South.

Flying at latitudes beyond these limits is prohibited.

OXYGEN

MINIMUM FLIGHT CREW OXYGEN PRESSURE

Applicable to: A318, A319, A320CEO, A321 CEO

REF Temperature ⁽¹⁾		°C	-10	0	10	20	30	40	50
		°F	14	32	50	68	86	104	122
MIN Bottle Pressure (PSI)⁽²⁾	2 Crewmembers		468	486	504	522	540	558	576
	2 Crewmembers + 1 OBS		606	629	652	675	698	721	744
	2 Crewmembers + 2 OBS		759	788	817	846	875	904	933

⁽¹⁾ REF Temperature :

- On ground : REF Temperature = (OAT + Cockpit TEMP) / 2
- In flight : REF Temperature = CAB TEMP (°C) - 10°C, or
REF Temperature = CAB TEMP (°F) - 18°F

⁽²⁾ Minimum Bottle Pressure to Cover:

- Preflight checks
- The use of oxygen, when only one flight crewmember is in the cockpit
- Unusable quantity (to ensure regulator operation with minimum pressure)
- Normal system leakage
- The most demanding case among the following:
 - Protection after loss of cabin pressure, with mask regulator on NORMAL (diluted oxygen):
 - During emergency descent for all flight crewmembers and observers for 13min
 - During cruise at FL100 for two flight crewmembers for 107min.
 - Protection against smoke with 100% oxygen for all flight crewmembers and observers during 15min at 8000ft cabin altitude.

Note: The above times that are based on the use of a sealed mask may be shorter for bearded crew (in terms of performance, pressure, or duration).

Applicable to: A3320NEO and A321NEO

REF Temperature ⁽¹⁾		°C	-10	0	10	20	30	40	50
		°F	14	32	50	68	86	104	122
MIN CAPT Indication (PSI)⁽²⁾	CAPT		460	480	500	520	540	550	570
	CAPT + 3 rd Occupant		650	680	700	730	750	780	800
MIN F/O Indication (PSI)⁽²⁾	F/O		460	480	500	520	540	550	570
	F/O + 4 th Occupant		650	680	700	730	750	780	800

⁽¹⁾ REF Temperature :

- On ground : REF Temperature = (OAT + Cockpit TEMP) / 2
- In flight : REF Temperature = CAB TEMP (°C) - 10°C, or
REF Temperature = CAB TEMP (°F) - 18°F

⁽²⁾ Minimum Bottle Pressure to Cover:

- Preflight checks
- The use of oxygen, when only one flight crewmember is in the cockpit
- Unusable quantity (to ensure regulator operation with minimum pressure)
- Normal system leakage
- The most demanding case among the following:
 - Protection after loss of cabin pressure, with mask regulator on NORMAL (diluted oxygen):
 - During emergency descent for all flight crewmembers and observers for 15min
 - During cruise at FL100 for two flight crewmembers for 105min.
 - Protection against smoke with 100% oxygen for all flight crewmembers and observers during 15min at 8000ft cabin altitude.

Note: The above times that are based on the use of a sealed mask may be shorter for bearded crew (in terms of performance, pressure, or duration).

SURVEILLANCE**GPWS/PREDICTIVE GPWS****Applicable to: ALL**

Aircraft navigation must not be based on the use of the terrain display .

The terrain display is intended to serve as a situation awareness tool only, and may not provide the accuracy on which to solely base terrain avoidance maneuvering.

The predictive GPWS functions should be inhibited (TERR pushbutton to OFF, on the GPWS panel) when the aircraft position is less than 15NM from the airfield:

- For operations from/to runways not incorporated in the predictive GPWS database.
- For specific approach or departure procedures, which have previously been identified as potentially causing expected or spurious terrain alerts.

Only aircraft with Man-made Obstacle Function can display obstacles on ND and trigger alerts, based on a dedicated database which includes artificial obstacles worldwide.

PRO – PROCEDURES
PRO-ABN – ABNORMAL PROCEDURES
PRO-ABN-01 Introduction

FCOM PROCEDURE LAYOUT

Applicable to: ALL

INTRODUCTION

The presentation of procedures is, as far as practicable, identical to the presentation on ECAM. The abbreviations are identical to those used on the cockpit panels.

All actions and information displayed on ECAM are provided in large letters. Other information, not on ECAM, is provided in small letters.

Expanded information is as far as practicable provided in layer 2. This information:

- Identifies the particular failures
- Explains actions for which the reason is not self-evident
- Furnishes additional background.

PROCEDURE TITLE

The title of an abnormal or emergency procedure, that appears on the ECAM, is on a white background.

Abnormal procedure displayed on ECAM (amber caution) :

TITLE

Emergency procedure displayed on ECAM (red warning) :

TITLE

The title of an abnormal or emergency procedure, that does not appear on the ECAM is on a grey background.

Abnormal procedure not displayed on ECAM :

TITLE

Emergency procedure not displayed on ECAM :

TITLE

SEVERAL ALERTS UNDER THE SAME TITLE

When applicable, several alerts may be grouped under the same procedure title. However, depending on the failure, the actions that the flight crew should perform may differ.

Note: Alerts that have the same procedure title may be differentiated by a subtitle (e.g. ENG FIRE (On Ground) versus ENG FIRE (In Flight)).

CONDITIONS

BLACK SQUARE

When several procedures appear under the same title, a black square marks the starting point of each procedure.

For example:

<u>ANTI ICE CAPT (F/O) (STBY) PROBES</u>	
☐ <u>CAPT PROBES</u>	a procedure to be applied
☐ <u>F / O PROBES</u>	b a or b or c
☐ <u>STBY PROBES</u>	c

Black squares also indicate parts of a procedure among which only one is applicable.

For example:

<u>BRAKES HOT</u>	
BRK FAN (if installed) ON	a procedure to be applied
☐ <u>ON GROUND</u>	b (a+b) or (a+c)
☐ <u>IN FLIGHT</u>	c

The ECAM does not display black squares.

BLACK DOT

If an action depends on a precondition, a black dot identifies the precondition. If the precondition appears on ECAM, it appears in LARGE LETTERS. If not, it appears in small letters.

For example:

F / CTL FLAPS FAULT	
FLAPS LEVER	RECYCLE
If unsuccessful :	
GPWS FLAP MODE	OFF

"If unsuccessful" does not appear on ECAM

INDENTATION

Indentation is used in order to identify when an action depends on a precondition/flight phase/procedure.

For example:

■ IN FLIGHT If Flaps locked <table border="0"> <tr> <td>APPR SPEED</td> <td>VREF +30</td> </tr> <tr> <td>MAX SPEED</td> <td>250 kt</td> </tr> </table>	APPR SPEED	VREF +30	MAX SPEED	250 kt
APPR SPEED	VREF +30			
MAX SPEED	250 kt			

- The APPR SPEED is equal to VREF +30 kt only if the flaps are locked, because "APPR SPEED.....VREF +30" is indented below "• If flaps locked".
- The MAX SPEED of 250 kt does not depend on the flaps locked condition because it is aligned with "• If Flaps locked". Therefore, MAX SPEED has to be respected whether the flaps are locked or not.

OPERATIONAL RECOMMENDATIONS

Applicable to: ALL

OVERVIEW

Abnormal and Emergency procedures involve actions that the flight crew must perform in order to ensure adequate safety, and help to make the remainder of the flight easier.

Abnormal and Emergency procedures are actions that the flight crew performs:

- After failures, that the ECAM detects, or
- After failures or situation, that the flight crew detects or encounters (e.g. CKPT WINDOW CRACKED, OVERWEIGHT LANDING), or
- After an aural alert (e.g. OBSTACLE AHEAD, PULL UP).

When the flight crew performs procedures, the flight crew uses the “READ” and “DO” principle (oral reading).

TASKSHARING

The general tasksharing shown below applies to all procedures.

The pilot's flying remains the pilot flying throughout the procedure.

The Pilot Flying (PF), is responsible for the:

- Thrust levers
- Control of flight path and airspeed
- Aircraft configuration (request configuration change)
- Navigation
- Communications.

The Pilot Monitoring (PM), is responsible for:

- Monitoring and reading aloud the ECAM and checklists
- Performing required actions, or actions requested by the PF, if applicable
- Using the engine master switches, cockpit C/Bs, IR and guarded switches, with PF's confirmation (except on ground).

MEMORY ITEMS

The following procedures are to be applied without referring to paper:

- CREW INCAPACITATION
- EGPWS
- Boxed actions of EMER DESCENT
- Immediate actions of UNRELIABLE SPEED INDICATION/ADR CHECK PROC
- LOSS OF BRAKING
- STALL RECOVERY
- STALL WARNING AT LIFT-OFF
- TCAS

- WINDSHEAR
- WINDSHEAR AHEAD

USE OF AUTOPILOT (AP)

The AP has not been certified in all configurations, and its performance cannot be guaranteed. If the pilot chooses to use the AP in such circumstances, extra vigilance is required, and the AP must be disconnected, if the aircraft deviates from desired or safe flight path.

For additional information, Refer to FCOM Limitations section (Auto Flight).

INITIATION OF PROCEDURES

Procedures are initiated on the Pilot Flying's command.

No action is taken (apart from cancelling audio warnings, through the MASTER WARN light) until:

- The appropriate flight path is established, and
- The aircraft is at least 400 ft above the runway, if a failure occurs during takeoff, approach, or go-around.

A height of 400 ft is recommended, because it is a good compromise between the necessary time for stabilization and excessive delay in procedure initiation.

In some emergency cases, provided that the appropriate flight path is established, the Pilot Flying may initiate actions before this height.

The flight crew can stop the procedure if the conditions for the application of the QRH procedure disappear.

LAND ASAP DEFINITION

If red LAND ASAP is part of the procedure, land as soon as possible at the nearest airport at which a safe landing can be made.

Note: red LAND ASAP information is applicable to a time-critical situation.

If amber LAND ASAP is part of the procedure, consider landing at the nearest suitable airport.

LANDING DISTANCE

Any increased landing distance, resulting from an emergency or abnormality, must be determined using QRH PER-C, or the LDG PERF application of FlySmart with Airbus.

ECAM

ECAM ALERT INHIBITION DURING TAKEOFF

Some ECAM alerts (non-inhibited) appear when the situation that prompts them occurs. Other ECAM alerts (inhibited) do not appear immediately, when the situation that prompts them occurs during takeoff.

IF AN ECAM ALERT DISAPPEARS WHILE APPLYING THE PROCEDURE

If an ECAM alert disappears, while a procedure is being applied, the flight crew can stop the procedure if there are no other indications that the failure is still present.

CREW COORDINATION

When carrying out a procedure displayed on ECAM, both pilots must be aware of the present display.

Before any "CLEAR" action, the pilots should crosscheck to confirm that there remains no blue message (except in case of no action feedback) that they can eliminate by a direct action.

NO CLEAR ACTION BEFORE CROSS-CONFIRMATION

Example of crew coordination and cross confirmation:

WARNING DISPLAY (Example, not for operational use)	PILOT FLYING	PILOT MONITORING
HYD B RSVR OVHT BLUE ELEC PUMP.....OFF	READ FAILURE TAKE ATC RADIO CTL – REQUEST ECAM ACTION (1)	READ FAILURE – READ ACTION (full line) – PERFORM ECAM ACTION OR REQUEST EXECUTION BY THE PF (thrust levers)
HYD B RSVR OVHT [B SYS LO PR]	*F/CTL – CHECK ECAM ACTION COMPLETED – CONFIRM CLEAR	– REQUEST CLEAR
SEAT BELTS *F/CTL	– CONFIRM CLEAR	– REVIEW ALL AFFECTED EQUIPMENT SHOWN IN AMBER ON F/CTL PAGE – REQUEST CLEAR
STATUS APPR PROC HYD LO PR INOP SYS IF BLUE OVHT OUT: CAT 3 BLUE ELEC PUMP ON BLUE HYD SPLR 3 CAT 2 ONLY SLATS SLOW	– CONFIRM REMOVE STATUS	– READ STATUS LINE BY LINE – REQUEST REMOVE STATUS

For standard calls, Refer to Standard Callouts.

(1) Although it is the responsibility of the pilot flying to request ECAM actions, this does not preclude the captain from either taking control of the aircraft or ordering ECAM actions he (she) considers to be necessary

Note: ECAM procedures and STATUS, supplemented by a PFD/ND check suffice for handling the fault.
However, before applying the ECAM procedures, the fault should be confirmed on the system display.

When ECAM actions have been performed, and ECAM STATUS has been reviewed, the flight crew may refer to FCOM procedure (FCOM/PRO/ABN) for supplementary information, if time permits.

PRO-NOR – NORMAL PROCEDURES
PRO-NOR-SOP – Standard Operating Procedures
General Information

Normal procedures are accomplished from memory and scan flows.

Normal procedures are accomplished on every flight and verify for each phase of flight that

- The aircraft configuration is satisfactory
- The flight deck configuration is correct

Normal procedures are written for a trained flight crew and assume that all systems operate normally and the full use of all automated features. NB: this does not preclude the possibility of manual flight for pilot proficiency where allowed.

BA-specific additions and procedures are indicated in blue text.

PF AND PM TASKS

On the ground until the aircraft starts to move, all duties are divided between the P1 and P2. From the start of the taxi phase until the after landing procedure is complete, duties are divided between the Pilot Flying (PF) and Pilot Monitoring (PM).

Each crewmember is responsible for moving the controls and switches in their area of responsibility.

The Captain may direct actions outside of the crewmembers area of responsibility.

The general PF phase of flight responsibilities are:

- Taxiing
- Flight path and airspeed control
- Aircraft configuration
- Navigation

The general PM phase of flight responsibilities are:

- Checklist reading
- Communications
- Tasks asked for by the PF
- Monitoring taxiing, flight path, airspeed, aircraft configuration and navigation

PF and PM duties may change during a flight. For example, the Captain could be the PF during taxi but the PM during takeoff through landing.

The FCU is the PF's responsibility. When flying manually, the PF directs the PM to make the changes on the FCU. PM may make FCU changes to heading and/or altitude without reference to PF in response to instructions given by ATC.

The Captain is the final authority for all tasks directed and done.

In role reversal, at Captain's discretion, P1 and P2 duties may be reversed wholly or in part.

When the PF is taxiing the a/c or hand flying, he should not carry out other activities, e.g. tune radios, select transponder codes, or make PAs. These must all be done by PM so that steering and lookout are not jeopardised. Additionally, when taxiing the PF should not read charts or books.

At no time will the PM touch the side stick in manual flight except in the following circumstances:

1. In an emergency if the PM intends to take over control of the aircraft, in which case they will state: "I have control", and press the sidestick priority pushbutton, keeping it pressed until the transfer of control is clearly established.
2. If PM is a Training Captain engaged in training duties or is the Captain of the aircraft. In this case they will clearly state the action they are taking.
3. When the PM uses the side stick transmit switch it is imperative that no side stick input is made. If this cannot be assured then the transmit switch on the ACP should be used.

ALTIMETER SETTING PROCEDURES

Changes to the BARO REF/Altimeter Setting must be confirmed and cross checked on each PFD and the STBY ALT/ISIS by all operating crew.

Altimeter barometric references must be set as follows:

QNH OPERATION

TAKE-OFF

QNH set on all altimeters.

CLIMB AND CRUISE ABOVE TRANSITION ALTITUDE

When above Aa and cleared above Transition Altitude (TA), PF initiates the altimeter change to STD by calling 'SET STANDARD'. Both pilots then set STD on their respective main altimeters and then visually crosscheck each other's altimeter. PM calls 'STD SET AND CROSSCHECKED'. The STBY ALT/ISIS should remain on QNH until above MSA and Transition Altitude.

Standard should normally be set for the cruise.

TOP OF DESCENT

The STBY ALT/ISIS should be set to the Destination QNH by TOD. The QNH BARO REF for the destination airfield may be preset on the FCU. After pre-setting the QNH both crew must check that STD is displayed on both PFDs.

DESCENT BELOW TRANSITION LEVEL

When cleared from a Flight Level to an altitude, PF initiates the altimeter change to the appropriate QNH by calling 'SET QNH'. Both pilots then set the appropriate QNH and visually crosscheck each other's altimeter. PM calls 'XXXX SET AND CROSSCHECKED'.

QFE OPERATION

At aerodromes where ATC clearances are referenced to metres QFE below Transition Height/Level, the QNH setting procedures detailed below are to be used provided the following criteria are met:

- The charts being used include QFE metres to QNH feet conversion tables (Navigraph & Aerosoft LIDO format charts provide this information)
- QNH is available on the ATIS or derived in accordance with the Note.

QFE OPERATIONS – QNH PROCEDURE

The QNH conversion tables on Navigraph & Aerosoft LIDO format charts allow crews to convert ATC descent/climb clearances from a QFE height in metres directly to a QNH altitude in feet.

All clearances below Transition Level should be received and read back in metres QFE. All selections made on the FCU are in feet QNH.

All conversions using the tables should be cross-checked by both pilots.

DEPARTURE

- Set QNH on all altimeters.
- Check that all altimeters indicate aerodrome elevation.
- All ATC clearances in QFE metres must be converted to QNH feet.

CLIMB AND CRUISE ABOVE TRANSITION HEIGHT

When above acceleration altitude and cleared above Transition Height to a FL, normal altimeter setting procedures apply.

TOP OF DESCENT

QNH and QFE must be obtained from the ATIS (or derived in accordance with the Note). The difference must be checked against threshold elevation hPa equivalent given on the relevant approach plate vertical profile.

Set QNH on the standby altimeter.

DESCENT BELOW TRANSITION LEVEL

All ATC clearances in QFE metres must be converted to QNH feet. When cleared from a Flight Level to height QFE metres, PF initiates the altimeter change to QNH by calling "SET QNH".

Both pilots then set the appropriate QNH and visually crosscheck each other's altimeter.

The PM calls "XXXX SET AND CROSSCHECKED".

AUTOTHRUST

During normal operations it is fleet policy that the ATHR, if available, is engaged during all phases of flight. The PF monitors ATHR operation at all times. During the approach the PF will rest one hand on the thrust levers.

BANK ANGLE

The recommended maximum bank angle for normal operations is 25°. This is consistent with that normally commanded by the autopilot/flight director. This is not an absolute limit. More bank will be used by the FMGS and more may be used manually when conditions demand it, e.g. holding in a strong cross wind, or localiser capture. However 30° of bank should not be exceeded deliberately.

DESCENT ENERGY MANAGEMENT

Establish speed and altitude management 'gates' for the planned approach. The agreed gates should specify a target speed, altitude and configuration based on the deceleration and descent rates specified below. They should take into account the likely approach routing, the winds at altitude and the surface winds.

During the descent and approach a continuous assessment of aircraft altitude and position, in relation to terrain clearance and track miles to touchdown, must be made; an example of a suitable point for such an assessment would be 10 track miles from touchdown. If any crew member assesses the aircraft approach profile as inappropriate this must be verbalised and appropriate action taken by the PF. The following table gives approximate target 'Gates' for still air with engine anti-ice OFF.

Distance	Height	Speed	Config
33	10000	250	Clean
20	6000	250	Clean
12	3600	210 or Green Dot	Flap 1
8	2400	180 or S speed	Flap 1

DECELERATION

The following table provides deceleration times and distance at idle thrust. Use of speedbrakes will reduce these times and distances by approximately 40%.

Speed Reduction	Time	Distance
350-210	2 mins 10 secs	10 nm
350-280	1 min	6nm
280-210	1 min 10 secs	4nm

ALTITUDE AWARENESS

When the 'Rad Alt' call is made/annunciated, both pilots will confirm their altimeter has QNH set and check that the terrain clearance is sensible with respect to aircraft altitude. Both pilots must confirm that the flight path is safe.

FLIGHT DIRECTORS

It is not permitted to select only one FD off. The PM must select both FDs ON or OFF at the same time.

NOISE ABATEMENT, ACCELERATION ALTITUDES AND THRUST REDUCTION

The normal take-off performance data is based on a default THR RED/ACC value of 1000 feet AAL and is valid for the ALL engines and SINGLE engine case.

When using CARD, if a different E/O Accel Alt (Aa) is stated this should be entered manually on to the Perf Take-off page in the FMGS (or from the take-off data page in the Performance Manual when using manual performance) and should be used for the ALL engines and SINGLE engine case (unless an ALL engines altitude is specified for noise abatement purposes).

Flight Crew should comply with these normal procedures unless CARD, NUBRF or the Performance Manual page specifies that the airfield-specific noise-abatement procedure is to be complied with.

Navigraph/Aerosoft LIDO AOI pages describe the NADP. NADP1 and TKOF PROC A can be complied with using the following:

Up to 1500 ft above aerodrome elevation:

- Take-off power.
- Take-off flaps.
- Climb maintaining SRS (approximately $V_2 + 10$ kt).

At 1500 ft AAL:

- Reduce power to not less than climb power.

From 1500 ft to 3000 ft AAL:

- Climb maintaining SRS (approximately $V_2 + 10$ kt).

At 3000 ft AAL:

- Accelerate in accordance with flap retraction schedule to climb speed.

The FMGC PERF TO page uses altitudes so this may be achieved by e.g. for an airfield at 200 ft AMSL:

THR RED/ACC	ENG OUT ACC
1700/3200	1200

THR RED 1700 feet (1500 AAL): 'LVR CLB' prompt on FMA.

ACC 3200 feet (3000 AAL): speed target increases towards 250 kt.

ENG OUT ACC 1200 feet (1000 AAL): reminder to crew but no effect on FMGS.

Missed Approach

The missed approach THR RED/ACC on the PERF GO AROUND page may be left as default unless specified on the Missed Approach ETP (If published).

The engine out missed approach acceleration altitude (ENG OUT ACC) should be set to the performance degraded Minimum Missed Approach Acceleration Altitude (MMAAA) or as specified on the Missed Approach ETP (If published).

The limiting factor in all cases is the 10 minute time limitation with TOGA thrust.

Where procedural speed limits are promulgated in the aerodrome booklets these should normally be complied with since there may be terrain considerations associated with the radius of turn.

MCDU PROCEDURES

Before taxi, the Captain or First Officer may make MCDU entries. The other pilot must verify the entries.

WARNING: Performance Data entry is a highly critical task. Procedures for data entry contained in this document are allocated in a way which improves data checking integrity between crew members. Follow these procedures carefully.

Make MCDU entries before taxi or when stopped if possible. If MCDU entries must be made during taxi, the PM makes the entries. The PF must verify the entries before they are activated.

In flight, the PF usually makes the MCDU entries when the autopilot is engaged. The PM may also make MCDU entries as tasked by the PF or in manual flight. The pilot making the entries activates the change only after the other pilot verifies the entries.

During high workload times, for example departure or arrival, try to reduce the need for MCDU entries. Do this by using the FCU heading, altitude and speed control modes. The FCU can be easier to use than entering complex route modifications in to the FCU.

BRIEFINGS

The style and tone of the briefing play an important role; interactive briefings – i.e., confirming the agreement and understanding of the PM after each phase of the briefing – provide more effective and productive briefings than an uninterrupted recitation terminated by the final query “Any questions?”.

Interactive briefings better fulfil an important purpose of the briefings: to provide the PF and PM with an opportunity to correct each other (e.g., confirming the use of the correct and effective departure/approach chart, confirming the correct setup of nav aids for the assigned takeoff/landing runway, etc).

Briefings should be structured (i.e., follow the logical sequence of the takeoff/departure or approach/landing) and concise.

The routine and formal repetition of the same points on each sector may become counterproductive; adapting and expanding the briefing by highlighting the special aspects of the airport and departure/approach procedure or the prevailing weather conditions and circumstances result in more lively and effective briefings. In short, the briefing should encourage effective listening to attract the PM's attention.

The briefing should therefore be conducted when the workload and availability of the PM permit effective communication.

Any aspect that may affect normal operation (e.g., system failures, weather conditions or other particular conditions) should be carefully evaluated and discussed.

The briefing should help both the PF (giving the briefing) and the PM (receiving and acknowledging the briefing) understand the sequence of events and actions, as well as the special hazards and circumstances of the takeoff, departure, approach and landing (i.e., by creating a common mental model of the takeoff or approach).

Whether anticipated or not, changes in an ATC clearance, weather conditions or landing runway require reviewing part of the initial briefing.

The takeoff briefing should be conducted while the aircraft is stationary (i.e., at the gate or other parking position).

Rushing during descent and approach is a significant factor in approach-and-landing incidents and accidents.

To prevent any rush in initiating the descent and the resulting increased workload in conducting the approach, the descent preparation and the approach and go-around briefings typically should be completed 10 minutes before reaching the top-of-descent.

USE OF NORMAL CHECKLIST

Applicable to: ALL

Airbus' NORMAL CHECKLIST takes into account ECAM information, and includes only those items that can directly impact flight safety and efficiency, if actions are not correctly performed. These checklists are of a "non-action" type (i.e. all actions should be completed from memory before the flight crew performs the checklist).

The NORMAL CHECKLIST includes 9 flight phases. The BEFORE START, BEFORE TAKEOFF, AFTER TAKEOFF and APPROACH checklists are divided in two sections: The "Down to the Line" section, and the "Below the Line" section. This format is designed to help flight crew manage the workload.

The Pilot Flying (PF) requests the NORMAL CHECKLIST, and the Pilot Monitoring (PM) reads it. The checklist actions are referred to as "challenge/response"-type actions. The PF "responds" to the "challenge" only after checking the current status of the aircraft in a considered and deliberate manner.

Level 2 information is provided to detail the intent of the checklist item and/or which cockpit display/panel to check.

If the configuration does not correspond to the checklist response, the PF must:

- Stop the checklist;
- Take corrective action before "responding" to the "challenge";
- Continue the checklist.

If it becomes apparent that an entire procedure was not done:

- Stop the checklist;
- Complete the entire procedure;
- Do the checklist from the start.

The PF may request that action is performed by the PM depending on the situation. If corrective action is not possible, then the PF must modify the response to reflect the real situation (with a specific answer). When necessary, the other flight crewmember must crosscheck the validity of the response.

The challenger (PM) waits for a response before proceeding with the checklist.

For the checklist items that are identified with (___), the response should correspond to the real condition or configuration of the system.

Normal Checklists should be initiated in a timely manner during low-workload periods to prevent unconscious completion, rushing or interruption that could defeat the safety purpose of the Normal Checklists.

Note: The Normal Procedures define the latest point by which each Normal Checklist must be initiated.

Critical items require response by the PF. These are indicated by an solid line:

CHALLENGE_____RESPONSE

Some less critical items may be both challenged and responded to by the PM alone. These are indicated by a dotted line:

CHALLENGE.....RESPONSE

The PM must announce "XXX CHECKLIST COMPLETED", after reading and completing the checklist.

Flight Preparation

WEATHER BRIEFING

The crew will get a weather briefing. The briefing should include:

- Actual and expected weather conditions, including runway conditions for takeoff and climb-out
- Significant weather enroute, including winds and temperatures
- Terminal forecasts for destination and 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 enroute icing conditions, and must consider the possibility of holding due to weather at the destination.

Weather briefing material is available from the [BAVirtual website](#) and on CIRRUS OFP documents from [Simbrief](#), PFPX etc.

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

In order to prevent the risks of projection of debris towards the trimmable horizontal stabilizer and the elevators, it is not recommended to takeoff from runways in bad condition (loose surface, under repair, covered with debris...)

NOTAM information is provided in the NUBRF section of CIRRUS OFP documents sourced from Simbrief, PFPX etc.

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 with VATSIM/IVAO as appropriate, in accordance with the prescribed procedures
- It agrees with the fuel flight plan routing.

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

OPTIMUM FLIGHT LEVEL

The flight crew should choose a flight level that is as close to the optimum as possible. The optimum flight level may be found on the PROG page of the MCDU.

As a general rule, an altitude that is 4 000 ft below the optimum produces a significant penalty (approximately 5 % of fuel). Flight 8 000 ft below the optimum altitude produces a penalty of more than 10 % against trip fuel. (The usual contingency allowance is 5 %).

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.

Ensure that both the captain and the first officer have verified that the fuel calculations and required fuel on board are correct and that the figure complies with the applicable regulations.

FUEL TRANSPORTATION

Fuel “tankering” will normally only take place where there is a significant favourable 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).

GENERAL

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

The following procedure ensures that all the required checks are performed before applying electrical power to avoid inadvertent operation of systems and danger to the aircraft and personnel.

Included is APU starting and the establishment of electrical and pneumatic power.

CREW ASSEMBLY

PF	PM
Crew assembly. Collate & check documentation: CIRBUS, NUBRF, weather, chartage. Discuss any points arising. Discuss load, fuel requirement, any extra fuel required.	
Commander approves fuel load requirement & loads fuel	Collates & checks all necessary documents & any supplementary information as required Enters ordered fuel on to flight plan Maintains written records throughout flight.

PRELIMINARY COCKPIT PREP

PF	PM
Plans to start FS & load the aircraft at the correct gate by STD -40 mins. If APU not already running, makes a visual check for engineering personnel working in the APU area and/or obtains engineering clearance to start the APU.	
Carries out exterior inspection Checks approach plates are available Carries out panel preparation Initializes Merlin	Carries out safety checks as required Obtains & records ATIS Checks approach plates are available Carries out panel preparation ENG MASTERS 1, 2..... CHECK OFF ENG MODE selector..... CHECK NORM * WEATHER RADAR.....OFF L/G lever..... CHECK DOWN Both WIPER selectors.....OFF BAT..... CHECK/AUTO EXT PWR pb-sw..... ON APU FIRE..... CHECK/TEST APU..... START When the APU is AVAIL: AIR COND panel.....SET * EXT PWR pb-sw.....AS RQRD * COCKPIT LIGHT.....AS RQRD * ECAM RCL pb.....PRESS * ECAM OXY PRESS/HYD QTY/ENG OIL QTY CHECK * SPD BRK LEVER..... CHECK RET & DISARMED * PARKING BRAKE handle..... ON * ACCU/BRAKES PRESS..... CHECK

COCKPIT PREPARATION

PF	PM
	<u>OVERHEAD PANEL</u> * ALL WHITE LIGHTS..... EXTINGUISH * RCRD GND CTL pb-sw ON CVR TEST pb TEST CAPT & PURS/CAPT sw PURS/CAPT * ALL IR MODE selector NAV EXTERIOR LIGHTS..... AS RQRD * SIGNS SET PROB/WINDOW HEAT AUTO LDG ELEV AUTO * PACK FLOW AS RQRD ELEC PANEL..... CHECK BAT CHECK ENG FIRE..... CHECK/TEST AUDIO SWITCH NORM VENT panel..... CHECK PA (3rd occupant) RECEPT MAINT PANEL CHECK <u>CTR INSTRUMENT PANEL</u> * STBY INSTRUMENTS/ISIS CHECK * CLOCK CHECK/SET * A/SKID N/W STRG sw ON <u>PEDESTAL</u> ACP CHECK SWITCHING PANEL..... NORM COCKPIT DOOR CHECK * THRUST LEVERS CHECK IDLE * ENG MASTER..... CHECK OFF * ENG MODE selector CHECK NORM PARKING BRAKE PRESS CHECK GRAVITY GEAR EXTN CHECK STOWED * ATC STDBY RMP SET * AIRFIELD DATA..... OBTAIN * MSG RECORD (MCDU)..... ERASE * ACARS/MERLIN..... INITIALIZE * FMS PREPARE
• When both pilots are seated <u>GLARESHIELD</u> * BAROMETRIC REFERENCE..... SET * FD CHECK ON * LS/ILS AS RQRD * ND mode and range SET * VOR/ADF selector AS RQRD	<u>GLARESHIELD</u> * BAROMETRIC REFERENCE..... SET * FD CHECK ON * LS/ILS AS RQRD * ND mode and range SET * VOR/ADF selector AS RQRD * FCU SET

LATERAL CONSOLE

OXY MASK TEST

PF INSTRUMENT PANEL

PFD-ND brightness ADJUST

LOUDSPEAKER SET

* PFD-ND CHECK

* LDG ELEV (ECAM) CHECK AUTO

* ECAM STATUS CHECK

FMGS DATA CONFIRMATION

* AIRFIELD DATA CONFIRM

* FMS PREPARATION CHECK

* ATC CLEARANCE CROSS CHECK

* IRS ALIGN CHECK

*FMGS CRITICAL DATA ENTRY

LOADSHEET CHECK

TAKEOFF DATA PREPARE and CHECK

INIT B INSERT

See [FMGS CRITICAL DATA ENTRY PROCEDURE](#)

PERF TAKEOFF INSERT

See [TAKEOFF DATA INSERTION PROCEDURE](#)

PRESET SPEEDS AS RQRD

* CHARTS/CHART APP PREPARE

* TAKEOFF BRIEFING PERFORM

LATERAL CONSOLE

OXY MASK TEST

PM INSTRUMENT PANEL

PFD-ND brightness ADJUST

LOUDSPEAKER SET

* PFD-ND CHECK

* ATC CLEARANCE OBTAIN

*FMGS CRITICAL DATA ENTRY

* ATC CODE SET

* CHARTS/CHART APP PREPARE

BEFORE PUSHBACK OR START

PF	PM
FOB.....CHECK SEATING POSITION ADJUST FMS PERF TO page..... SELECT BEFORE START C/L down to the line COMPLETE WINDOWS AND DOORS CHECK CLOSED THR LEVERS IDLE ACCU PRESS.....CHECK BAV MERLIN START If pushback is not required: PARK BRK handle CHECK ON BRAKE PRESS indicator CHECK BEFORE START C/L below the line COMPLETE If pushback is required: N/W STRG DISC MEMO CHECK DISPLAYED BEFORE START C/L below the line COMPLETE PARK BRK handle OFF When pushback is completed: PARK BRK handle..... ON BRAKE PRESS indicator CHECK When Headset Operative no longer rgrd: HEADSET OPERATIVE.....DISMISS	FOB CHECK SEATING POSITION ADJUST FMS F-PLN page..... SELECT EXT PWR.....CHECK AVAIL EXT PWR DISCONNECTION REQUEST BEFORE START C/L down to the line..... COMPLETE PUSHBACK/START CLEARANCE..... OBTAIN BEACON..... ON WINDOWS AND DOORS CHECK CLOSED ATC..... SET BAV MERLIN START BEFORE START C/L below the line COMPLETE BEFORE START C/L below the line COMPLETE

ENGINE START

PF	PM
ENG MODE selector IGN/START ENG 2 START ANNOUNCE ENG MASTER switch 2 ON ENG IDLE PARAMETERS.....CHECK ENG 1 START ANNOUNCE REPEAT THE START SEQUENCE	

AFTER START

PF	PM
ENG MODE selector NORM	Y ELEC PUMP AS RQRD
APU BLEED OFF	GND SPOILERS ARM
ENG ANTI-ICE AS RQRD	RUD TRIM ZERO
WING ANTI-ICE AS RQRD	FLAPS SET
APU MASTER switch AS RQRD	PITCH TRIM SET
	ECAM DOOR PAGE CHECK
AFTER START C/L COMPLETE	AFTER START C/L COMPLETE

TAXI

PF	PM
EXTERIOR LIGHTS SET	TAXI CLEARANCE OBTAIN
Taxi clearance obtained: PARKING BRAKE OFF THRUST LEVERS AS RQRD BRAKES CHECK	
Loadsheet received GW ANNOUNCE	LOADSHEET ACKNOWLEDGE & ACTION GW CONFIRM
ATC clearance obtained: FLT INST & FMA CHECK TERR ON ND AS RQRD DEPARTURE BRIEF PERFORM	ATC CLEARANCE CONFIRM FMGS F-PLN/SPD CHECK FCU ALT/HDG SET BOTH FD CHECK ON FLT INST & FMA CHECK RADAR and PRED WINDSHEAR SYS AS RQRD ATC CODE CONFIRM/SET TCAS TFC or TA/RA TERR ON ND AS RQRD
	CABIN REPORT MONITOR
Engine 2 Start required: START ENG 2 ORDER	OET Supplementary Procedure PERFORM
Engine 2 Started: FLT CTL CHECK	FLT CTL CHECK AUTO BRK MAX
When TO point confirmed: TO DATA CHECK	TO DATA CHECK
BEFORE TAKEOFF C/L down to the line..COMPLETE	BEFORE TAKEOFF C/L down to the line. COMPLETE

BEFORE TAKEOFF

PF	PM
	TAKEOFF/LINE UP CLEARANCE OBTAIN
APPROACH CLEAR OF TRAFFIC.....CHECK	CABIN CREW ADVISE
	PACKS 1+2.....AS RQRD
	EXTERIOR LIGHTS..... SET
TAKEOFF RUNWAY CONFIRM	
SLIDING TABLE STOW	SLIDING TABLE STOW
	BRAKE TEMP CHECK
	BRAKE FANS OFF
	ENG MODE selector.....AS RQRD
BEFORE TAKEOFF C/L below the line COMPLETE	BEFORE TAKEOFF C/L below the line COMPLETE

TAKEOFF

PF	PM
TAKEOFF ANNOUNCE	
BRAKES RELEASE	
THRUST LEVERS TOGA/FLEX	
DIRECTIONAL CONTROL USE RUDDER	
FMA ANNOUNCE	CHRONO START
Below 80 kt:	PFD/ND CHECK
AT 100 kt	N1 (EPR) CHECK
100 kt CHECK	THRUST SET ANNOUNCE
- AT V1: - AT VR:	PFD/ENG PARAMETERS SCAN
ROTATION PERFORM	ONE HUNDRED KNOTS ANNOUNCE
WHEN POSITIVE CLIMB:	V1 ANNOUNCE
L/G UP ORDER	ROTATION ORDER
AP AS RQRD	POSITIVE CLIMB ANNOUNCE
FMA ANNOUNCE	L/G SELECT UP
AT THR RED ALT:	
THRUST LEVERS CL	
FMA ANNOUNCE	PACK 1+2 (if applicable)..... ON
AT ACCEL ALT	
FMA ANNOUNCE	
AT F SPEED	FLAPS 1 SELECT
FLAPS 1 ORDER	
AT S SPEED	FLAPS 0 SELECT
FLAPS 0 ORDER	GND SPOILERS DISARM
	EXTERIOR LIGHTS..... OFF/RETRACT

AFTER TAKEOFF

PF	PM
	APU BLEED pb-sw AS RQRD
	APU MASTER sw AS RQRD
	ENG MODE selector AS RQRD
	ANTI ICE pb-sw AS RQRD
AFTER TAKEOFF/CLIMB C/L down to the line	AFTER TAKEOFF/CLIMB C/L down to the line
.....COMPLETE	 COMPLETE

CLIMB

PF	PM
MCDU PERF CLB FCU/FMGS SET IF AP ON When cleared to a Flight Level: BARO REF SET STD/X CHECK AFTER TAKEOFF/CLIMB C/L below the line COMPLETE RADAR ADJUST AS APPROPRIATE At 10 000 ft EFIS OPTION AS RQRD	MCDU F-PLN FCU/FMGS SET IF AP OFF BARO REF SET STD/X CHECK AFTER TAKEOFF/CLIMB C/L below the line COMPLETE ENG ANTI ICE AS RQRD LAND LIGHTS selector RETRACT SEAT BELTS sw AS RQRD EFIS OPTION AS RQRD ECAM MEMO REVIEW FUEL PRED UPDATE NAVAIDS CLEAR SEC F-PN AS RQRD OPT/MAX ALT CHECK Performed upon PF request or approval

CRUISE

PF	PM
 RADAR AS APPROPRIATE	ECAM MEMO/SYS PAGES REVIEW FLIGHT PROGRESS CHECK FUEL MONITOR NAV ACCURACY CHECK CABIN TEMP MONITOR

DESCENT PREPARATION

PF	PM
CHARTS PREPARE	WEATHER AND LANDING INFORMATION ...OBTAIN
LANDING PERFORMANCE COMPUTE	CHARTS PREPARE
FMS PREPARE	LANDING PERFORMANCE CHECK
	FMS PREPARATION CHECK
LDG ELEV CHECK	GPWS LDG FLAP 3 AS RQRD
AUTO BRK AS RQRD	
APPR BRIEFING PERFORM	
TERR ON ND AS RQRD	TERR ON ND AS RQRD
RADAR ADJUST AS APPROPRIATE	
	ENG ANTI ICE pb-sw AS RQRD
	WING ANTI ICE pb-sw AS RQRD
	DESCENT CLEARANCE OBTAIN
CLEARED ALTITUDE ON FCU SET	

DESCENT

In normal BA operations, “monitored approach” procedures are carried out. Approaching T/D and after the approach briefing has been completed, control of the aircraft is transferred. The Landing Pilot will be Pilot Monitoring for the duration of the descent, whilst the Non-Landing Pilot will become Pilot Flying. Control will be returned to the Landing Pilot at 1000R or when the required visual references are achieved, whichever is later.

LANDING PILOT	NON-LANDING PILOT
FMA CHECK	DESCENT INITIATE
MCDU F-PLN	FMA ANNOUNCE
	MCDU PROG/PERF DESCENT
	DESCENT MONITOR
	SPEEDBRAKES AS RQRD
	RADAR AS APPROPRIATE
TERR ON ND AS RQRD	TERR ON ND AS RQRD
ECAM STATUS CHECK	
At 10 000 ft:	
LAND LIGHTS AS RQRD	
SEAT BELTS ON/AUTO	
EFIS OPTION CSTR	EFIS OPTION CSTR
LS/ILS pb AS RQRD	LS pushbutton AS RQRD
RADIO NAV SELECT/IDENT	
ENG MODE selector AS RQRD	
APPR PHASE CONSIDER	
If GPS PRIMARY not available:	
NAV ACCY CHECK	NAV ACCY CHECK
When cleared to an Altitude:	
BARO REF SET/X CHECK	BARO REF SET/X CHECK

AIRCRAFT CONFIGURATION FOR APPROACH

LANDING PILOT	NON-LANDING PILOT
ENG MODE selector AS RQRD	<u>INITIAL APPROACH</u>
APPR PHASE ACTIVATE or set green dot ⁽¹⁾	F-PLN SEQUENCING ADJUST
NAV ACCURACY MONITOR	MANAGED SPEED CHECK
APPROACH C/L COMPLETE	FLIGHT PATH MONITOR
	SPEED BRAKES lever AS RQRD
	RADAR ADJUST AS APPROPRIATE
	APPROACH C/L COMPLETE
	<u>INTERMEDIATE/FINAL APPROACH</u>
At green dot:	
FLAPS 1 SELECT	FLAPS 1 ORDER
S SPEED CHECK OR SET ⁽¹⁾	
At 2 000 ft AGL minimum:	
FLAPS 2 SELECT	FLAPS 2 ORDER
F SPEED CHECK OR SET ⁽¹⁾	
When FLAPS 2:	
L/G SELECT DOWN	L/G DOWN ORDER
AUTO BRAKE CONFIRM	
GRND SPLRS ARM	
EXTERIOR LIGHTS SET	
When L/G down:	
FLAPS 3 SELECT	FLAPS 3 ORDER
ECAM WHEEL PAGE CHECK	
When FLAPS 3:	
FLAPS FULL SELECT	FLAPS FULL ORDER
SPEED TARGET CHECK OR SET ⁽¹⁾	
A/THR CHECK SPEED	
WING A. ICE (if not required) OFF	
SLIDING TABLE STOW	
LDG MEMO CHECK NO BLUE	
CABIN REPORT MONITOR	
LDG C/L COMPLETE	LDG C/L COMPLETE
FLT PARAMETERS MONITOR	ANNOUNCE ANY FMA MODIFICATION
Announce any deviation in excess of:	
- VS: 1 000 ft/min - IAS: speed target +10 kt; speed target -5 kt - PITCH: 2.5° nose down; 10° nose up (A318, A319, A320)/7.5° nose up (A321) - BANK: 7°	

(1) PF if AP is ON, PM if AP is OFF. The PF may request that this action is performed by the PM depending on the situation.

APPROACH USING LOC G/S GUIDANCE

LANDING PILOT	NON-LANDING PILOT
	<u>DESCENT PREPARATION</u> APPROACH MINIMUM..... DETERMINE APPROACH BRIEFING..... PERFORM <u>INTERMEDIATE APPROACH</u> APPR pb on FCU..... PRESS BOTH AP ENGAGE LOC CHECK ARMED G/S..... CHECK ARMED LOC CAPTURE MONITOR G/S CAPTURE..... MONITOR GO AROUND ALT SET ⁽¹⁾
FLT PARAMETERS..... MONITOR Announce any deviation in excess of: • LOC: ½ dot • GLIDE: ½ dot • At minimum: CONTINUE OR GO-AROUND..... ANNOUNCE	<u>FINAL APPROACH</u> • At 350 ft: LAND mode CHECK ENGAGED • At minimum +100ft: ONE HUNDRED ABOVE MONITOR/ANNOUNCE MINIMUM..... MONITOR/ANNOUNCE

(1) PF if AP is ON, PM if AP is OFF. The PF may request that this action is performed by the PM depending on the situation.

APPROACH USING FINAL APP GUIDANCE

LANDING PILOT	NON-LANDING PILOT
WEATHER AND LANDING INFO OBTAIN	<u>DESCENT PREPARATION</u> F-PLN A Page CHECK PROG Page COMPLETE GO AROUND STRATEGY REVIEW <u>DESCENT</u> - At 10 000 ft: NAV ACCURACY CHECK - For RNAV(GNSS) GPS PRIMARY CHECK BARO REF SET <u>INTERMEDIATE/FINAL APPROACH</u> POSITION MONITOR APPR pb on FCU PRESS APP NAV CHECK ARMED or ENGAGED FINAL CHECK ARMED - At Final Descent Point: FINAL APP CHECK ENGAGED GO AROUND ALT SET ⁽¹⁾ FLT PARAMETERS MONITOR Announce any deviation in excess of: - XTK > 0.1 nm - V/DEV > ½ dot - At minimum CONTINUE OR GO-AROUND ANNOUNCE
	At minimum +100ft ONE HUNDRED ABOVE MONITOR/ANNOUNCE MINIMUM MONITOR/ANNOUNCE

(1) PF if AP is ON, PM if AP is OFF. The PF may request that this action is performed by the PM depending on the situation.

APPROACH USING F-LOC F-G/S GUIDANCE

LANDING PILOT	NON-LANDING PILOT
WEATHER AND LANDING INFO OBTAIN	<u>DESCENT PREPARATION</u> F-PLN A Page CHECK FLS DATA CHECK G/S DESELECT FOR ILS G/S OUT PROG Page COMPLETE GO AROUND STRATEGY REVIEW
<u>DESCENT</u> • At 10 000 ft: LS PB ON	<u>DESCENT</u> • At 10 000 ft: LS PB ON FLS CAPABILITY CHECK • For RNAV(GNSS) FLS CAPABILITY CHECK F-APP BARO REF SET/CROSSCHECK
	<u>INTERMEDIATE/FINAL APPROACH</u> APPR pb on FCU PRESS F-LOC (LOC) CHECK ARMED F-G/S CHECK ARMED F-LOC (LOC) CAPTURE MONITOR F-G/S CAPTURE MONITOR GO-AROUND ALTITUDE SET
GO AROUND ALT SET ⁽¹⁾	
FLT PARAMETERS MONITOR Announce any deviation in excess of: • F-LOC > ½ dot • F-G/S > ½ dot • At minimum CONTINUE OR GO-AROUND ANNOUNCE	• At minimum +100ft ONE HUNDRED ABOVE MONITOR/ANNOUNCE MINIMUM MONITOR/ANNOUNCE

(1) PF if AP is ON, PM if AP is OFF. The PF may request that this action is performed by the PM depending on the situation.

APPROACH USING FPA GUIDANCE

LANDING PILOT	NON-LANDING PILOT
	<u>DESCENT PREPARATION</u> F-PLN A Page.....CHECK PROG Page..... COMPLETE GO AROUND STRATEGY REVIEW <u>DESCENT</u> - At 10 000 ft: NAV ACCURACY CHECK - For RNAV(GNSS) GPS PRIMARY CHECK <u>INTERMEDIATE/FINAL APPROACH</u> LATERAL GUIDANCE MODE ..SET FOR APPROACH - For LOC ONLY and ILS G/S OUT LOC pb-sw..... PRESS LOC CHECK ARMED - For back course localizer approaches: TRK FPA MODE..... USE FOR APPROACH LATERAL path INTERCEPT TRK FPA (Bird) SELECT FPA FOR FINAL APPROACH SET - At 0.3 nm from the Final Descent Point: FPA pb PULL FPA CHECK ENGAGED POSITION/FLT PATH MONITOR / ADJUST
GO AROUND ALT SET ⁽¹⁾ FLT PARAMETERS MONITOR Announce any deviation in excess of: - Approach using NAV MODE : XTK > 0.1 nm - Approach using LOC MODE : LOC ½ dot - Approach using TRK MODE : - VOR: ½ dot or 2.5° - NDB: 5° - At minimum CONTINUE OR GO-AROUND ANNOUNCE	- At minimum +100ft ONE HUNDRED ABOVE MONITOR/ANNOUNCE - MINIMUM MONITOR/ANNOUNCE

(1) PF if AP is ON, PM if AP is OFF. The PF may request that this action is performed by the PM depending on the situation.

LANDING PILOT	NON-LANDING PILOT
In stabilized approach conditions, at approx. 30ft: FLARE PERFORM THRUST LEVERS IDLE At touchdown: DEROTATION INITIATE BOTH THRUST LEVERS REV MAX or REV IDLE DIRECTIONAL CONTROL ENSURE At 70 kt BOTH THRUST LEVERS REV IDLE At taxi speed: REVERSERS.....STOW Before 20 kt AUTOBRK.....DISENGAGE	ATTITUDE MONITOR GRND SPOILERS CHECK/ANNOUNCE REVERSERS.....CHECK/ANNOUNCE DIRECTIONAL CONTROL MONITOR 70 kt ANNOUNCE

PF	PM
THRUST LEVERS TOGA	FLAPS SELECT AS RQRD
ROTATION PERFORM	FMA CHECK
GO-AROUND ANNOUNCE	POSITIVE CLIMB ANNOUNCE
FMA CHECK	L/G SELECT UP
L/G UP ORDER	FMA ANNOUNCE
AP AS RQRD	
NAV or HDG MODE AS RQRD	
At GA thrust red. altitude:	
THRUST LEVERS CL	
At GA ACCEL altitude:	
SPEED MONITOR	
AT F SPEED:	
FLAPS 1 ORDER	FLAPS 1 SELECT
AT S SPEED	
FLAPS 0 ORDER	FLAPS 0 SELECT
	GND SPOILERS DISARM
	EXTERIOR LIGHTS SET
AFTER TAKEOFF C/L DOWN TO THE LINE COMPLETE	AFTER TAKEOFF C/L DOWN TO THE LINE COMPLETE

AFTER LANDING

PF	PM
GRND SPLRS..... DISARM <i>(signal for PM to commence after landing items)</i>	LAND LIGHTS RETRACT STROBE LIGHTS AUTO OTHER EXT LIGHTS AS RQRD
	RADAR OFF/STBY PREDICTIVE WINDSHEAR OFF ENG MODE SEL..... NORM FLAPS RETRACT TCAS SET on standby APU START ANTI ICE..... AS RQRD AFTER LDG C/L COMPLETE
AFTER LDG C/L COMPLETE	Consider ONE ENGINE TAXI ARRIVAL ENG 2 SHUT DOWN Y ELEC PUMP ON

PF	PM
Approaching parking position:	SLIDES DISARM ORDER
At parking position:	
ACCU PRESS.....CHECK	
PARKING BRK ON	
ENG MASTER 1, 2 OFF	
SLIDES CHECK DISARMED	
Engines spooled down and Slides Disarmed:	
BEACON LT OFF	FUEL PUMPS OFF
OTHER EXTERIOR LIGHTS AS RQRD	ATC.....STDBY
SEAT BELTS OFF	IRS PERFORMANCE CHECK
	FUEL QTY CHECK
	STATUS.....CHECK
	BRAKE FAN.....OFF
DUs.....DIM	DUs.....DIM
PARKING C/L COMPLETE	PARKING C/L COMPLETE

PF	PM
PARKING BRK CHECK ON	ADIRS (1+2+3) OFF
	OXY CREW SUPPLY OFF
	EXTERIOR LIGHTS..... OFF
	MAINT BUS SW..... AS RQRD
	APU BLEED OFF
	APU MASTER SW OFF
	EMER EXIT LT OFF
	SIGNS..... OFF
	EXT PWR..... AS RQRD
	BAT 1+2..... OFF
SECURING THE A/C C/L COMPLETE	SECURING THE A/C C/L COMPLETE

PRO-NOR-EXP – EXPANDED NORMAL PROCEDURES
Preliminary Cockpit Preparation

GENERAL

Applicable to: ALL

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

The following procedure, performed by the PM, ensures that all the required checks are performed before applying electrical power to avoid inadvertent operation of systems and danger to the aircraft and personnel.

Included is APU starting and the establishment of electrical and pneumatic power.

DOCUMENTATION AND MAINTENANCE

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

AIRCRAFT POWER UP

Applicable to: ALL

ENG

ENG MASTERS 1, 2 OFF
ENG MODE selector NORM

***WEATHER RADAR**

* Power supply sw OFF
* Predictive Windshear sw OFF
* GAIN knob AUTO/CAL
* MODE selector AS RQRD

L/G

L/G lever DOWN

WIPERS

Both WIPER selectors OFF

ELEC

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

BAT 1 pb and BAT 2 pb CHECK OFF
BAT 1 and 2 VOLTAGE CHECK 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 min is required.

BAT 1 pb and BAT 2 pb AUTO
EXT PWR pb-sw ON

Check on ELEC SD PAGE that the battery contactor is closed and the batteries are charging.

- After 20 min:

BAT 1 pb and BAT 2 pb..... OFF
BAT 1 and 2 VOLTAGE..... CHECK ABOVE 25.5 V

If the APU is started on batteries only, it should be started within 30 min after the selection of the batteries to AUTO (35 min 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 h:**
BAT 1 pb and BAT 2 pb..... AUTO
- **If the AVAIL light is on:**
EXT PWR pb-sw..... ON

HYD

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

APU FIRE TEST/APU START

Applicable to: ALL

APU FIRE

APU FIRE pb-sw IN and GUARDED
AGENT lights OUT
APU FIRE TEST pb PRESS

Check:

- *APU FIRE warning on ECAM + CRC + MASTER WARN light (if AC Power available).*
- *APU FIRE pb-sw lighted red*
- *SQUIB light and DISCH light on*

APU START

- **If the EXT PWR pb-sw ON light is on:**
APU MASTER SW pb-sw ON
APU START pb-sw ON

Note: Wait at least 3 s before selecting APU START pb-sw.

EXT PWR pb-sw AS RQRD

The flight crew should keep ON the external power units to reduce the APU load, particularly in hot weather conditions.

- **If the EXT PWR pb-sw ON light is off:**
APU MASTER SW pb-sw ON
APU START pb-sw ON

Note: Wait at least 3 s before selecting APU START pb-sw.

AIR COND

Applicable to: ALL

AIR COND

- **When the APU is AVAIL:**
APU BLEED pb-sw ON

Do not use APU BLEED, if the ground personnel confirms that a LP or HP ground air unit is connected to the aircraft.

To determine if an HP ground air unit is connected, the flight crew should also check on the BLEED SD PAGE, if there is pressure in the bleed air system.

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

Full range temperature 24 ± 6 °C (75 ± 11 °F)

CARGO HEAT

Applicable to: ALL

CARGO HEAT

TEMPERATURE selector AS RQRD

COCKPIT LIGHTS

Applicable to: ALL

COCKPIT LIGHTS

* COCKPIT LIGHTS AS RQRD

Set INT LT, FLOOD LT, INTEG LT (including glareshield and FCU).

ECAM

Applicable to: A318

* ECAM

* RCL pb PRESS 3 s

This action recalls all the warnings that the flight crew cleared or cancelled during the last flight.

* Check MEL if required.

- **On the DOOR SD PAGE:**
* OXY CHECK PRESSURE
- **If the OXY pressure is half boxed in amber:**
MIN FLT CREW OXY CHART CHECK PRESSURE

Verify that the pressure is sufficient for the scheduled flight.

- **On the HYD SD PAGE:**
* RESERVOIR FLUID LEVEL CHECK WITHIN NORMAL RANGE
- **On the ENG SD PAGE:**
* ENG OIL QUANTITY CHECK NORMAL

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

ECAM

Applicable to: A319, A320 and A321

* ECAM

* RCL pb PRESS 3 s

This action recalls all the warnings that the flight crew cleared or cancelled during the last flight.

* Check MEL if required.

- **On the DOOR SD PAGE:**
* OXY CHECK PRESSURE
- **If the OXY pressure is half boxed in amber:**
MIN FLT CREW OXY CHART CHECK PRESSURE
Verify that the pressure is sufficient for the scheduled flight.
- **On the HYD SD PAGE:**
* RESERVOIR FLUID LEVEL CHECK WITHIN NORMAL RANGE
- **On the ENG SD PAGE:**
* ENG OIL QUANTITY CHECK NORMAL

Check that the oil quantity is at or above 9.5 qt + estimated consumption (average estimated consumption ~ 0.3 qt/h).

ECAM

Applicable to: A320NEO and A321NEO

- On the **DOOR SD PAGE**:
* OXY CHECK PRESSURE
- If the **OXY pressure is half boxed in amber**:
MIN FLT CREW OXY CHART CHECK PRESSURE
Verify that the pressure is sufficient for the scheduled flight.
- On the **HYD SD PAGE**:
* RESERVOIR FLUID LEVEL CHECK WITHIN NORMAL RANGE

Note: The volume of the hydraulic fluid in the reservoirs may change with Outside Air Temperature. As a result, the reservoir fluid level that appears on the HYD SD page may be outside of the normal range with no HYD RSVR LO AIR PR or HYD RSVR LO LVL warning. If the fluid level is outside of the normal range, contact maintenance to determine if service is required.

- On the **ENG SD PAGE**:
* ENG OIL QUANTITY CHECK NORMAL

Check that the oil quantity is at or above 10.6 qt + estimated consumption (average estimated consumption ~ 0.45 qt/h).

Note: If the engine oil quantity indication does not appear on the ENG SD page, set the ENG 1 and 2 FADEC GND PWR pb-sw on the overhead maintenance panel to ON. After the check of the engine oil quantity, set the ENG 1 and 2 FADEC GND PWR pb-sw to off.

BEFORE WALKAROUND

Applicable to: ALL

F/CTL

FLAPS CHECK POSITION

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

* **SPEEDBRAKE** lever CHECK RETRACTED and DISARMED

WARNING

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

*** PARKING BRAKE**

ACCU PRESS indicator CHECK

The ACCU PRESS indication must be in the green band. In case of low accumulator pressure, chocks are required before engine 1 shutdown.

PARKING BRAKE handle ON

When one brake temperature is above 500 °C, avoid applying the parking brake unless operationally necessary.

BRAKES PRESS indicator CHECK

Check for normal indications.

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

RAIN REPELLENT

RAIN RPLNT indicators CHECK PRESSURE and QUANTITY

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 panels CHECK

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

GEARS PINS AND COVERS

* GEARS PINS and COVERS CHECK ONBOARD and STOWED

Check that three are on board and stowed.

FAN COWL LATCH KEYS AND FLAGS

* FAN COWL LATCH KEYS and FLAGS CHECK ONBOARD and STOWED

Check that two keys and flags are on board and stowed.

Cockpit Preparation

INTRODUCTION

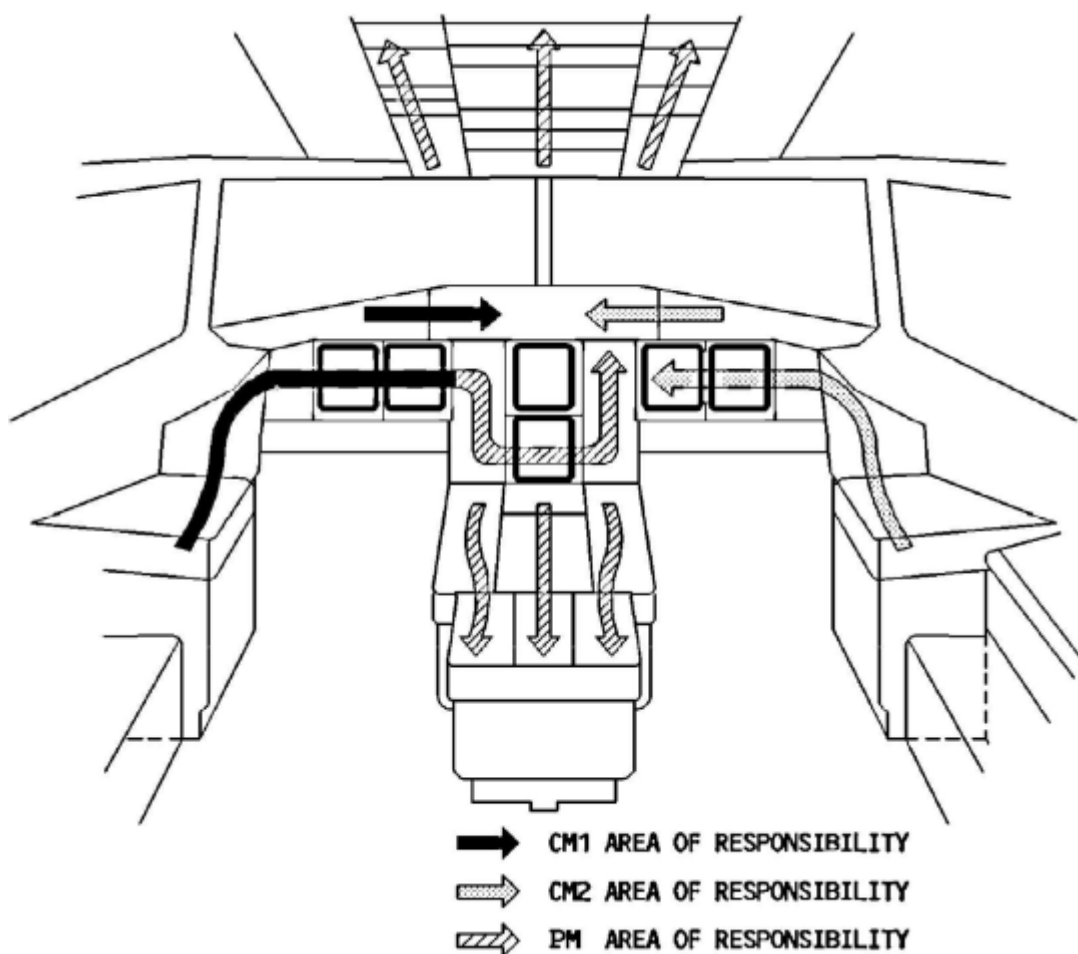
Applicable to: ALL

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

The PF and PM should perform the cockpit preparation according to the panel scan sequence defined below and the task sharing defined in the [Standard Operating Procedures](#) above.

PANEL SCAN SEQUENCE

Applicable to: ALL



OVERHEAD PANEL

Applicable to: ALL

WHITE LIGHTS ON THE OVERHEAD PANEL

- During the scan sequence of the overhead panel:
* ALL WHITE LIGHTS EXTINGUISH

It is a general rule to turn off all the white lights during the scan sequence; therefore, these actions are not listed here.

RCDR

* RCDR GND CTL pb-sw ON

In order to perform the test, ensure that the PARK BRK is on.

LOUDSPEAKER VOLUME knob OFF (BOTH SIDES)
ACP INT/RAD sw (CAPT and F/O) SET to INT
INTERPHONE VOLUME RECEPTION KNOB (CAPT and FO) RELEASE

Turn the volume down to the minimum.

CVR TEST pb PRESS AND MAINTAIN

The CVR test is successful when an audio test signal is heard through the loudspeakers and the CVR TEST pb is pressed and maintained.

Depending on the CVR model, the audio test signal is:

- For CVR 30 minutes:
 - A continuous tone, or
 - A short tone.
- For CVR 120 minutes:
 - A short tone, or
 - A short tone and a beep every 4 s, or
 - Two short tones and a beep every 4 s.

The audio test signal stops when the CVR TEST pb is released.

Note: - The flight crew may also hear an acoustic feedback (i.e. Larsen effect) during the test.

The test is still valid even if this acoustic feedback (i.e. Larsen effect) is heard.

EVAC

CAPT & PURS/CAPT sw AS RQRD

Usual position is PURS/CAPT.

***ADIRS**

All IR MODE selector NAV

Align or realign IRS as appropriate.

***SIGNS**

* SIGNS sw ON/AUTO

The seat belt signs are turned on once refuelling is complete.

* EMER EXIT LT selector ARM

Note: Leaving the EXIT selector or NO SMOKING selector or NO PORTABLE/ELEC DEVICE selector ON prevents the emergency batteries from charging. If the CIDS has been programmed for a non-smoking flight, NO SMOKING or NO PORTABLE/ELEC DEVICE signs are permanently on, with the EXIT sw or NO SMOKING sw or NO PORTABLE/ELEC DEVICE sw at AUTO (with permanent charge of emergency batteries).

PROBE/WINDOW HEAT

PROBE/WINDOW HEAT pb CHECK AUTO

CABIN PRESS

LDG ELEV knob AUTO

Applicable to: A319

***AIR COND**

* PACK FLOW selector AS RQRD

Select:

*LO if the number of passengers is below 138.
HI for abnormally hot and humid conditions
NORM for all other normal operating cases*

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

Applicable to: A320

***AIR COND**

* PACK FLOW selector AS RQRD

Select:

*LO if the number of passengers is below 141.
HI for abnormally hot and humid conditions
NORM for all other normal operating cases*

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

Applicable to: A321

***AIR COND**

* ECON FLOW pb AS RQRD

Select:

ON: ECON flow, if number of passengers is below 168

Off: For normal flow

If the APU is supplying, pack controllers select 120% of the normal flow automatically, independent of the pushbutton position.

Applicable to: A318

*AIR COND

- **If the external conditions are abnormally hot and humid:**
HI FLOW pb.....ON

If the APU bleed is supplying air-conditioning system, the controllers select HI flow automatically, independent of the crew selection.

Applicable to: ALL

ELEC

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

ELEC pb (on the ECAM Control Panel) PRESS
BAT 1 pb-sw and BAT 2 pb-sw OFF then ON

This action initiates a charging cycle of the batteries.

10s after setting all BAT pb-sw ON, check on the ELEC SD page that the current charge of the battery is below 60 A, and is decreasing.

- **If the charge of at least one battery is not below 60 A:**
Wait until the end of the charging cycle of the batteries and perform this check again.

Applicable to: A321

*FUEL

CAUTION	If the FUEL MODE SEL pb-sw is unduly left in the MAN position on ground, when the CTR TK L XFR pb-sw and CTR TK R XFR pb-sw are not in the OFF position: There is a possibility of fuel spillage. In this configuration, the center tank fuel transfer will not stop when the wing tanks become full.

FUEL MODE SEL pb-sw.....CHECK AUTO

Applicable to: A318, A319 and A320

*FUEL

- **If the centre tank is less than 200 kg (440 lb) for the flight:**

Apply the following procedure, if your airline is affected by FUEL CTR TK PUMPS LO PR cautions on ground or in flight when the centre tank is less than 200 kg (440 lb):

FUEL MODE SEL pb-sw MAN
CTR TK 1 pb-sw and CTR TK 2 pb-sw OFF

- **If the centre tank is NOT less than 200 kg (440 lb) for the flight:**

CAUTION

If the FUEL MODE SEL pb is unduly left in the MAN position on ground, when the CTR TK PUMP 1 pb & CTR TK PUMP 2 pb are not in the OFF position: There is a possibility of fuel spillage, if there are any hidden failures.

FUEL MODE SEL pb CHECK AUTO

Applicable to: ALL

ENG 1 – ENG 2 FIRE

ENG 1 FIRE pb-sw and ENG 2 FIRE pb-sw CHECK IN and GUARDED
AGENT 1 light and AGENT 2 light CHECK OFF
ENG 1 TEST pb and ENG 2 TEST pb PRESS AND MAINTAIN
The flight crew should maintain the TEST pb pressed during the time of the test.

TEST RESULT

Check that all ENG FIRE detection and extinguishing systems are operative:

- The continuous repetitive chime (CRC) sounds
- The MASTER WARN lights flash
- The ECAM displays the **ENG 1 FIRE**, **ENG 2 FIRE** alerts
- All ENG FIRE pb-sw come on red
- All **SQUIB** lights of the AGENT pb come on
- All **DISCH** lights of the AGENT pb come on
- All **FIRE** lights on the ENG MASTER panel come on.

AUDIO SWITCHING PANEL

AUDIO SWITCHING selector..... NORM

VENT

ALL LIGHTS.....CHECK OFF

THIRD OCCUPANT AUDIO CONTROL PANEL

PA knob RECEPT

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

MAINTENANCE PANEL

ALL LIGHTS.....CHECK OFF

CTR INSTRUMENT PANEL

Applicable to: WILCO/FEELTHERE

CTR INSTRUMENT PANEL – STBY INSTRUMENT

* STBY ASI CHECK
* STBY ALTI.....CHECK
* STBY HORIZON.....CHECK
Check no flag – Erect if necessary

Applicable to: AEROSOFT, FSLABS

CTR INSTRUMENT PANEL – ISIS

* ISIS CHECK

- Adjust brightness, check IAS, altimeter readings, altimeter settings and attitude display.
- Check no flags – reset attitude, if necessary.

Note: Use of the ISIS bugs function is not recommended.

Applicable to: ALL

*CLOCK

CLOCK CHECK/SET

Applicable to: ALL

NOSEWHEEL STEERING

* A/SKID & NW STRG sw ON

PEDESTAL

Applicable to: ALL

ACP

INT knob PRESS OUT / VOLUME CHECK

For FSLabs, make sure that INT is selected on and volume is turned up to permit contact with the GSX ground crew.

VHF CHECK

Check transmission and reception.

HF (if required for flight) CHECK

- Check transmission and reception
- Do not transmit on HF during refuelling.

SWITCHING PANEL

All selectors CHECK NORM

*ENG

* THRUST lever IDLE

* ENG MASTER sw OFF

* ENG MODE selector NORM

*PARKING BRK

ACCU PRESS indicator CHECK

The ACCU PRESS indicator 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 pressurised by the yellow electric pump. Ground crew clearance must be obtained before using the electric pump.

- * PARK BRK handle CHECK ON
- * BRAKES PRESS indicator CHECK

Check for normal indications

GRAVITY GEAR EXTN

GRAVITY GEAR EXTN CHECK STOWED

ATC

ATC STBY

Set code 2000 until a code is allocated by ATC. TCAS is on standby.

ALT RPTG ON
ATC SYS 1 SELECT

For RVSM operations, select SYS 1 if AP 1 is used, and SYS 2 if AP 2 is used.

Only system 1 is available in emergency electrical configuration.

RMP

Applicable to: ALL

RMP CHECK ON
Green NAV light CHECK OFF
SEL light CHECK OFF
COM FREQUENCIES TUNE

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

AIRFIELD DATA

Applicable to: ALL

* AIRFIELD DATA OBTAIN

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

ATC DATALINK COMMUNICATION

Applicable to: HOPPIE ACARS clients

* FLT INFO ENTER
* NETWORK LOG ON

Enter all relevant data including DEP/DEST, CALLSIGN, AIRCRAFT REGISTRATION etc. Ensure system is logged on to the Hoppie network and ready for use.

ACARS

Applicable to: ALL

* Initialize BAV MERLIN

Log in, select flight, enter CRZ ALT, ALTN, ATS ROUTE. Note PIREP ID number. Submit data so that system is primed ready to start just prior to pushback.

FMGS PREPARATION

Applicable to: FSLABS

At electrical power-up, the FMGSs and FCU run through various internal tests. Allow enough time (3 min) 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.

Applicable to: ALL

* ENGINE & AIRCRAFT TYPE CHECK

Press the DATA key, and display the STATUS page (if not displayed).

* FM database validity CHECK

- Check DATA BASE validity and stored WPT/NAVAIDS/RWY/ROUTES, if any. If applicable, review the stored data for deletion decision.
- If conducting a Connected Flight Deck flight, confirm that both pilots are using the same FM database and cycle.

* NAVAID DESELECTION AS RQRD

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

Applicable to: FSLABS

* FLIGHT PLAN INITIALIZATION COMPLETE

Flight Plan Initialization through ACARS

- File a flight plan with VATSIM or IVAO as appropriate
- Press the INIT key
- Fill the FLT NO field with the callsign **exactly as filed on the VATSIM/IVAO flight plan, including BAW/SHT** (e.g. SHT12N)
- Press the INIT REQUEST* prompt at 2R
When the flight plan is received, a message "AOC F-PLN UPLINK" is displayed on the MCDU scratchpad. The up-linked route is inserted in to the F-PLN and contains the airways segments, but not the runways, SIDS or STARS.
- Activate F/PLN
- Check FROM/TO

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

Applicable to: AEROSOFT, WILCO/FEELTHERE

* FLIGHT PLAN INITIALIZATION COMPLETE

Flight Plan Initialization through COROUTE

- Generate (e.g. through Simbrief, PFPX etc) and save required flightplan in appropriate format in appropriate folder. Normal BA COROUTE naming convention is to use the IATA codes of the departure and destination airfields followed by the route number, e.g. LHRLYS6.
- Press the INIT key
- Enter the file name of the coroute as saved (e.g. LHRLYS6) in to the CO RTE field
- Activate F/PLN
- Check FROM/TO
- Check/modify ALTN
- Enter (and/or check) cost index
- Enter intended initial CRZ FL, or check if it was already supplied by the database
- Modify it, if necessary, taking in to account ATC constraints or expected gross weight
- Check and modify CRZ FL TEMP and tropopause level to agree with forecast
- Press IRS INIT prompt
- Check alignment latitude/longitude

Applicable to: ALL

* ADIRS POSITION INITIALIZATION AS APPROPRIATE

Confirm or insert position co-ordinates for the IRS alignment.

* F-PLN A page COMPLETE AND CHECK

The flight 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, the SID, the TRANS using scroll keys.
Note: On the MCDU departure page, select only a runway associated with an ILS or NO NAVAIDS.
- Lateral revision at WPT for ROUTE modification if needed
- Vertical revision. Check or enter climb speed limit, constraints according to ATC clearance. Enter step altitude as appropriate.

* WINDS AS APPROPRIATE

* F-PLN CHECK

- Check the F-PLN using F-PLN page and ND PLAN mode vs the computer (paper) flight plan or navigation chart.

- Check DIST TO DEST along the F-PLN. Compare it with the total distance computed for the flight with the computer (paper) flight plan.

* SECONDARY FLIGHT PLAN AS APPROPRIATE

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

- Copy the active F-PLN, but modify it at a suitable WPT for an immediate return to the departure airfield in the event of, for example, engine failure*
- If weather is below landing minima at the departure airfield, the secondary flight plan should be that required for a diversion immediately after takeoff*
- 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.*

* RADIO NAV CHECK

- 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.
-

GLARESHIELD

Applicable to: ALL

*EFIS CONTROL PANEL

* BAROMETRIC REFERENCE SET

- Set QNH on the EFIS control panel and on the standby altimeter
- Check barometer settings and altitude indications on the PFD and standby altimeter

* FD CHECK ON

*LS AS RQRD

* ND MODE and RANGE AS RQRD

* ADF/VOR sw AS RQRD

Display VOR and ADF needles as needed.

Applicable to: ALL

*FCU

* SPD MACH window DASHED

* HDG V/S – TRK FPA pb HDG V/S

* ALT window INITIAL EXPECTED CLEARANCE ALT

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

INSTRUMENT PANELS

Applicable to: ALL

PFD and ND brightness knob AS RQRD

Check that the ND outer ring is set to maximum brightness (radar/terrain display).

* PFD CHECK

- 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

- Check for correct display
- Crosscheck compass indication on the ND
- Check heading, initial waypoint, VOR ADF indications.

ECAM CONTROL PANEL

Applicable to: ALL

*ECAM CONTROL PANEL

* PRESS pb PRESS

Check that the CAB PRESS page displays LDG ELEV AUTO, to confirm the correct position of the LDG ELEV knob.

* STS pb.....PRESS

Check the INOP SYS display is compatible with MEL.

FMGS DATA CONFIRMATION

Applicable to: ALL

* AIRFIELD DATA..... CONFIRM

* ATC CLEARANCE.....OBTAIN

* FMS PREPARATION CHECK

After the PM prepared the FMS, the PF check:

- The airfield data
- All FMS entered data
- ACARS/BAV Merlin is initialized

To check F-PLN A page:

- Select the EFIS CSTR pushbutton switch on
- Ensure that the inserted F-PLN agrees with planned route
- Use the scroll key to check the whole F-PLN thoroughly, using ND in PLAN mode as necessary. Tracks and distances between waypoints are displayed on the second line from the top of the MCDU. SID tracks and distances must be checked from the appropriate navigation charts.
- Check speed and altitude constraints. Add new speed or altitude constraints if required.

* ATC CLEARANCE.....CROSS CHECK

Both crew shall check the ATC CLEARANCE whether by DATALINK, TEXT or VOICE. PF shall verbalise CALLSIGN, departure RWY and SID from FPLN A page, PM shall check this against the DATALINK PDC, TEXT or voice ATC CLEARANCE recorded on CIRBUS.

* IRS ALIGN.....CHECK

On the POSITION MONITOR page, check that the IRS are in NAV mode, and check that the distance between each IRS and the FMS position is lower than 5 nm. Select ND in ROSE-NAV or ARC mode, and confirm that the aircraft position is consistent with the position of the airport, the SID and the surrounding NAVAIDs.

NAV CHARTS CLIPBOARD PREPARE

FMGS CRITICAL DATA ENTRY

Applicable to: ALL

This procedure may be carried out at any time after fuel loading has been completed and the Loadsheet (provisional or final) is available.

Throughout the procedure the Loadsheet and CARD or manual performance data should be available to be viewed by both pilots and P1 should check transfer of data to his MCDU to ensure the correct figures are loaded.

* LOADSHEET CHECK

The Captain should thoroughly check the Load and Trim Sheet (LTS), particularly for gross errors. Make sure that the loadsheet data is correct: correct flight, correct aircraft, configuration, Fuel On Board etc. Check that the takeoff CG is within the LTS operational limits.

* TAKEOFF DATA.....PREPARE AND CHECK

Use an approved takeoff performance calculator to calculate the takeoff performance. The PERF REQ function within the FSLabs ATSU is recommended as this is a very close simulation of the actual BA CARD system in both appearance and function.

For other models not incorporating performance tools, [Wabpro](#) is recommended.

If Late Closeout Procedures are in use, extract the takeoff performance for the provisional TOW +1 000 kg, or the RTOW for the runway in use if limiting. This will ensure that, should the TOW increase by up to 1 000 kg in the final loadsheet, the take off speeds, flap config and Flex Temperature need not be adjusted.

Both pilots must independently check the performance data for the correct information prior to entering the data in the MCDU PERF TAKE-OFF page.

GROSS WEIGHT INSERTION (INIT B PAGE):

* ZFW/ZFWCG.....INSERT

P1 checks the provisional or final Loadsheet data against CIRRUS data and reads aloud the ZFW and MACZFW. P2 checks these figures against CIRRUS and enters them in to his MCDU.

It is strongly recommended that the ZFW/ZFWCG is inserted manually rather than relying upon the Aerosoft automatic entry as this has been shown to be prone to errors.

* BLOCK FUEL INSERT

- *P2 enters the actual fuel on board and reads aloud the FMGS calculated TOW from his MCDU.*
- *P1 records the FMGS calculated TOW on the Performance Data printout. Both pilots check this against the Loadsheet TOW. Any discrepancy between the FMGS calculated TOW, the Loadsheet TOW and the Performance Data requested TOW must be explained.*
- *P1 reads aloud the Landing Weight, passenger total and the MACTOW.*

CAUTION

The characteristic speeds displayed on the MCDU (green dot, F, S, VLS) are computed from the ZFW and ZFWCG entered by the crew on the MCDU. Therefore, this data must be carefully checked.

- The flight crew should insert the weights after completing the F-PLN A page. This is to avoid cycles of prediction computations at each change in flight plan, constraints etc.
- If ZFW, ZFWCG and BLOCK FUEL are inserted, the FM will provide all predictions, as well as the EXTRA fuel, if any.

TAKEOFF DATA INSERTION (PERF TAKEOFF PAGE):

- * RWY CONFIRM
- * TO SHIFT AS RQRD

Enter the takeoff SHIFT distance, if takeoff is to be from an intersection

- * FLAPS reminder INSERT
- * FLX TO TEMP INSERT
- * ENG OUT ACC altitude SET or CHECK
- * V1, VR, V2 INSERT
- * THR RED/ACC altitude SET or CHECK

The normal THR RED/ACC ALT and engine out ACC ALT are set at same altitude, unless otherwise specified in the Performance Manual for a particular airfield/runway.

- * GREEN DOT AS RQRD

The PF reads aloud the Green Dot speed computed by the takeoff performance calculator. PM reads aloud the Green Dot speed computed by the FMGS (labelled 'CLEAN'). A discrepancy of more than 3 kts indicates a difference in the TOW used in both systems.

CLIMB, CRUISE, DESCENT, SPEED PRESELECTION

- * PRESET SPEEDS AS RQRD

If the flight is cleared for a close-in turn or close-in altitude constraint, the flight crew may preselect green dot speed on the PERF CLB page. Once the CLB phase is active, the preselected speed will be displayed in the FCU speed window and on the PFD (blue symbol). Once the turn is completed or the altitude cleared, the pilot will resume the managed speed profile by pressing the SPD selector on the FCU.

Similarly the pilot may select a CRZ MACH number on the PERF CRZ page (constant CRZ Mach segment, for example). When the CRZ phase is active, the preselected CRZ MACH number will be displayed in the FCU speed window and on the PFD. When ECON MACH number may be resumed, the crew presses the FCU SPD selector.

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

SPD LIM is defaulted to 250 kt below 10 000 ft in the managed speed profile. This may be either cleared or modified on the VERT REV page at the origin (or a climb waypoint).

CHARTS/CHART APP

Applicable to: ALL

ELECTRONIC CHARTING APP

* ELECTRONIC CHARTING APP SET

If an electronic charting app such as Navigraph, Aerosoft Charts, Aivlasoft EFB etc is being used, select and sequence charting for the planned departure. Also select and sequence charting for contingency procedures.

CAUTION

Distraction or excessive workload may occur if charting app is not correctly configured before critical flight phases.

CAUTION

Crews should consider the possibility of a non-normal event, e.g. airborne return, when setting up the chart clip, in order to minimise the potential for distraction during times of high work load.

PAPER CHARTS

* PAPER CHARTS PREPARE

If paper charts are being used, select and organise as appropriate.

TAKEOFF BRIEFING

Applicable to: ALL

* TAKEOFF BRIEFING PERFORM

Before Pushback or Start

BEFORE START CLEARANCE

Applicable to: ALL

FOB.....CHECK

- Check that the ECAM fuel on board corresponds to the F-PLN
- Check that fuel imbalance is within limits

SEATING POSITION

SEATING POSITION ADJUST

The viewpoint is correctly adjusted when the pilot's eyes are in line with the red and white balls on the windscreen centre post.

MCDU

FMS PERF TO page SELECT

It is recommended to display the PERF TO page on the PF side.

FMS F-PLN page SELECT

It is recommended to display the F-PLN page on the PM side.

ELEC

EXT PWR.....CHECK AVAIL

WARNING

Disconnection of the external power with the EXT PWR pb-sw ON may cause injury to the ground engineer. Request disconnection of the external power only with the EXT PWR pb-sw AVAIL.

EXT PWR DISCONNECTION.....REQUEST

BEFORE START CHECKLIST DOWN TO THE LINE

BEFORE START CHECKLIST DOWN TO THE LINE COMPLETE

CAUTION

No activities, except pushback procedures, engine start procedures and any non-normal procedures requiring immediate action, may be carried out from the commencement of the first engine start until the After Start checklist has been completed.

Taxi clearance must not be requested nor taxi commenced until the "After Start Checklist Complete" standard call has been made.

PUSHBACK/START UP CLEARANCE

PUSHBACK/START CLEARANCE.....OBTAIN

Obtain ATC pushback/startup clearance.

Obtain ground crew clearance.

EXTERIOR LIGHTS

BEACON sw ON

SIGNS SET

WINDOWS AND DOORS

WINDOWS and DOORS CHECK CLOSED

- To ensure that the sliding window is correctly closed and locked, push the handle of the sliding window fully forward to the closed position, and check that the red indicator is visible
- Check, on the ECAM lower display, that all the aircraft doors are closed
- Check that the cockpit door is closed and locked (no cockpit door open/fault indication).

THRUST LEVERS

THRUST LEVERS IDLE

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.

Applicable to: AEROSOFT, TOLISS

ATC XPDR

Applicable to: FEELTHERE/WILCO, FSLABS, FLIGHTFACTOR

ATC AUTO

TCAS remains in STBY. ALT RPTG should remain ON at all times.

Applicable to: ALL

ACCU PRESSURE

ACCU PRESS CHECK

The ACCU PRESS indicator must be in the green band.

PARKING BRAKE AND NOSEWHEEL STEERING

● If pushback is not required:

PARK BRK handle CHECK ON
BRAKES PRESS indicator CHECK

Check for normal indications.

BEFORE START CHECKLIST below the line COMPLETE

● If pushback is required:

N/W STRG DISC MEMO CHECK DISPLAYED

In case of pushback (conventional or towbarless), the nosewheel steering selector bypass pin must be in the tow position. The ECAM's NW STRG DISC, or N WHEEL STEERG DISC memos indicate this to the flight crew.

CAUTION

If the ECAM does not display the N WHEEL STEERG DISC memo, but the ground crew confirms that the tow pin is in the towing position, the flight crew should not start the engine during pushback. This is to avoid possible nose landing gear damage upon green hydraulic pressurization.

In case of a powerpush by the main landing gear, the nosewheel steering selector should remain in the normal position to steer the aircraft.

BEFORE START CHECKLIST below the line COMPLETE
PARK BRK handle OFF

CAUTION

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

● **When the pushback is completed:**

PARK BRK handle ON
BRAKE PRESS indicator CHECK

Check for normal indications.

GROUND CREW

● **When Headset Operative no longer required:**

HEADSET OPERATIVE DISMISS

In normal operations ground crew may be disconnected prior to engine stabilisation once the pushback (if required) has been completed and the park brake is set to ON.

In certain circumstances, such as unusual engine starts, consideration should be given to when ground crew clearance is given.

The ground crew:

- *Removes the chocks*
- *Disconnects the interphone*
- *Makes the hand signal on the left or right side.*

Engine Start

AUTOMATIC ENGINE START

Applicable to: A318

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 use the manual start procedure, instead the automatic procedure.

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

ENG MODE selector IGN/START

The lower ECAM displays the ENG SD PAGE.

ENGINE 2 START ANNOUNCE

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

ENG 2 MASTER sw ON

- Do not turn the ENG 2 MASTER sw ON before all amber crosses and messages have disappeared on the engine parameters (upper ECAM display).
- Parameter callouts are not mandatory.
- 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 ENG 2 MASTER sw. Then, perform a 30 s dry crank.

ON ECAM UPPER DISPLAY	ON ECAM LOWER DISPLAY
N2 increases	Corresponding start valve in line. Bleed pressure indication green. Oil pressure increases.
At 16% N2	Indication of the active igniter (A or B).
At 22% N2 - FF increases 15 s (maximum) after fuel is on - EGT increases - N1 increases	
At 50% N2	Start valve starts closing (it is fully closed between 50% and 56% N2). Igniter indication off.

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

ENG IDLE PARAMETERS CHECK

At ISA sea level: N1 about 19.5%
N2 about 58.5%
EGT about 390 °C
FF about 275 kg/h (600 lb/h)

Grey background on N2 indication disappears.

ENGINE 1 START ANNOUNCE
ENG 1 MASTER sw.....ON

Same procedure as for engine 2.

Both pack valves reopen with 30 s delay after the second engine N2 is above 50%.

Note: A PTU FAULT is triggered if the second engine is started within 40 s following the end of the cargo doors operation.

AUTOMATIC ENGINE START

Applicable to: A319, A320, A321

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 use the manual start procedure, instead the automatic procedure.

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

ENG MODE selector IGN/START

The lower ECAM displays the ENG SD PAGE.

ENGINE 2 START ANNOUNCE

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

ENG 2 MASTER sw ON

- Do not turn the ENG 2 MASTER sw ON before all amber crosses, except on N1 and N2, and messages, have disappeared on the engine parameters (upper ECAM display).
- Parameter callouts are not mandatory.
- 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 ENG 2 MASTER sw. Then, perform a 30 s dry crank.

ON ECAM UPPER DISPLAY	ON ECAM LOWER DISPLAY
N2 increases	Corresponding start valve in line. Bleed pressure indication green. Oil pressure increases.
30 s after ENG 2 MASTER sw is ON: - FF increases	Indication of the active igniter (A or B).
20 s (maximum) after fuel is on - EGT increases - N1 increases prior to 34% N2	
At 43% N2	Igniter indication off.
Slightly above 43% N2	Start valve crossline.

Note: When the FADEC detects an impending hung start or hot start, the FADEC applies an automatic recovery sequence without an ECAM message. The crew will notice that dual ignition (A+B) is applied, and that fuel will be commanded OFF, and then re-commanded ON within 0.5 s. It is not necessary for the crew to shut down the engine.

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

ENG IDLE PARAMETERS CHECK

At ISA sea level: EPR about 1.01
N1 about 21.4%
N2 about 57.8%
EGT about 414 °C
FF about 350 kg/h (775 lb/h)

ENGINE 1 START ANNOUNCE
ENG 1 MASTER sw.....ON

Same procedure as for engine 2.

Note: A PTU FAULT is triggered if the second engine is started within 40 s following the end of the cargo doors operation.

AUTOMATIC ENGINE START

Applicable to: A320NEO and A321NEO

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 use the manual start procedure, instead the automatic procedure.

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

ENG MODE selector IGN/START

The lower ECAM displays the ENG SD PAGE.

ENGINE 2 START ANNOUNCE

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

ENG 2 MASTER sw ON

- Do not turn the ENG 2 MASTER sw ON before all amber crosses, except on N1 and N2, and messages, have disappeared on the engine parameters (upper ECAM display).
- Parameter callouts are not mandatory.
- 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 ENG 2 MASTER sw. Then, perform a 30 s dry crank
- Depending on the engine thermal state, the FADEC can command an automatic dry cranking before the start of the engine. The dry cranking may last up to approximately one minute. During the dry cranking, the FADEC logic limits the maximum N2 to 30%. During the dry cranking, the vibration level increases but remains below the amber display limit in normal operating conditions.

ON ECAM UPPER DISPLAY	ON ECAM LOWER DISPLAY
N2 increases	Corresponding start valve in line. Bleed pressure indication green. Oil pressure increases.
Above 20% N2 when the automatic dry cranking is completed: - FF increases 15 s (maximum) after fuel is on: - EGT increases - N2 increases	Indication of the active igniter (A or B).
At 55% N2 At 63% N2	Igniter indication off. Start valve starts closing

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

ENG IDLE PARAMETERS CHECK

At ISA sea level: N1 about 19%
N2 about 68%
EGT about 520 °C
FF about 290 kg/h (650 lb/h)

Grey background on N2 indication disappears.

ENGINE 1 START ANNOUNCE
ENG 1 MASTER sw.....ON

Same procedure as for engine 2.

Both pack valves reopen with 60 s delay after the second engine thrust is at or above idle.

Note: A PTU FAULT is triggered if the second engine is started within 40 s following the end of the cargo doors operation.

After Start

AFTER START

Applicable to: ALL

CAUTION

No activities, except pushback procedures, engine start procedures and any non-normal procedures requiring immediate action, may be carried out from the commencement of the first engine start until the After Start checklist has been completed.

Taxi clearance must not be requested nor taxi commenced until the "After Start Checklist Complete" standard call has been made.

Applicable to: A318

ENG MODE

ENG MODE selector NORM

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

The last engine started must run for at least 2 min before takeoff initiation, to ensure that takeoff is not initiated before the center tank pumps test is finished, since takeoff on center tank is prohibited.

Applicable to: A319 and A320

ENG MODE

ENG MODE selector NORM

After a shutdown period greater than 2 h, to avoid thermal shock, the pilot should operate the engine at idle or near idle for at least 5 min before advancing the thrust lever to high power. Taxi time at idle may be included in the warm-up period.

The last engine started must run for at least 2 min before takeoff initiation, to ensure that takeoff is not initiated before the center tank pumps test is finished, since takeoff on center tank is prohibited.

Applicable to: A321

ENG MODE

ENG MODE selector NORM

After a shutdown period greater than 2 h, to avoid thermal shock, the pilot should operate the engine at idle or near idle for at least 5 min before advancing the thrust lever to high power. Taxi time at idle may be included in the warm-up period.

Applicable to: ALL

APU BLEED

APU BLEED pb-sw OFF

- This action enables to avoid ingestion of engine exhaust gases.
- APU BLEED valve closes, ENG BLEED valves open.

Applicable to: A319, A320 and A321

ANTI-ICE

CAUTION

In icing conditions the flight crew must turn on the engine anti-ice and should not wait until seeing ice building up.

ENG 1 ANTI ICE pb-sw and ENG 2 ANTI ICE pb-sw AS RQRD

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

During ground operation, when in icing conditions and the OAT is plus 3 °C or less, or if significant engine vibration occurs, the following procedure should be applied for ice shedding:

CAUTION

If, during thrust increase, the aircraft starts to move, immediately retard the thrust levers to IDLE.

If ground surface conditions and the environment permit, the flight crew should accelerate the engines to minimum 50 % of N1 at intervals not greater than 15 min. There is no requirement to maintain the high thrust settings.

In addition, this engine acceleration should also be performed just before take-off, with particular attention to engine parameters to ensure normal engine operation.

Note: When performing the static run-up, the 61-74 % N1 range should be avoided.

If ENG ANTI ICE is selected ON and the valve(s) do not open (FAULT light(s) remain on), increase the N2 of the associated engine by about 5 %.

When the valves are open, retard the thrust lever(s) to idle.

If ENG ANTI ICE is switched on, the IGNITION memo appears on the ECAM because continuous ignition is automatically selected.

Applicable to: A318

ANTI-ICE

CAUTION

In icing conditions the flight crew must turn on the engine anti-ice and should not wait until seeing ice building up.

ENG 1 ANTI ICE pb-sw and ENG 2 ANTI ICE pb-sw AS RQRD

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

During ground operation, when in icing conditions and the OAT is +3 °C or less, or if significant engine vibration occurs, the following procedure should be applied for ice shedding:

- Note:*
1. The flight crew must consider the taxi-in time from the previous flight and the taxi-out time of the current flight to determine the total taxi time
 2. If a maintenance task to de-ice the conditions was performed before engine start, the taxi-in time of the previous flight must be disregarded.

3. For taxi-in time, refer to Parking – Icing Conditions.

CAUTION	If, during thrust increase, the aircraft starts to move, immediately retard the thrust levers to IDLE.

If ground surface conditions and the environment permit, the flight crew should accelerate the engines to approximately 70% N1 for 30 s at intervals not greater than 30 min.

In addition, this engine acceleration should also be performed just before take-off, with particular attention to engine parameters to ensure normal engine operation. If ground surface or environment do not permit to accelerate the engine to 70% N1, then power setting and dwell time should be as high as practical.

When operating in conditions of freezing rain, freezing drizzle, freezing fog or heavy snow, ice shedding may be enhanced, by additional run ups at intervals, to not exceed 10 min, advancing throttles to 70% N1 momentarily (no hold time).

Applicable to: A320NEO and A321NEO

ANTI-ICE

CAUTION	In icing conditions the flight crew must turn on the engine anti-ice and should not wait until seeing ice building up.

ENG 1 ANTI ICE pb-sw and ENG 2 ANTI ICE pb-sw AS RQRD

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

During ground operation, when in icing conditions and the OAT is +3 °C or less, or if significant engine vibration occurs, the following procedure should be applied for ice shedding:

- Note:
1. The flight crew must consider the taxi-in time from the previous flight and the taxi-out time of the current flight to determine the total taxi time
 2. If a maintenance task to de-ice the conditions was performed before engine start, the taxi-in time of the previous flight must be disregarded.
 3. For taxi-in time, refer to Parking – Icing Conditions.

CAUTION	If, during thrust increase, the aircraft starts to move, immediately retard the thrust levers to IDLE.

If ground surface conditions and the environment permit, the flight crew should accelerate the engines to approximately 50% N1 for 5 s at intervals not greater than 60 min.

In addition, this engine acceleration should also be performed just before take-off, with particular attention to engine parameters to ensure normal engine operation. If ground surface or environment do not permit to accelerate the engine to 50% N1, then power setting and dwell time should be as high as practical.

If takeoff is not initiated within 120 min in ground icing conditions, the flight crew must request the maintenance personnel to perform an engine inspection in accordance with the applicable maintenance procedure.

Applicable to: ALL

WING ANTI ICE pb-sw.....AS RQRD

When icing conditions are encountered:

- The flight crew may turn on the wing anti-ice to prevent ice accretion on the wing leading edge.
- The flight crew must turn on the wing anti-ice if there is evidence of ice accretion, such as ice on the visual indicator, or on the wipers, or with the SEVERE ICE DETECTED alert. This is to remove any ice accumulation from the wing leading edge.

APU

- If the APU is not required:

APU MASTER SW..... OFF

ONE ENGINE TAXI DEPARTURE

Consider One Engine Taxi Supplementary Procedure.

Y ELEC PUMP AS REQD

GROUND SPOILERS

GROUND SPOILERS ARM

RUDDER TRIM

RUD TRIM position indication CHECK ZERO

- If the RUD TRIM position indication is not at zero:

RESET pb.....PRESS

Note: After the reset, the flight crew may observe an indication of up to 0.3 ° (L or R) in the RUD TRIM position indication.

FLAPS

FLAPS lever..... SET FOR TAKEOFF

FLAPS CHECK POSITION

Check the position of the flaps on the ECAM upper display.

- If taxiing in icing conditions with rain, slush or snow:

*Maintain the flaps retracted until the aircraft reaches the holding point of the takeoff runway.
This action prevents contamination of the slats/flaps mechanism.*

PITCH TRIM

PITCH TRIM handwheel SET

Set takeoff CG on pitch trim handwheel.

ECAM

- On the DOOR/OXY SD PAGE:

ALL SLIDES.....CHECK ARMED

N/W STEER DISC MEMO

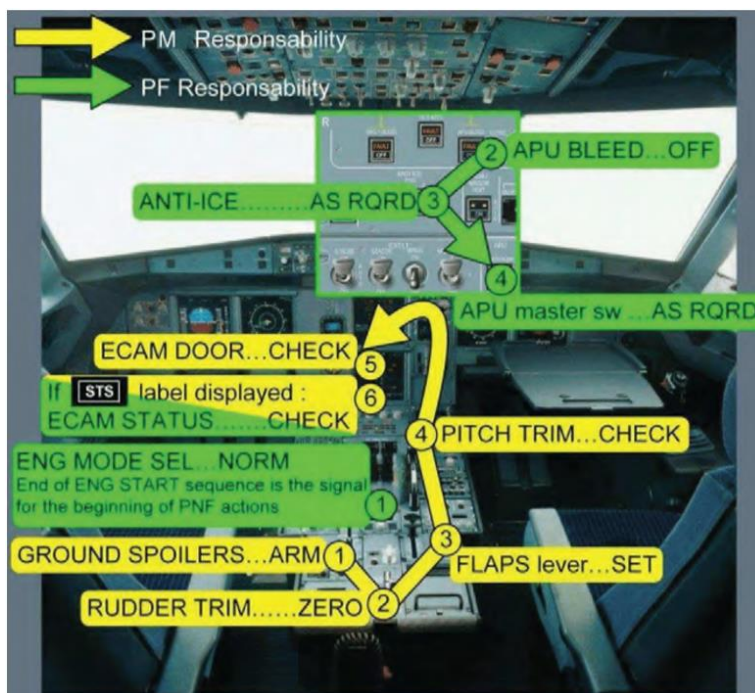
N/W STEER DISC MEMO CHECK NOT DISPLAYED

AFTER START CHECKLIST

AFTER START CHECKLIST COMPLETE

AFTER START – FLOW PATTERN

When the engines have started, the PF sets the ENG MODE selector to NORM to permit normal pack operation. At this time, the After Start Flow Pattern begins.



Note: Item 6 (ECAM STATUS) must not be checked until during the After Start checklist to minimise the threat to ground crew following distraction.

- Y ELEC PUMP is added to PM scan flow to facilitate One Engine Taxi.

Taxi

TAXI

Applicable to: ALL

TAXI CLEARANCE

TAXI clearance OBTAIN

EXTERIOR LIGHTS

NOSE sw TAXI

● **When crossing a runway:**

STROBE sw ON

RWY TURN OFF sw ON

The PF may ask the PM to set the exterior lights.

PARK BRK

PARK BRK handle OFF

BRAKES PRESSURE CHECK AT ZERO

The flight crew may observe slight residual pressure on the triple indicator for a short period of time.

THRUST LEVER

THRUST lever AS RQRD

The flight crew will need a little power above idle thrust to move the aircraft (approximately up to 40 % N1).

BRAKES

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.

BRAKE PEDALS PRESS

BRAKES CHECK

- *Once the aircraft starts moving:*

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

If an arc is displayed on the ECAM WHEEL SD PAGE, above the brake temperature, set the brake fans on.

NOSEWHEEL STEERING

TILLER or RUDDER PEDALS US AS RQRD

FLIGHT CONTROLS

FLIGHT CONTROLS CHECK

LATE CLOSEOUT PROCEDURE

LOADSHEET ACKNOWLEDGE & ACTION

The ACARS Final Loadsheel message is received and acknowledged.

If it is “COMPLIANCE WITH” then:

- ZFW is within +1 000 kg and -2 000 kg and
- MACZFW & MACTOW are within 2 % of the corresponding Provisional Loadsheel.
- No changes should be made to the FMGS provided the TOW does not exceed the TOPL.

If there are “REVISIONS TO” then:

- The significant changes must be adjusted in the FMGS and/or Pitch Trim wheel and cross-checked.
- Both pilots must confirm that the TO DATA remains valid or independently recalculate it.

PM confirms that LATE CLOSEOUT procedure has been completed.

GW ANNOUNCE/CONFIRM

PF verbalizes the GW from the SD, which PM cross-checks against the TOW from ACARS Final Loadsheel.

ATC CLEARANCE

ATC clearance CONFIRM

AFS/FLIGHT INSTRUMENTS

F-PLN (SID,TRANS) REVISE or CHECK

Carefully confirm that the ATC clearance agrees with the FMS, if NAV mode is to be used.

INITIAL CLIMB SPEED AND SPEED LIMIT MODIFY or CHECK

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

CLEARED ALTITUDE ON FCU SET
HDG ON FCU IF REQUIRED, PRESET

If a heading is required by the ATC after takeoff, in case of a radar vector departure, preset the heading on the FCU. NAV mode will be disarmed.

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

BOTH FD CHECK ON
FMA CHECK
PFD/ND.....CHECK

RADAR (if required) ON
To check the radar and the departure path, set the TILT sw to MAN. The flight crew can then set the radar to the AUTO position.

PREDICTIVE WINDSHEAR SYSTEM AUTO

ATC

ATC code/mode CONFIRM/SET FOR TAKEOFF
TCAS Mode Selector TA/RA

TERR ON ND

TERR ON ND AS RQRD

- *In mountainous areas, consider displaying terrain on ND.*
- *If use of radar is required, consider selecting the radar display on the PF side, and TERR ON ND on the PM side only.*

AUTO BRK

AUTO BRK MAX pb-sw ON

DEPARTURE BRIEFING

DEPARTURE BRIEF PERFORM

PF may update the Departure Briefing once ATC Departure clearance (RWY & SID) is obtained. This may be before the takeoff point (Intersection) is known. Maximum use should be made of the PFD, ND and EWD to check that the FMGS has been set up for the cleared departure. Refer to DEPARTURE BRIEF for more information.

RUNWAY: PF shall verbalize the RUNWAY from which departure has been cleared and the RWY designator with position relative to the aircraft (ND).

SID: PF shall verbalize the cleared SID, checking the gross flight path (ND) and Stop Altitude (PFD).

EXTRAS: PF verbalizes any other pertinent items, especially where these have changed since the TAKEOFF brief BEFORE START, and checks PM's understanding.

TAKEOFF DATA/CONDITIONS

If takeoff data has changed, or in case of a runway change, prepare updated takeoff data, as appropriate. The PM will carry out the critical data entry whilst PF taxis the aircraft. An independent cross-check must be performed by PF after handing over control to PM or after the aircraft has been brought to a stop and the park brake has been set.

F-PLN (Runway) REVISE
FLAPS lever AS APPROPRIATE

Select takeoff position.

V1, V2, VR REINSERT
FLX TO temperature REINSERT

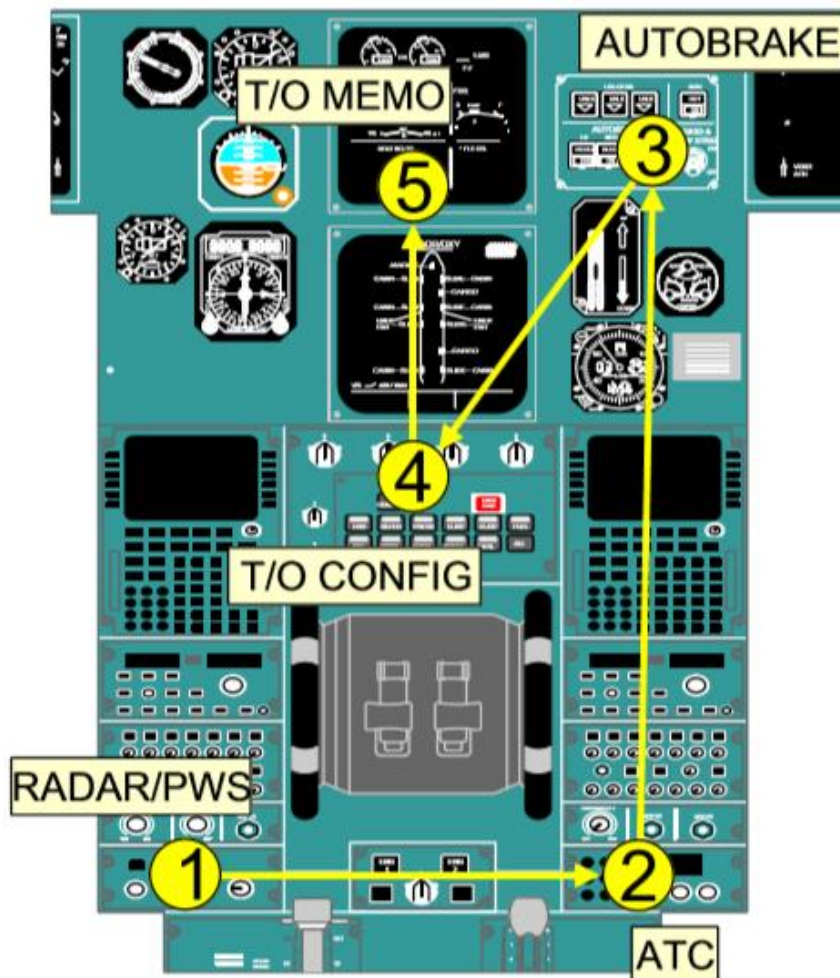
FINAL CHECK

CABIN REPORT MONITOR

BEFORE TAKEOFF CHECKLIST

BEFORE TAKEOFF CHECKLIST down to the line..... COMPLETE

TAXI FLOW PATTERN

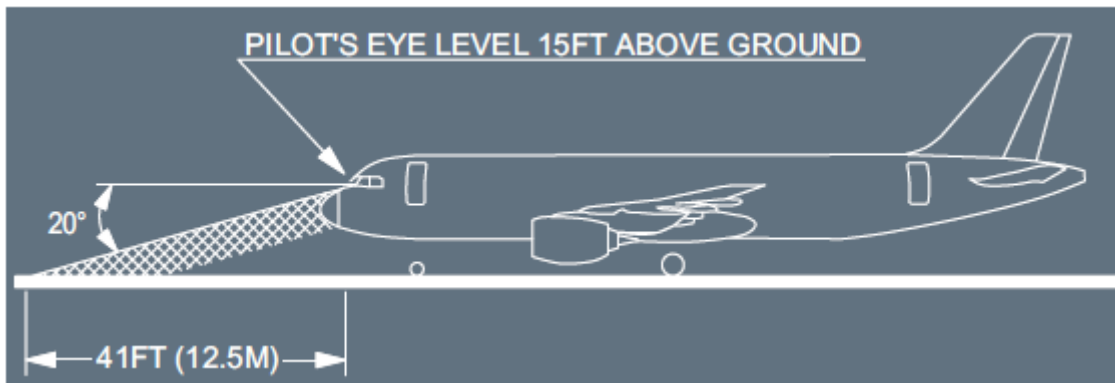


Note:

- Item 3 is delayed until Flight Controls have been checked once both engines are running
- Items 4 and 5 are delayed until reached in the before take-off checklist to act as a reminder of whether this checklist has been completed.

VISUAL GROUND GEOMETRY

Applicable to: ALL



180 DEG TURN ON RUNWAY

Applicable to: A318, A319, A320, A320NEO

A minimum runway width of 30 m (99 ft) is required for a 180° turn.

Applicable to: A321

A minimum runway width of 32 m (105 ft) is required for a 180° turn.

Applicable to: ALL

The following procedure is recommended for performing a 180° turn on the runway.

● FOR THE CM1:

- Taxi on the right of the runway and turn left, maintaining 25° of divergence from the runway axis
- When physically over the runway edge:
 - Turn right up to full tiller deflection
 - If necessary, use asymmetric thrust (IDLE on ENG 2) and/or differential braking (more brake pressure on the right side) to maintain a constant speed.

The Ground Speed (GS) for the entire maneuver should be between 5 kt and 8 kt, to prevent the width of the turn from increasing.

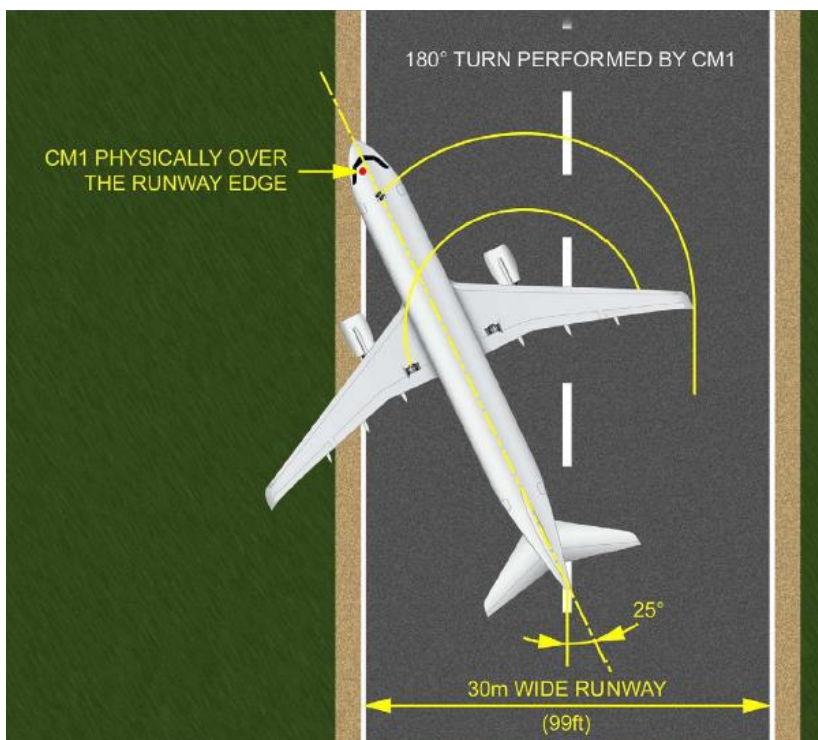
When the 180° turn is complete, align with runway centreline and release the tiller to the neutral position before stopping.

● FOR THE CM2:

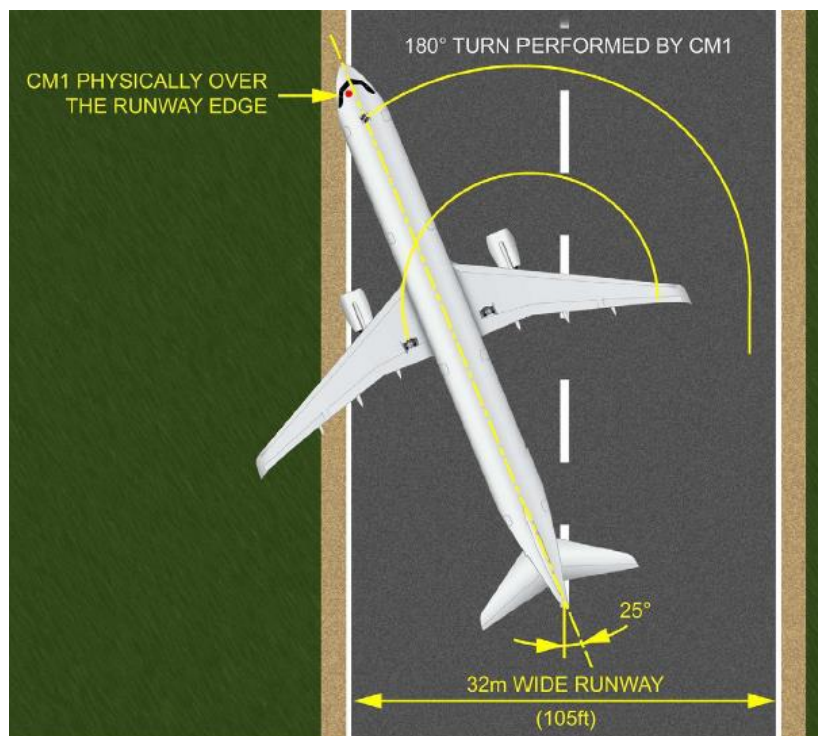
The procedure is symmetrical. (Taxi on the left-hand side of the runway).

Note: On a wet or contaminated runway, it is recommended to maintain a speed of 5 kt during the entire manoeuvre.

For A318/A319/A320/A320Neo



For A321



Before Takeoff

BEFORE TAKEOFF

Applicable to: ALL

● **If the brake fans are running:**

BRAKE TEMP CHECK

- If brake temperature is above 150 °C, delay takeoff.
- If brake temperature is below 150 °C, select brake fans off.

TAKEOFF OR LINE UP CLEARANCE OBTAIN

EXTERIOR LIGHTS

RWY TURN OFF sw ON

NOSE sw T.O

STROBE sw ON

Set the STROBE sw to ON when entering the runway.

Note: The flight crew can switch off the strobe lights if the lights cause any visual trouble during the flight.

LAND LIGHTS sw ON

Set the LAND LIGHTS sw to ON when entering the runway and takeoff clearance is received.

Note: Setting the RWY TURN OFF sw, the LAND LIGHTS sw and the NOSE sw to ON/T.O minimizes bird strike hazard during takeoff.

Applicable to: A319, A320 and A321

CABIN CREW ADVISE

To signal to the cabin crew that take off will soon commence select NO SMOKING sign to OFF and then back to AUTO to sound 2 chimes.

Applicable to: A318

CABIN CREW ADVISE

To signal to the cabin crew that take off will soon commence select Seat Belt sign to OFF and then back to ON to sound 2 chimes.

Applicable to: ALL

APPROACH PATH CLEARED OF TRAFFIC

APPROACH PATH CLEARED OF TRAFFIC

Check that the approach path is clear of traffic, visually and using TCAS display on ND.

Applicable to: A319, A320 and A321

ENG MODE selector AS RQRD

Select IGN START, if heavy rain or severe turbulence is expected after takeoff.

Note: Continuous ignition is automatically selected if the ENG 1 ANTI ICE pb and ENG 2 ANTI ICE pb are ON.

Applicable to: A318

ENG MODE selector AS RQRD

Select IGN if:

- The runway has standing water, or
- Heavy rain is falling, or
- Heavy rain or severe turbulence is expected after takeoff.

Applicable to: ALL

SLIDING TABLE STOWED

TAKEOFF RUNWAY CONFIRM

TAKEOFF RUNWAY CONFIRM

Confirm that the line up is performed on the intended runway. Useful aids are:

- The runway markings,
- The runway lights,
Be careful that in low visibility, edge lights could be mixed up with the center line lights.
- The ILS signal,
If the runway is ILS equipped, the flight crew can press the ILS pb (or LS pb): The LOC deviation should be centered after line up.
- The runway symbol on the ND,
- The Runway Awareness and Advisory System

PACK 1 and 2 AS RQRD

Consider selecting packs OFF, or APU bleed ON.

This will improve performance when using TOGA thrust.

In case of a FLEX takeoff, selecting packs OFF or APU bleed ON will reduce takeoff EGT, and thus reduce maintenance costs.

The use of flex thrust may reduce maintenance costs. The effect is particularly significant with the first degrees of FLEX.

Use of APU bleed is not authorized, if wing anti-ice is to be used.

BEFORE TAKEOFF CHECKLIST below the line COMPLETE

Read the checklist below the line, when line-up clearance is obtained.

Takeoff

TAKEOFF

Applicable to: ALL

The below procedure is the standard takeoff procedure. However, rolling takeoff is permitted.

TAKEOFF ANNOUNCE

Applicable to: A319, A320 and A321

THRUST SETTING

THRUST LEVERS 50% N1 (1.05 EPR)

- **If the crosswind is at or below 20 kt and there is no tailwind:**

To counter the nose-up effect of setting engine takeoff thrust, apply half forward sidestick until the airspeed reaches 80 kt. Release the sidestick gradually to reach neutral at 100 kt.

BRAKES RELEASE
THRUST LEVERS FLX or TOGA

Once the thrust levers are set to FLX or TOGA detent, the PF keeps his hand on the thrust levers until the aircraft reaches V1.

- **In case of tailwind, or if crosswind is greater than 20 kt:**

The PF applies full forward sidestick.

BRAKES RELEASE
THRUST LEVERS FLX or TOGA

- *The PF increases thrust progressively to reach takeoff thrust by 40 kt ground speed, while maintaining sidestick full forward up to 80 kt. Release the sidestick gradually to reach neutral at 100 kt.*
- *Once the thrust levers are set to FLX or TOGA detent, the PF keeps his hand on the thrust levers until the aircraft reaches V1.*

Note: 1. ENG SD PAGE replaces WHEEL SD PAGE on the ECAM lower display
2. The FADEC includes a keep-out zone, which is designed to avoid steady state operation inside a N1 range between 60 % and 74 % due to fan flutter phenomenon. This can result in discontinuous EPR increase during thrust setting.

DIRECTIONAL CONTROL USE RUDDER

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

CHRONO START
PFD/ND MONITOR

1. Check the FMA on the PFD. The following modes are displayed: MAN TOGA (or MAN FLX xx) / SRS/RWY (or blank) / ATHR (in blue).

Note: If an ILS that corresponds to the departure runway is tuned, RWY mode appears. If not, no lateral mode appears until the aircraft lifts off.

2. Check the FMS position on the ND (aircraft on runway centerline).

Note: If GPS PRIMARY is not available, check the FMS position update.

FMA ANNOUNCE

Applicable to: A320NEO and A321NEO

THRUST SETTING

The bellow procedure is the standard takeoff procedure. However, rolling takeoff is permitted.

THRUST LEVERS 50% N1

- **If the crosswind is at or below 20 kt and there is no tailwind:**

To counter the nose-up effect of setting engine takeoff thrust, apply half forward sidestick until the airspeed reaches 80 kt. Release the sidestick gradually to reach neutral at 100 kt.

BRAKES RELEASE
THRUST LEVERS FLX or TOGA

Once the thrust levers are set to FLX or TOGA detent, the PF keeps his hand on the thrust levers until the aircraft reaches V1.

- **In case of tailwind, or if crosswind is greater than 20 kt:**

The PF applies full forward sidestick.

BRAKES RELEASE
THRUST LEVERS FLX or TOGA

- The PF rapidly increases thrust to about 70% N1, then above 15 kt ground speed, progressively increases thrust to reach takeoff thrust by 40 kt ground speed, while maintaining sidestick full forward up to 80 kt. Release the sidestick gradually to reach neutral at 100 kt.
- Once the thrust levers are set to FLX or TOGA detent, the PF keeps his hand on the thrust levers until the aircraft reaches V1.

Note: ENG SD PAGE replaces WHEEL SD PAGE on the ECAM lower display

DIRECTIONAL CONTROL USE RUDDER

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

CHRONO START
PFD/ND MONITOR

1. Check the FMA on the PFD. The following modes are displayed: MAN TOGA (or MAN FLX xx) / SRS/RWY (or blank) / ATHR (in blue).

Note: If an ILS that corresponds to the departure runway is tuned, RWY mode appears. If not, no lateral mode appears until the aircraft lifts off.

2. Check the FMS position on the ND (aircraft on runway centerline).

Note: If GPS PRIMARY is not available, check the FMS position update.

FMA ANNOUNCE

Applicable to: A318

THRUST SETTING

THRUST LEVERS 50 % N1 (1.05 EPR)

- **If the crosswind is at or below 20 kt and there is no tailwind:**

To counter the nose-up effect of setting engine takeoff thrust, apply half forward sidestick until the airspeed reaches 80 kt. Release the sidestick gradually to reach neutral at 100 kt.

BRAKES RELEASE
THRUST LEVERS FLX or TOGA

Once the thrust levers are set to FLX or TOGA detent, the PF keeps his hand on the thrust levers until the aircraft reaches V1.

- **In case of tailwind, or if crosswind is greater than 20 kt:**

The PF applies full forward sidestick.

BRAKES RELEASE
THRUST LEVERS FLX or TOGA

- The PF rapidly increases thrust to about 70 % N1 (1.15 EPR) then progressively to reach takeoff thrust by 40 kt ground speed, while maintaining sidestick full forward up to 80 kt. Release the sidestick gradually to reach neutral at 100 kt.
- Once the thrust levers are set to FLX or TOGA detent, the PF keeps his hand on the thrust levers until the aircraft reaches V1.

Note: ENG SD PAGE replaces WHEEL SD PAGE on the ECAM lower display.

DIRECTIONAL CONTROL USE RUDDER

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

CHRONO START
PFD/ND MONITOR

1. Check the FMA on the PFD. The following modes are displayed: MAN TOGA (or MAN FLX xx) /SRS/RWY (or blank) / ATHR (in blue).

Note: If an ILS that corresponds to the departure runway is tuned, RWY mode appears. If not, no lateral mode appears until the aircraft lifts off.

2. Check the FMS position on the ND (aircraft on runway centerline).

Note: If GPS PRIMARY is not available, check the FMS position update.

FMA ANNOUNCE

BELOW 80 KT

TAKEOFF N1 CHECK

Check that the actual N1 of the individual engines has reached the N1 rating limit, before the aircraft reaches 80 kt. Check EGT.

THRUST SET ANNOUNCE
PFD and ENG indications MONITOR

Scan airspeed, N1, and EGT throughout the takeoff.

Applicable to: A319, A320 and A321

BELOW 80 KT

TAKEOFF EPR CHECK

Check that the actual EPR of the individual engines has reached the EPR rating limit, before the aircraft reaches 80 kt. Check EGT.

THRUST SET ANNOUNCE
PFD and ENG indications MONITOR

Scan airspeed, EPR, and EGT throughout the takeoff.

Applicable to: ALL

REACHING 100 KT

ONE HUNDRED KNOTS ANNOUNCE

- The PF crosschecks and confirms the speed indicated on the PFD

AT V1

V1 ANNOUNCE

AT VR

ROTATION ORDER
ROTATION PERFORM

- At VR, initiate the rotation to achieve a continuous rotation with a rate of about 3 °/s, towards a pitch attitude 15 ° (12.5 ° if one engine is failed)
- Minimize the lateral inputs on ground and during the rotation, to avoid spoiler extension
- In strong crosswind conditions, small lateral stick inputs may be used, if necessary, to aim at maintaining wings level
- After lift-off, follow the SRS pitch command bar.

CAUTION

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

Applicable to: A319, A320 and A321

WHEN POSITIVE CLIMB

POSITIVE CLIMB.....ANNOUNCE
L/G UP ORDER
L/G SELECT UP
AP AS RQRD

Above 100 ft AGL, AP 1 or 2 may be engaged.

Applicable to: A318

WHEN POSITIVE CLIMB

POSITIVE CLIMB.....ANNOUNCE
L/G UP ORDER
L/G SELECT UP

Note: Due to temporary high hydraulic demand on the green system, the PTU may run for a few seconds, during landing gear retraction.

AP AS RQRD

Above 100 ft AGL, AP 1 or 2 may be engaged.

Applicable to: ALL

AT THRUST REDUCTION ALTITUDE

THRUST LEVERS CL

Move the thrust levers to the CL 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 and 2 (if applicable) ON

Select PACK 1 on after CLB thrust reduction.

Select PACK 2, at least 10 s after PACK 1 is selected on, for passenger comfort.

- Note:
1. Selecting pack on before reducing takeoff thrust would result in an EGT increase.
 2. If packs are not switched on after the takeoff phase, an ECAM caution will be triggered.

AT ACCELERATION ALTITUDE

Check the target speed changes from V2 + 10 to the first CLB speed (either preselected or managed).

- Note:
1. When THR RED and ACC ALT are equal, the FMA will change from MAN FLX/SRS/NAV to THR CLB/CLB/NAV.
 2. If FCU-selected altitude is equal to or close to the acceleration altitude, then the FMA will switch from SRS to ALT*.

Applicable to: A318, A319 and A320

ABOVE ACCELERATION ALTITUDE (OR ONCE IN CLIMB PHASE)

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

- **At F speed:**

Note: For takeoff in CONF 1 + F, “F” speed does not appear.

FLAPS 1	ORDER
FLAPS 1	SELECT

- **At S speed:**

FLAPS 0	ORDER
FLAPS 0	SELECT
GND SPLRS	DISARM
NOSE sw	OFF
RWY TURN OFF sw	OFF
OTHER EXTERIOR LIGHTS	OFF/RETRACT

There are no regulatory requirements that require landing lights to be extended and on. Anti-collision lights/TCAS are effective in enabling aircraft to be seen.

Note: Fuel burn is increased by 2% with lights extended.

For flights in the USA, pilots are encouraged to use landing lights below 10 000 ft and within 10 nm of the airfield.

Note: The CRUISE SD PAGE replaces the ENG SD PAGE.

Applicable to: A321

ABOVE ACCELERATION ALTITUDE (OR ONCE IN CLIMB PHASE)

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

- **At F speed:**

Note: For takeoff in CONF 1 + F, "F" speed does not appear.

FLAPS 1 ORDER
FLAPS 1 SELECT

- **At S speed:**

Note: At heavy takeoff weight, the S speed on A321 may be higher than the MAX speed of configuration 1 + F (215 kt). Continue to accelerate and on reaching 210 kt the automatic flap retraction will occur and the MAX speed will move to 230 kt.

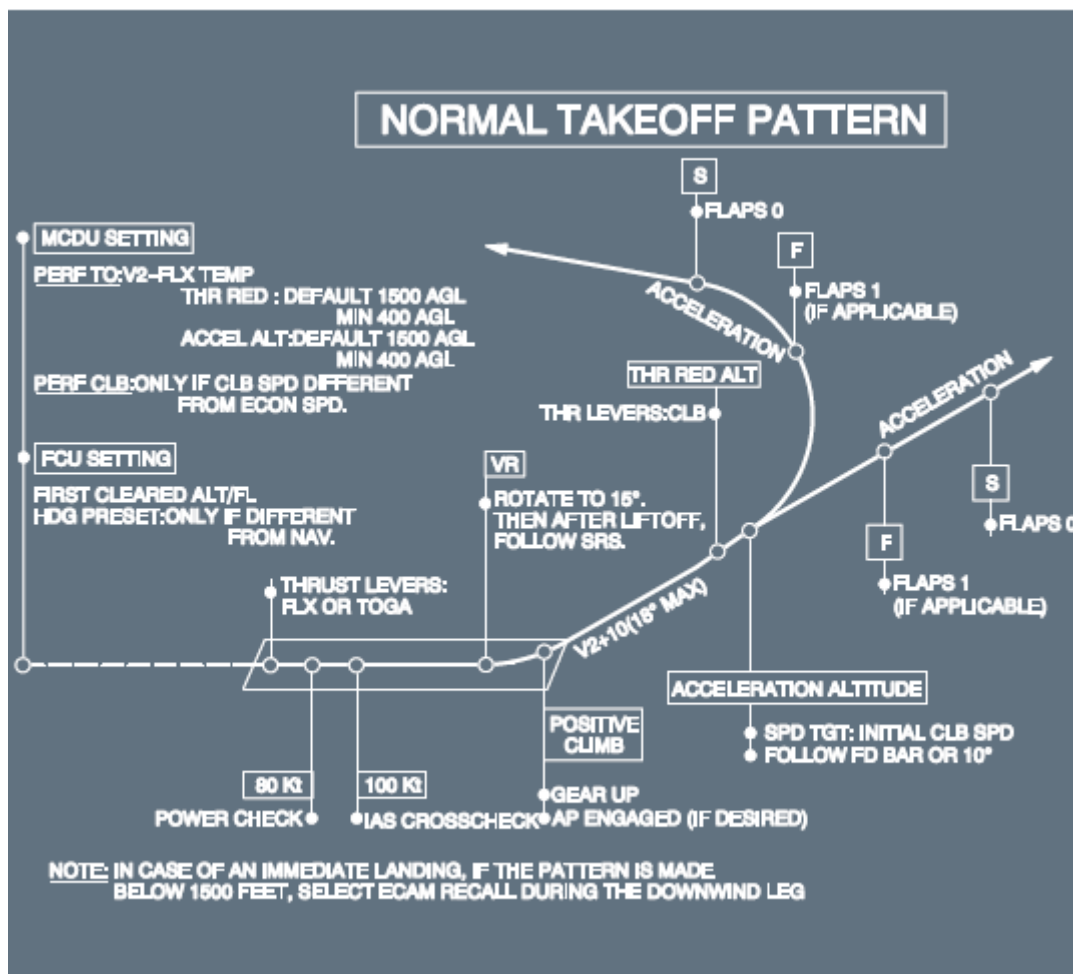
FLAPS 0 ORDER
FLAPS 0 SELECT
GND SPLRS DISARM
NOSE sw OFF
RWY TURN OFF sw OFF
OTHER EXTERIOR LIGHTS OFF/RETRACT

There are no regulatory requirements that require landing lights to be extended and on. Anti-collision lights/TCAS are effective in enabling aircraft to be seen.

Note: Fuel burn is increased by 2% with lights extended.

Note: The CRUISE SD PAGE replaces the ENG SD PAGE.

Applicable to: ALL



After Takeoff

AFTER TAKEOFF

Applicable to: ALL

APU BLEED pb AS RQRD

If the APU has been used to supply air conditioning during takeoff, set the APU BLEED pb to OFF.

APU MASTER SW pb AS RQRD

ENG MODE selector AS RQRD

Select IGN, if severe turbulence or heavy rain is encountered.

TCAS Mode selector TA/RA

Select TA/RA, if the takeoff has been performed with TA only.

Applicable to: A319, A320 and A321

ENG ANTI-ICE pb-sw AS RQRD

ENG ANTI ICE must be ON, when icing conditions exist or are anticipated, except during climb when the SAT is below -40°C (-40°F)

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

WING ANTI-ICE pb-sw AS RQRD

When icing conditions are encountered:

- The flight crew may turn on the wing anti-ice to prevent ice accretion on the wing leading edge
- The flight crew must turn on the wing anti-ice if there is evidence of ice accretion, such as ice on the visual indicator or on the wipers, or with the **SEVERE ICE DETECTED** alert. This is to remove any ice accumulation from the leading edge.

Applicable to: A318

ENG ANTI-ICE pb-sw AS RQRD

ENG ANTI ICE must be ON, when icing conditions are expected with a TAT at, or below, 10 °C.

WING ANTI-ICE pb-sw AS RQRD

When icing conditions are encountered:

- The flight crew may turn on the wing anti-ice to prevent ice accretion on the wing leading edge
- The flight crew must turn on the wing anti-ice if there is evidence of ice accretion, such as ice on the visual indicator or on the wipers, or with the **SEVERE ICE DETECTED** alert. This is to remove any ice accumulation from the leading edge.

Applicable to: ALL

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

Climb

CLIMB

Applicable to: ALL

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

PF MCDU.....PERF CLB

- 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.
With the AP engaged, the PF may revise the flight plan.
- 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 (CI).
- 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.

PM MCDU F-PLN

PM 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 knob and pull.

Speed target is now “selected”.

To return to managed speed mode, push FCU SPD 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 pb 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.

To return to ECON CLB speed:

Push ALT knob.

Check FMA: THR CLB/CLB/NAV

BAROMETRIC REFERENCE SET STD/CROSSCHECK

When cleared to a Flight Level set STD on the EFIS control panel.

Cross-check baro settings and altitude readings.

Note: When STD is set on the EFIS control panel, the transponder transmits the last QNH or QFE baro setting to the Air Traffic Control (ATC).

Only the FCU selected altitude, if used by the Air Traffic Control (ATC) on ground may be misinterpreted.

CRZ FL SET AS RQRD

- *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 MCDU 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.*

Applicable to: ALL

AFTER TAKEOFF/CLIMB CHECKLIST below the line COMPLETE

ANTI ICE ENG 1 pb and ANTI ICE ENG 2 pb AS RQRD

ENG ANTI ICE should be ON when icing conditions exist or are anticipated, unless the SAT is below -40 °C.

RADAR AS APPROPRIATE

- Note:
1. *If the weather is good, or not significant, in order to check that the radar is operating correctly: down tilt until displaying ground echoes.*
 2. *If the weather display is ambiguous or unexpected, in order to better analyze the weather situation, use manual tilt according to standard technique.*
 3. *In particular below FL 200, for situations with low-level weather, weather with low reflectivity or in front of suspected active cells, the flight crew should switch to Manual mode and adjust the tilt setting downward until the weather is detected or the ground clutter appears on the upper part of the display.*
 4. *In addition, the flight crew may increase the manual gain control to display lower reflectivity targets. The manual gain control can be increased in both AUTO and Manual modes to display lower levels of weather. In both cases, ground clutter may also be displayed as a result of low settings and/or increased gain.*

Applicable to: ALL

AT 10.000FT

LAND lights selector.....RETRACT

SEAT BELTS sw AS RQRD

EFIS option AS RQRD

Select CSTR on one side and ARPT on the other side.

ECAM MEMO REVIEW

FUEL PRED UPDATE ZFW

Both pilots should confirm and update the FINAL ZFW, if flight time is greater than one hour.

RAD NAV page CHECK

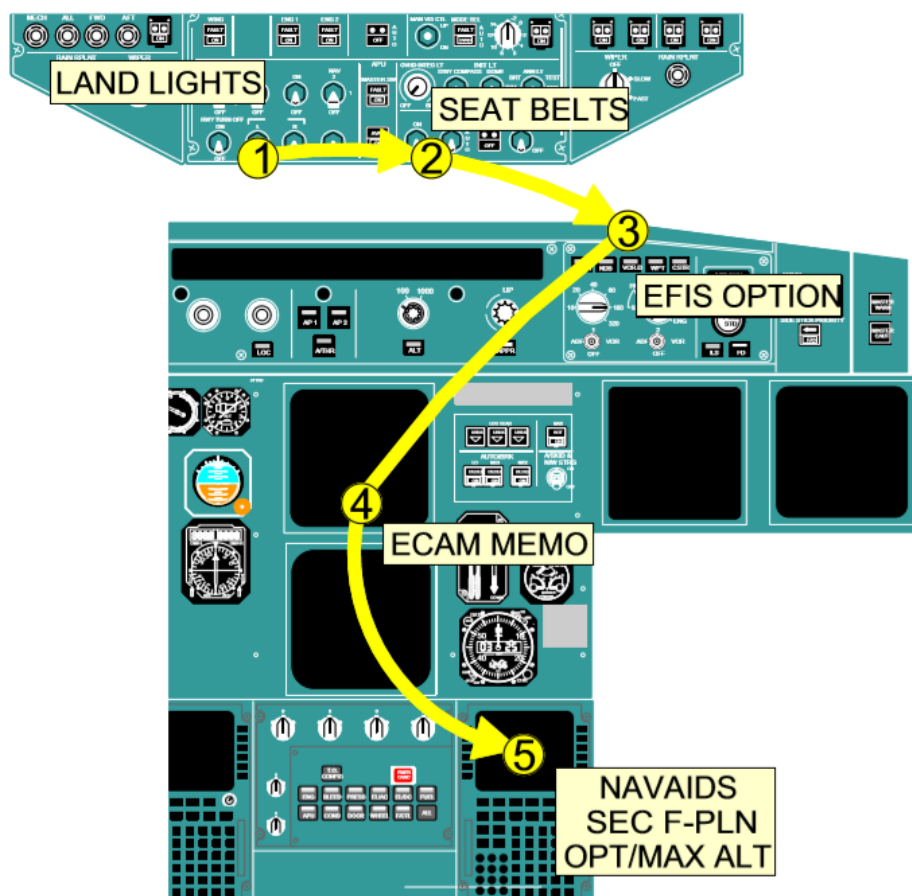
Clear manually tuned VORs from MCDU RAD NAV page.

SEC F-PLN page AS RQRD

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

OPT/MAX ALT CHECK

10 000 ft FLOW PATTERN



EFIS Option:

- The PF will select CSTR for grid MORA
- The PM will select ARPT

Cruise

CRUISE

Applicable to: ALL

ECAM MEMO REVIEW
ECAM SD PAGES REVIEW

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 landing gear retraction.
FUEL: Fuel distribution.
COND: Duct temperature, compared with zone temperature.
Avoid large differences for passenger comfort.
FLT CTL: Note any unusual control surface position.

FLIGHT PROGRESS CHECK

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 min:

- Check FUEL : Check FOB (ECAM), and fuel prediction (FMGC), and compare with the computer flight plan
- 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
NAV ACCURACY MONITOR

On aircraft equipped with GPS primary, no navigation accuracy check is required, as long as GPS PRIMARY is available.

Otherwise, a navigation accuracy check must be performed especially when any of the following occurs:

- GPS PRIMARY LOST appears on the ND
- IRS only navigation
- The PROG page displays LOW accuracy
- "NAV ACCUR DOWNGRAD" appears on the MCDU.

Note: Methods for checking accuracy:

- **If the check is positive (error ≤ 3 N.m): FM position is reliable.**
Use ND (ARC or NAV) and managed lateral guidance.
- **If the check is negative (error > 3 N.m): 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).

RADAR AS APPROPRIATE

Note:

1. If the weather is good, or not significant, in order to check that the radar is operating correctly: down tilt until displaying ground echoes.
2. If the weather display is ambiguous or unexpected, in order to better analyze the weather situation, use manual tilt according to standard technique.
3. In particular below FL 200, for situations with low-level weather, weather with low reflectivity or in front of suspected active cells, the flight crew should switch to Manual mode and adjust the tilt setting downward until the weather is detected or the ground clutter appears on the upper part of the display.
4. In addition, the flight crew may increase the manual gain control to display lower reflectivity targets. The manual gain control can be increased in both AUTO and Manual modes to display lower levels of weather. In both cases, ground clutter may also be displayed as a result of low settings and/or increased gain.

Descent Preparation

DESCENT PREPARATION

Applicable to: ALL

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

WEATHER AND LANDING INFORMATION..... OBTAIN

Check weather reports at ALTERNATE and DESTINATION airports. Airfield data should include runway in use for arrival.

LANDING PERFORMANCE CONFIRM

Perform an in-flight landing performance assessment.

Note: 1. If the weather conditions are expected to change at the landing airport, or in the event of significant precipitation, the flight crew should consider a second calculation of the in-flight landing distance with the worst possible runway condition.

2. The selection of REV MAX is the standard practice for landing.

However, on dry runways the flight crew may select REV IDLE.

On WET runways (runway surface condition GOOD), the flight crew may select REV IDLE, if all the following conditions are satisfied:

- A landing distance assessment has been made with the following parameters:
 - MEDIUM TO POOR landing performance level for the in-flight landing distance computation (with no safety margin added)
 - No reverser credit
- The result of this landing distance assessment is within the LDA.

• **If landing conditions change:**

LDG PERFORMANCE(RE)COMPUTE
LDG PERFORMANCE CROSSCHECK

ARRIVAL page..... COMPLETE/CHECK

Insert APPR, STAR, APPR VIA and TRANS if applicable. (Access by lateral revision at destination.)

F-PLN A page CHECK

- Ensure that the inserted F-PLN agrees with planned approach and missed approach.
- Use the scroll key to check the F-PLN thoroughly, using ND in PLAN mode as necessary.

Tracks and distances between waypoints are displayed on the second line from the top of the MCDU.

Approach and Missed Approach tracks and distances must be checked from the appropriate navigation charts.

- Check speed constraints. Add new speed constraints if required.
- Check altitude constraints. Add new altitude constraints if required.

Note: The FMS may have deleted the altitude constraints that are at or above the CRZ FL, or at or above any previous lower CRZ FL in the case of step.

In that case,

- Insert again the affected procedures (STAR, APPR VIA or TRANS)

The FMS keeps the altitude constraints that are below the CRZ FL, and deletes again the altitude constraints that are above current CRZ FL. The FMS may also delete the altitude constraints that are at current CRZ FL, and the altitude constraint windows that have a constraint at or above current CRZ FL.

- Manually enter the altitude constraints that are below current CRZ FL using the MCDU Vertical Revision pages.

It is not possible to enter an altitude constraint at the CRZ FL.

In the case of an "AT" or "AT OR ABOVE" altitude constraint at the CRZ FL, ensure that the altitude constraint is met before initiating the descent.

- In all cases, do not modify the final approach (FAF to runway or MAP), including altitude constraints.
- Identify the position and the altitude of Final Descent Point (FDP) and check the value of the FPA after this FDP,
- Identify the Missed Approach Point.

DES WIND CHECK

Enter winds for descent starting at cruise flight level.

PERF CRUISE page CHECK

Modify the cabin descent rate if different pressure rate is required.

PERF DES page CHECK

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 T/D computation, and it will be used for the managed speed descent profile (instead of ECON).

A speed limit of 250 kt below 10 000 ft 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

Enter the QNH, temperature, and wind at destination.

Note: Insert the average wind given by the ATC or ATIS. Do not insert the gust value. During approach, the Ground Speed Mini function (manage speed mode) takes into account the instantaneous gust.

*For more information: Refer to Ground Speed Mini Function.
For example, if the wind is 15020G35KT, insert 150/20.*

Insert the minimum.

Note: Changing the RWY or type of approach automatically erases the previous minimums.

Note: After the activation of the SEC F-PLN, check the VAPP, and modify if necessary.

Check or modify the landing configuration. Always select the landing configuration on the PERF APP page: The normal landing configuration on A318 and A319 is CONF FULL and for A320 and A321 is CONF 3.

CONF 3 or CONF FULL may be used at P1's discretion having complied with all Aircraft Limitations, MEL restrictions, QRH requirements or other system failures.

The crew must also consider the implications of:

- *Landing distance.*
- *Forecast windshear.*
- *Approach speeds.*
- *LVO's forward visibility.*
- *Brake temperature.*
- *Landing weight.*
- *Tailstrike avoidance.*
- *Tailwind component.*

Check or modify the transition altitude.

PERF GO-AROUND page CHECK/MODIFY

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

RAD NAV page CHECK

- *Set nav aids, as required, and check ident on the NDs (VOR-ADF) and PFDs (ILS/MLS). 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.*
- *When the flight plan calls for an NDB approach, the system automatically tunes the ADF, only when the aircraft is passing the first fix of the approach. Therefore, it is convenient to manually tune the ADF earlier (before activating the approach phase).*

SEC F-PLN page AS RQRD

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 check/set the new minimum and nav aids.

GPWS LDG FLAP 3 pb-sw AS RQRD

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

LDG ELEV CHECK

Check that the LDG ELEV AUTO green is displayed on the ECAM CRUISE page, and check the associated value.

AUTO BRK.....AS RQRD

*Use of autobrake is preferable.
Use of MAX mode is not recommended at landing.
On short or contaminated runways, use MED mode.
On long runways, LO mode is recommended.*

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

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

CHARTS/CHART APP SET

Select and sequence charting for planned approach and likely contingencies

APPROACH BRIEFING PERFORM

TERR ON ND AS RQRD

- *In mountainous areas, consider displaying terrain on ND.*
- *If use of radar is required, consider selecting the radar display on the PF side, and TERR ON ND on the PM side only.*
- *If NAV ACCURACY is LOW, do not use TERR on ND.*

RADAR ADJUST AS APPROPRIATE

Note:

1. *If the weather is good, or not significant, in order to check that the radar is operating correctly: down tilt until displaying ground echoes.*
2. *If the weather display is ambiguous or unexpected, in order to better analyze the weather situation, use manual tilt according to standard technique.*
3. *In particular below FL 200, for situations with low-level weather, weather with low reflectivity or in front of suspected active cells, the flight crew should switch to Manual mode and adjust the tilt setting downward until the weather is detected or the ground clutter appears on the upper part of the display.*
4. *In addition, the flight crew may increase the manual gain control to display lower reflectivity targets. The manual gain control can be increased in both AUTO and Manual modes to display lower levels of weather. In both cases, ground clutter may also be displayed as a result of low settings and/or increased gain.*

Applicable to: A319, A320 and A321

ENG ANTI ICE pb-sw AS RQRD

During descent, ENG ANTI ICE must be ON when icing conditions are encountered.

When ENG ANTI ICE is ON, the FADEC automatically controls continuous ignition and selects a higher idle thrust which gives better protection against flame-out. The IGNITION memo appears on the ECAM.

WING ANTI ICE pb-sw AS RQRD

ANTI ICE ON reduces the descent path angle (when the engines are at idle). The pilot can compensate for this by increasing the descent speed, or by extending up to half speedbrakes.

Applicable to: A318

ENG ANTI ICE pb-sw.....AS RQRD

*Engine anti-ice must be set to ON before and during descent, event if the SAT is below -40 °C (-40 °F).
When ENG ANTI ICE is ON, the FADEC selects a higher idle thrust which gives better protection against flame-out.*

WING ANTI ICE pb-sw.....AS RQRD

When icing conditions are encountered:

- The flight crew may turn on the wing anti-ice to prevent ice accretion on the wing leading edge
- The flight crew must turn on the wing anti-ice if there is evidence of ice accretion, such as ice on the visual indicators, the wipers or with the **SEVERE ICE DETECTED** alert. This is to remove any ice accumulation from the wing leading edge.

ANTI ICE ON reduces the descent path angle (when the engines are at idle). The pilot can compensate for this by increasing the descent speed, or by extending up to half speedbrakes.

Applicable to: ALL

DESCENT CLEARANCE OBTAIN
CLEARED ALTITUDE ON FCU SET

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.

Descent

DESCENT INITIATION

Applicable to: ALL

DESCENT INITIATE

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

- 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. (The pilot may use a V/S of -1 000 ft/min).

- If ATC delays the descent:

Beyond T/D, the PFD and the MCDU display either "DECELERATE" or "T/D REACHED" message.

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.

DESCENT MONITORING

Applicable to: ALL

PF MCDU PROG/PERF DES

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

- *PROG page in order to get VDEV or RQD DIST TO LAND/DIRECT DIST TO DEST information*
- *PERF DES in order to get predictions down to any inserted altitude in DES/OP DES modes and EXP mode.*

PM MCDU F-PLN

DESCENT MONITOR/ADJUST

- *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.*

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

The flight crew can use this symbol 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.

$$FPA (^{\circ}) = \Delta FL / DIST (NM)$$

DESCENT ADJUSTMENT

Applicable to: ALL

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 M 0.8 or 340 kt, 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.

If engine anti-ice is selected in descent, the flight idle is increased. So, to maintain the rate of descent that the airplane had before engine anti-ice selection it may be necessary to use up to half speedbrakes to maintain the required rate of descent, in OPEN DES vertical mode. If the rate of descent has to be increased, full speedbrakes may be 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.

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

2. In order to avoid overshooting the altitude, due to speedbrake retraction in ALT* mode, retract the speedbrakes at least 2 000 ft before the selected altitude.

ECAM STATUS CHECK

- 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.

AT 10 000 FT

LAND lights selector.....AS RQRD

LAND lights should be considered when turning on the final approach and ON for landing.

SEAT BELTS sw.....AS RQRD

Note: Seat belt signs should be selected ON in conjunction with the "Cabin Crew, 10 minutes to landing" PA.

EFIS option pb CSTR

Select CSTR on both sides.

LS / ILS (as installed) pb.....AS RQRD

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

The PFD displays the LOC and glide scales and deviation symbol, if there is a valid ILS or MLS signal. Check the ILS identification is properly displayed on the PFD.

RAD NAVAIDS..... SELECTED/IDENTIFIED

Ensure that appropriate radio NAVAIDS are tuned and identified.

For NDB approaches, manually select the reference NAVAID.

APPROACH PHASE..... CONSIDER

NAV ACCURACY.....CHECK

On aircraft equipped with GPS primary, no navigation accuracy check is required, as long as GPS PRIMARY function is available.

Otherwise, crosscheck NAV ACCURACY using the PROG page (BRG/DIST computed data), and the ND (VOR/DME raw data).

BAROMETRIC REFERENCE SET

Set QNH on the EFIS control panel and on the standby altimeter when cleared to an altitude.

Crosscheck BARO settings and altitude readings.

ENG MODE selector.....AS RQRD

- Select IGN if the runway is covered with standing water, or if heavy rain or severe turbulence is expected during approach or go-around area.

APPROACH CHECKLIST

APPROACH CHECKLIST COMPLETE

The approach checklist should be completed at a time of low workload when the airfield data has been confirmed.

Approach

Approach General

INTRODUCTION

Applicable to: ALL

The APPROACH section provides the standard operating procedures for the following approach types:

- ILS / MLS / GLS approaches
- Conventional approaches: VOR, VOR-DME, NDB, NDB-DME
- Approaches based on a LOC signal without any G/S signal: LOC ONLY, ILS G/S OUT, LOC B/C
- RNAV approaches including:
 - RNAV(GNSS) approaches with LNAV minimum or LNAV/VNAV minimum
 - RNAV(RNP) approaches for which Authorization is Required (AR) - If capability installed.

Note: In relation to the names in the ICAO Performance-Based Navigation (PBN) Manual:

- "RNP APCH operations" corresponds to RNAV(GNSS) approaches
- "RNP AR APCH operations" corresponds to RNAV(RNP) approaches.

CROSS-REFERENCE TABLE

Applicable to: A319, A320CEO, A321CEO, G-TTNA - G-TTNX, G-NEOP – G-NEOZ

	Guidance Modes per Approach Types				
	LOC G/S	FINAL APP	LOC FPA	NAV FPA	TRK FPA
ILS / MLS / GLS	Refer to APPR using LOC G/S	N/A	N/A	N/A	N/A
LOC ONLY ILS G/S OUT	N/A	N/A	Refer to APPR using FPA Guidance	N/A	N/A
LOC B/C	N/A	N/A	N/A	N/A	Refer to APPR using FPA Guidance
RNAV(GNSS) with LNAV/VNAV minima	N/A	Refer to APPR using FINAL APP	N/A	Not Authorized	Not Authorized
RNAV(GNSS) with LNAV minima	N/A	Refer to APPR using FINAL APP⁽¹⁾	N/A	Refer to APPR using FPA Guidance	Not Authorized
RNAV(GNSS) with LPV minima	N/A	Not Authorized	N/A	Not Authorized	Not Authorized
VOR VOR-DME NDB NDB-DME	N/A	Refer to APPR using FINAL APP⁽¹⁾	N/A	Refer to APPR using FPA Guidance	Refer to APPR using FPA Guidance

⁽¹⁾ The FINAL APPR is the recommended guidance mode for this type of approach.

CROSS-REFERENCE TABLE

Applicable to: G-TTNV – G-TTSA, G-TNEA – G-TNEE

	Guidance Modes per Approach Types					
	LOC G/S	F-LOC F-G/S	FINAL APP	LOC FPA	NAV FPA	TRK FPA
ILS / MLS / GLS	Refer to APPR using LOC G/S	N/A	N/A	N/A	N/A	N/A
LOC ONLY ILS G/S OUT	N/A	Refer to APPR using LOC F-G/S⁽¹⁾	N/A	Refer to APPR using FPA Guidance	N/A	N/A
LOC B/C	N/A	Refer to APPR using LOC B/C F-G/S⁽¹⁾	N/A	N/A	N/A	Refer to APPR using FPA Guidance
RNAV(GNSS) with LNAV/VNAV minima	N/A	Refer to APPR using LOC F-G/S⁽¹⁾	Refer to APPR using FINAL APP	N/A	Not Authorized	Not Authorized
RNAV(GNSS) with LNAV minima	N/A	Refer to APPR using LOC F-G/S⁽¹⁾	Refer to APPR using FINAL APP	N/A	Refer to APPR using FPA Guidance	Not Authorized
RNAV(GNSS) with LPV minima	N/A	Not Authorized	Not Authorized	N/A	Not Authorized	Not Authorized
VOR VOR-DME NDB NDB-DME	N/A	Refer to APPR using LOC F-G/S⁽¹⁾	Refer to APPR using FINAL APP	N/A	Refer to APPR using FPA Guidance	Refer to APPR using FPA Guidance

⁽¹⁾ F-LOC F-G/S is the recommended guidance mode for this type of approach.

For Visual Approach, Refer to VISUAL APPROACH

For Circling Approach, Refer to CIRCLING APPROACH

FLYING REFERENCE

Applicable to: ALL

Use the following recommended flying reference:

- In vertical managed modes: HDG-V/S reference associated with the FD crossbars
- In vertical selected modes: TRK-FPA reference associated with FPD.

STABILIZATION CRITERIA

Applicable to: ALL

The objective is to be stabilized on the final descent path at VAPP in the landing configuration, by 1000 FT Rad Alt.

If the stabilised approach criteria detailed in Part A are not met, a go-around must be carried out. The Target Approach Speed is VAPP TARGET in managed speed or VAPP in selected speed.

APPROACH SPEED TECHNIQUE

Applicable to: ALL

DECELERATED APPROACH

The decelerated approach with FD or AP/FD guidance is the standard flying technique for ILS / MLS / GLS approaches and approaches using FLS or FINAL APP guidance.

EARLY STABILIZED APPROACH

Under certain circumstances, the flight crew may decide to reduce the speed down to VAPP in the landing configuration at the Final Descent Point (i.e. approach via selected guidance, high glide path angle, low altitude intermediate approach, etc.). In order to obtain a valuable deceleration pseudo waypoint and to ensure a timely deceleration, the flight crew should enter VAPP as a speed constraint at the Final Descent Point.

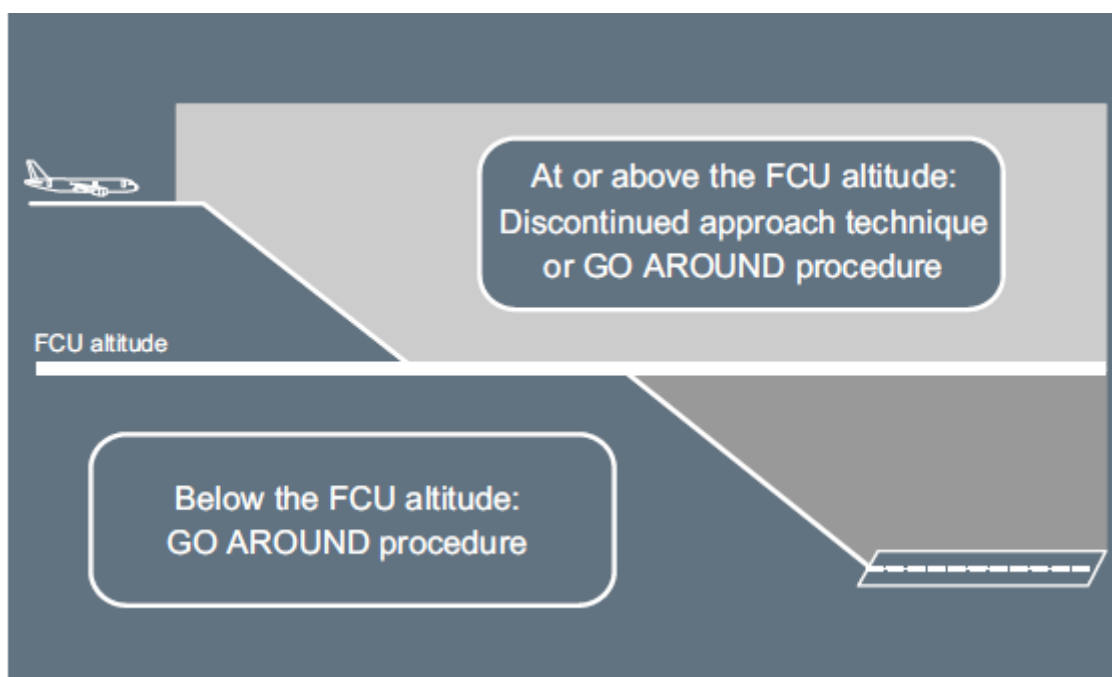
DISCONTINUED APPROACH

Applicable to: ALL

In order to discontinue an approach when the aircraft is at or above the altitude selected on the FCU, the flight crew can either:

- Apply the GO AROUND procedure, or
- Apply the discontinued approach technique.

When the aircraft is below the FCU altitude, the flight crew must apply the GO AROUND procedure.



- **If at or above the FCU altitude:**

Announce "CANCEL APPROACH".

To disarm any AP/FD approach mode, press APPR pb or LOC pb.

Note: Valid only for ILS / MLS / GLS / FLS or FINAL APP guidance.

Select lateral mode as required (NAV or HDG mode).

Select vertical mode as required (level off or adjust V/S).

Select SPEED and adjust.

- **If F-PLN has no destination anymore:**

Perform a LAT REV at the last waypoint and redefine the destination in the NEW DEST field.

- Note:
1. The FMS does not automatically string the previous flown approach in the active F-PLN when the aircraft overflies the last waypoint. The FMS has no more destination in the F-PLN.
 2. Because the thrust levers are not set to TOGA detent, the FMS remains in approach phase.

Aircraft Configuration Management

INITIAL APPROACH

Applicable to: ALL

GENERAL

The initial approach procedure described here is a general guidance whatever the type of approach expected.

INITIAL APPROACH

F-PLN SEQUENCING..... ADJUST

- The NAV mode will be available after GO AROUND if the F-PLN is properly sequenced. A good cue to monitor the proper F-PLN sequencing is the TO waypoint on the upper right side of the ND, which should remain meaningful.
- In NAV mode, the F-PLN will sequence automatically.
- In HDG/TRK mode, the F-PLN will sequence automatically only if the aircraft flies close to the F-PLN route.

APPROACH PHASE..... CHECK/ACTIVATE

- 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 (PERF DES page).

MANAGED SPEED..... CHECK

- If ATC requires a particular speed, use selected speed. When the ATC speed constraint no longer applies, return to managed speed.

FLIGHT PATH..... MONITOR

- In NAV mode, use VDEV information on the PFD and PROG page.
- In HDG/TRK mode, use the energy circle on ND representing the required distance to land.

SPEED BRAKES lever..... AS RQRD

- If the flight crew uses the speed brakes to increase the rate of deceleration or to increase the rate of descent, the VLS will increase as well:
 - The flight crew should ensure that appropriate speed margin exists before the extension of the speed brakes
 - If the speed brakes are extended, the flight crew should ensure that appropriate speed margin exists before the beginning of a turn.

This will avoid the activation of the Alpha-Floor protection.

Note: In clean configuration, the VLS with speed brakes fully extended may be higher than green dot speed or VFE FLAP 1.

RADAR

RADAR ADJUST AS APPROPRIATE

NAVIGATION ACCURACY

NAV ACCURACY..... MONITOR

- When GPS PRIMARY is available, no NAV ACCURACY monitoring is required.
- If GPS PRIMARY is lost, or GPS not installed, check on PROG page that the required navigation accuracy is appropriate to the phase of flight.
- If NAV ACCURACY is LOW, at least one ND must be in ROSE LS/VOR depending on the approach.

INTERMEDIATE/FINAL APPROACH

Applicable to: ALL

GENERAL

The intermediate and final approach procedure described here is general guidance whatever the type of approach expected.

Applicable to: A318, A319 and A320

AT GREEN DOT SPEED

CAUTION The flight crew should avoid extended flight in icing conditions with the slats extended.

FLAPS 1..... ORDER
FLAPS 1..... SELECT

- FLAPS 1 should be selected more than 3 NM before the Final Descent Point.
- Check deceleration toward "S" speed.
- For decelerated approaches, the aircraft must reach or be established on the final descent with FLAPS 1 and "S" speed at or above 2 000 ft AGL.
- If the aircraft does not decelerate on the flight path or aircraft speed is significantly higher than "S" speed, extend the landing gear in order to slow down. The use of speedbrakes is possible. The flight crew should be aware that the use of speedbrakes causes an increase in VLS.

Applicable to: A321

AT GREEN DOT SPEED

CAUTION The flight crew should avoid extended flight in icing conditions with the slats extended.

FLAPS 1..... ORDER
FLAPS 1..... SELECT

- At high weights, if the green dot speed is close to VFE NEXT, the flight crew may select a lower speed.
- FLAPS 1 should be selected more than 3 NM before the Final Descent Point.
- Check deceleration toward "S" speed.
- For decelerated approaches, the aircraft must reach or be established on the final descent with FLAPS 1 and "S" speed at or above 2 000 ft AGL.
- If the aircraft does not decelerate on the flight path or aircraft speed is significantly higher than "S" speed, extend the landing gear in order to slow down. The use of speedbrakes is possible. The flight crew should be aware that the use of speedbrakes causes an increase in VLS.

Applicable to: ALL

AT 2 000 FT AGL MINIMUM

FLAPS 2..... ORDER
FLAPS 2..... SELECT

- Check deceleration toward "F" speed.
- For ILS / MLS / GLS and approaches using FLS, if the aircraft intercepts the flight path below 2 000 ft AGL, select FLAPS 2 at one dot below the flight path.
- If the aircraft speed is significantly higher than "F" speed on the flight path, or the aircraft does not decelerate on the flight path, extend the landing gear in order to slow down the aircraft. The use of speed brakes is not recommended.
- When the speed brakes 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.

WHEN FLAPS ARE AT 2

LOW NOISE APPROACH SUPPLEMENTARY PROCEDURE

During a normal decelerated approach the Landing Gear is selected down following Flaps 2 at 2 000 ft AGL. A fuel efficient, minimum noise approach may be possible by delaying the gear down selection to a lower height. To use this technique comply with the following procedure:

Applicability:

- This technique is only applicable to suitable decelerated approaches in favourable prevailing conditions.

Approach Briefing (Avoid):

- A bottom line to commence the gear extension for final configuration must be briefed, set and agreed to assure final configuration is achieved prior to 1000 ft RA. Early 1 000 ft RA auto callouts and factors increasing aircraft approach energy, such as final flap configuration, tailwind component, steep glide path angle, aircraft weight and engine anti-ice must be evaluated as part of the bottom line setting.

Approach Execution (Trap):

- If aircraft energy is too great during the approach, abandon the low noise approach and lower the gear prior to the bottom line to assure stability.
- If the agreed bottom line is breached PM shall interject to ensure gear is lowered immediately and final configuration achieved.

Mitigation:

- The stable approach criteria must met by 1 000 ft RA, otherwise a Go Around is mandatory.

L/G DOWN..... ORDER
L/G lever SELECT DOWN
AUTO BRK..... CONFIRM

- If the runway conditions have changed from the approach briefing, consider another braking mode.

GROUND SPOILERS ARM
EXTERIOR LIGHTS..... SET

- Set NOSE sw to TAXI and RWY TURN OFF sw to ON.

Applicable to: A318, A319, A320CEO and A320NEO

WHEN LANDING GEAR IS DOWN

FLAPS 3..... ORDER
FLAPS 3..... SELECT

- *Retract the speed brakes before selecting FLAPS 3 to prevent a pitch down when the speed brakes automatically retract.*

ECAM WHEEL SD PAGE CHECK

- *WHEEL SD PAGE appears below 15 500 ft when landing gear is extended.*
- *Check for three green indications on the landing gear indicator panel. At least one green triangle on each landing gear strut on the WHEEL SD PAGE is sufficient to indicate that the landing gear is downlocked. Rely also on the “LDG GEAR DN” green LDG MEMO message to confirm that the landing gear is downlocked.*

● **If residual pressure is indicated on the triple indicator:**

RESIDUAL BRAKING PROC APPLY

- *Due to the accomplishment of the alternate braking functional test after the landing gear is downlocked, brief brake pressure indications may be observed on BRAKES PRESS.*

FLAPS FULL..... ORDER
FLAPS FULL..... SELECT

- *Check deceleration towards VAPP.*
- *Check correct TO waypoint on the ND.*

A/THR CHECK IN SPEED MODE
WING ANTI-ICE pb-sw OFF

- *Switch the WING ANTI ICE pb-sw to ON, only in severe icing conditions.*

SLIDING TABLE STOW
LDG MEMO CHECK NO BLUE
CABIN REPORT MONITOR
LANDING CHECKLIST COMPLETE
FLIGHT PARAMETERS..... MONITOR

- *The PF announces any FMA modification.*
- *The PM calls out, if:*
 - *The speed goes lower than the speed target -5 kt , or greater than the speed target +10 kt*
 - *The pitch attitude goes lower than -2.5 °, or greater than +10° nose up*
 - *The bank angle becomes greater than 7 °*
 - *The descent rate becomes greater than 1 000 ft/min*
- *Following PM flight parameter exceedance callout, the suitable PF response will be:*
 - *Acknowledge the PM callout, for proper crew coordination purposes*

- *Take immediate corrective action to control the exceeded parameter back into the defined stabilized conditions*
- *Assess whether stabilized conditions will be recovered early enough prior to landing, otherwise initiate a go-around.*

Applicable to: A321

WHEN LANDING GEAR IS DOWN

FLAPS 3 ORDER
FLAPS 3 SELECT
ECAM WHEEL SD PAGE CHECK

- *WHEEL SD PAGE appears below 15 500 ft when landing gear is extended.*
- *Check for three green indications on the landing gear indicator panel. At least one green triangle on each landing gear strut on the WHEEL SD PAGE is sufficient to indicate that the landing gear is downlocked. Rely also on the “LDG GEAR DN” green LDG MEMO message to confirm that the landing gear is downlocked.*

● **If residual pressure is indicated on the triple indicator:**

RESIDUAL BRAKING PROC APPLY

Due to the accomplishment of the alternate braking functional test after the landing gear is downlocked, brief brake pressure indications may be observed on BRAKES PRESS.

FLAPS FULL ORDER
FLAPS FULL SELECT

- *Check deceleration towards VAPP.*
- *Check correct TO waypoint on the ND.*

A/THR CHECK IN SPEED MODE
WING ANTI-ICE pb-sw OFF

Switch the WING ANTI ICE pb-sw to ON, only in severe icing conditions.

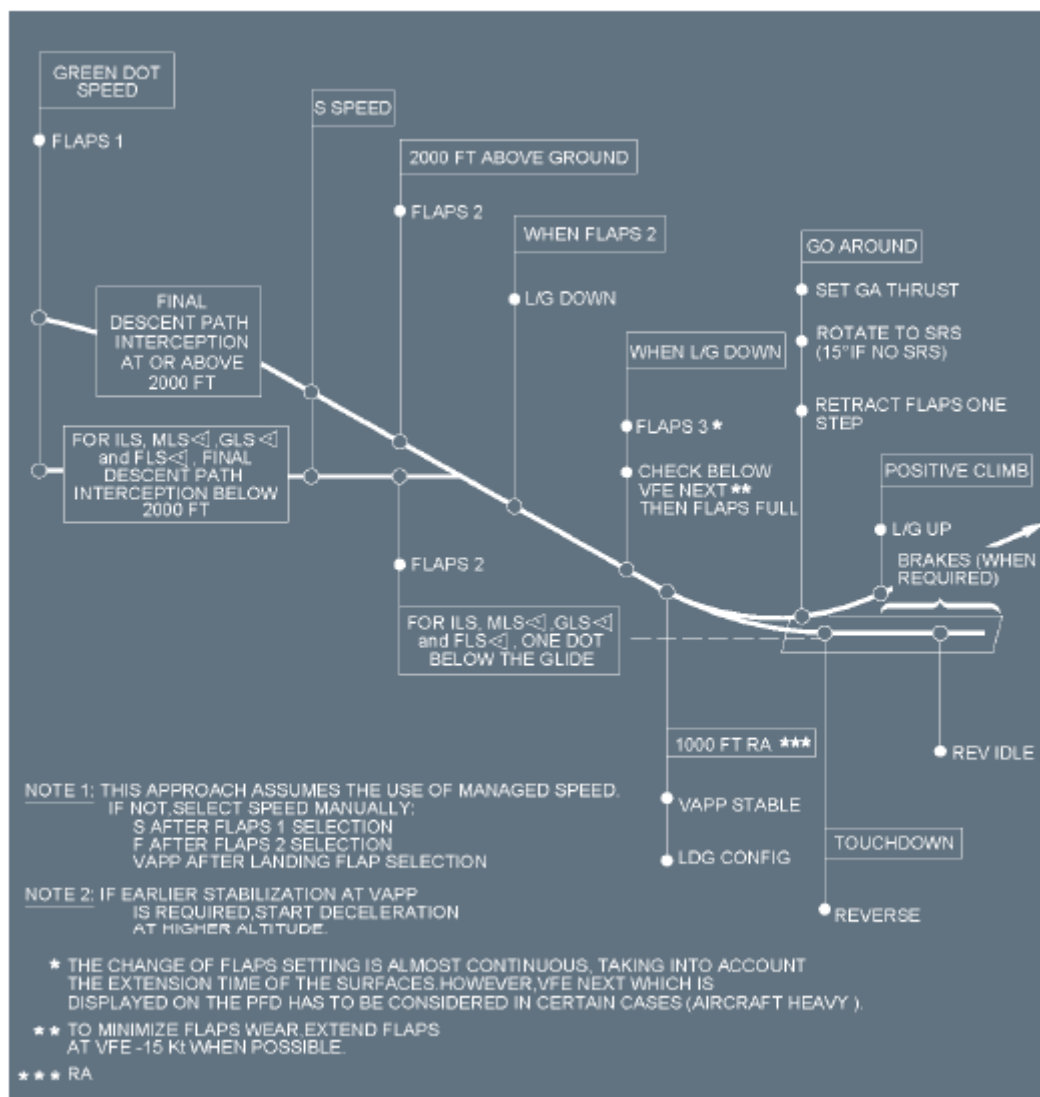
SLIDING TABLE STOW
LDG MEMO CHECK NO BLUE
CABIN REPORT MONITOR
LANDING CHECKLIST COMPLETE
FLIGHT PARAMETERS MONITOR

- *The PF announces any FMA modification.*
- *The PM calls out, if:*
 - *The speed goes lower than the speed target -5 kt , or greater than the speed target +10 kt*
 - *The pitch attitude goes lower than -2.5°, or greater than +7.5° nose up*
 - *The bank angle becomes greater than 7 °*
 - *The descent rate becomes greater than 1 000 ft/min*
- *Following PM flight parameter exceedance callout, the suitable PF response will be:*
 - *Acknowledge the PM callout, for proper crew coordination purposes*

- Take immediate corrective action to control the exceeded parameter back into the defined stabilized conditions
- Assess whether stabilized conditions will be recovered early enough prior to landing, otherwise initiate a go-around.

Applicable to: ALL

PATTERN (DECELERATED)



Aircraft Guidance Management

APPROACH USING LOC G/S GUIDANCE

Applicable to: ALL

GENERAL

The following items are to be performed in addition to previous SOP chapters for ILS / MLS / GLS approach.

INITIAL/INTERMEDIATE APPROACH

APPR pb on FCU PRESS

- Press the APPR pb when:
 - Cleared for the approach
 - On the intercept trajectory for the final approach course
 - LOC deviation is available.

This arms the LOC and G/S modes.

Note: In NAV mode, the aircraft may leave the F-PLN to capture the LOC.

- LOC and/or G/S capture modes will engage no sooner than 3 s after being armed.
- ICAO defines the envelope where the quality of the G/S signal ensures a normal capture. This envelope is within 10 NM, $\pm 8^\circ$ of the centerline of the ILS glide path and up to 1.75θ and down to 0.3θ (θ = nominal glide path angle). When arming the approach well outside of the normal G/S capture envelope, a spurious G/S* engagement may occur due to a wrong G/S deviation signal. Whenever the pilot notices the pitch movement, or the spurious G/S*, or the trajectory deviation, he will immediately disconnect the AP, if engaged, to re-establish a normal attitude and will disengage APPR mode. It is then recommended to arm/rearm APPR (ILS) mode within the normal capture zone.

BOTH APs ENGAGE

- When APPR mode is selected, AP1 and AP2 should be engaged.
- Above 5 000 ft AGL, the FMA displays CAT 1.
- Below 5 000 ft AGL, the FMA displays the correct approach capability for the intended approach.

LOC CHECK ARMED

G/S CHECK ARMED

LOC CAPTURE MONITOR

G/S CAPTURE MONITOR

GO AROUND ALTITUDE SET

GLIDE INTERCEPTION FROM ABOVE

The following procedure should only be applied when established on the localizer. The flight crew must react without delay to meet the stabilization criteria.

In order to get the best rate of descent when cleared by ATC and below the limiting speeds, the flight crew should lower the landing gear and select flaps as required (at least CONF 2 should be selected to ensure that the aircraft speed will not increase).

● **If above the glideslope:**

APPR mode.....ARM / CHECK ARMED
FCU ALTITUDE.....SET ABOVE A/C ALTITUDE
V/S MODE SELECT

- Select V/S 1 500 ft/min initially. V/S in excess of 2 000 ft/min will result in the speed increasing towards VFE.
- When reaching VFE, the AP maintains VFE and reduces the V/S without MODE REVERSION.

FINAL APPROACH

FLIGHT PARAMETERS..... MONITOR

- The PM calls out if excessive deviation occurs:
 - LOC: ½ dot
 - GLIDE: ½ dot

AT ENTERED MINIMUM + 100 FT

ONE HUNDRED ABOVE MONITOR OR ANNOUNCE

AT ENTERED MINIMUM

MINIMUM..... MONITOR OR ANNOUNCE
Below minimum, the visual references must be the primary reference until landing.

● **If visual references are sufficient:**

CONTINUE ANNOUNCE

- *Do not duck under the glide slope. Maintain a stabilized flight path down to the flare. At 50 ft, one dot below the glide slope is 7 ft below the glide slope.*

● **If visual references are not sufficient:**

GO AROUND.....ANNOUNCE

- *Initiate a go around.*

MANAGEMENT OF DEGRADED GUIDANCE

EARLY/UNTIMELY FLARE MODE ENGAGEMENT

- Perform a go around (thrust levers set to TOGA), or
- Disconnect AP, set both FDs to OFF and continue the approach using raw data or external visual references.

In association to an early/untimely FLARE mode engagement on the FMA, the following effects may occur:

- On the Primary Flight Display (PFD):
 - The RA height indication may be frozen at a positive or negative value,

- Discrepancies between both PFDs may happen on the following indications:
 - RA heights,
 - FD orders,
 - FMA indications when both APs are engaged.
- Warnings and/or Callouts:
 - Untimely activation of the AUTOLAND warning light.
 - Untimely Terrain Awareness and Warning System (TAWS) alerts,
 - Untimely or absence of “RETARD” callout,
 - Untimely L/G GEAR NOT DOWN ECAM warning,
 - Absence or interruption of RA automatic callout (height announcement)
- On the System Display (SD): A pulsing cabin differential pressure advisory may appear on the ECAM - CAB PRESS PAGE

Note: This ECAM advisory has no consequence on the real cabin pressure.

AUTOLAND WARNING LIGHT

- Perform a go-around, or
- Disconnect APs and continue the approach manually if external visual references are sufficient.

The AUTOLAND warning flashes when:

- At least one RA indicates a height below 200 ft, and
- At least one AP is engaged with LAND or FLARE mode on the FMA, and
- At least one of the following conditions occurs:
 - The LOC deviation exceeds 1/4 dot and the aircraft is above 15 ft RA (the LOC scale flashes on the PFD), or
 - The GLIDE deviation exceeds 1 dot and the aircraft is above 100 ft RA (the GLIDE scale flashes on the PFD), or
 - Loss of LOC signal above 15 ft RA (The FD vertical bar flashes on the PFD), or
 - Loss of GLIDE signal above 100 ft RA (The FD horizontal bar flashes on the PFD), or
 - The difference between both RA indications is greater than 15 ft RA, or
 - The FMGS detects a long flare.
 - The last autopilot disengages.

APPROACH USING F-LOC F-G/S GUIDANCE

Applicable to: G-TTNV – G-TTSA, G-TNEA – G-TNEE

GENERAL

The following items are to be performed in addition to previous SOP chapters in the following cases:

- RNAV(GNSS) approaches with LNAV or LNAV/VNAV minima
- Conventional approaches based on VOR or NDB using F-LOC F-G/S guidance
- ILS G/S OUT, LOC ONLY approaches

AIRCRAFT EQUIPMENT

For RNAV(GNSS) approaches, 1 FMS must be operative in GPS PRIMARY.

In addition, the following equipment is recommended:

1 MCDU, 1 FD, 1 PFD and 1 ND on the PF side, and both FCU channels.

DESCENT PREPARATION

WEATHER AND LANDING INFORMATION.....OBTAIN

- The FLS vertical beam (F-G/S) computation takes in to account the effect of low OAT on obstacle clearance if the destination temperature is correctly inserted on the PERF APPR page.

PERF APPR page..... CHECK/SELECT FLS

- Check that the FLS guidance mode is selected on the PERF APPR page.

F-PLN A page CHECK

- 0.1 degree of difference between the MCDU and the charted final vertical path is acceptable
- 1 degree of difference between the MCDU and the charted final lateral track is acceptable
- 3 degree of difference between the MCDU and the charted final lateral track is acceptable for overlay to a conventional radio NAVAID approach.

FLS DATA.....CHECK

- Press the LS pb to display FLS data on PFD and ND
- Check the following FLS data against the published approach chart:
 - o The anchor point
 - o The course of the F-LOC (LOC) (LOC B/C) beam
 - o The slope of the F-G/S beam
- On the ND, check the compatibility of the FLS beam with the final approach leg of the flight plan.

Note: For ILS G/S out, LOC only and LOC B/C approaches, FLS data is only composed of the F-G/S beam.

● For ILS G/S OUT:

G/S..... DESELECT

Deselect the G/S on the RAD NAV page.

PROG page COMPLETE

- Insert the reference RWY threshold in the BRG/DIST field for position monitoring during approach.

GO AROUND STRATEGY..... REVIEW

- The briefing should include a review of the "Management of Degraded Navigation" chapter.

DESCENT

At 10 000 ft:

FLS CAPABILITY.....CHECK

- The FLS function may be used if the FLS capability is F-APP or F-APP + RAW

● For RNAV(GNSS) approaches:

FLS CAPABILITY..... CHECK F-APP

BARO REF..... SET/CROSSCHECK

- The vertical guidance requires a precise baro setting. The maximum acceptable discrepancy between altimeters is 100 ft.

CAUTION

Obstacle clearance is not guaranteed if an erroneous BARO setting is selected, or if FLS guidance is used outside the published approach.

INITIAL/INTERMEDIATE/FINAL APPROACH

APPR pb on FCU PRESS

Press the APPR pb when all of the following is applicable:

- The aircraft is cleared for approach
- The aircraft is on the intercept trajectory for the final approach course.

This arms the **F-LOC** and **F-G/S** modes.

For ILS G/S OUT and LOC only approaches, this arms the **LOC** and **F-G/S** modes.

Note: In **NAV** mode, the aircraft may leave the F-PLN to capture the F-LOC.

F-LOC (LOC) CHECK ARMED

F-G/S CHECK ARMED

F-LOC (LOC CAPTURE) MONITOR

F-G/S CAPTURE MONITOR

GO AROUND ALTITUDE SET

Set the go-around altitude on the FCU.

F/GS INTERCEPTION FROM ABOVE

The following procedure must only be applied when established on the F-LOC (LOC) (LOC B/C) beam. The flight crew must react without delay in order to meet the stabilization criteria.

In order to achieve the best rate of descent, when cleared by ATC and below the limiting speeds the flight crew should lower the landing gear and select flaps as required (at least CONF 2 should be selected to ensure that the aircraft speed will not increase).

● If above the F-G/S beam:

APPR pb on FCU PRESS

F-LOC (LOC) (LOC B/C) CHECK ENGAGED

FCU ALTITUDE SET ABOVE A/C ALTITUDE

V/S MODE SELECT

- Select V/S -1 500 ft/min initially. V/S in excess of -2 000 ft/min will result in the speed increasing toward VFE.
- When reaching VFE, the AP maintains VFE and reduces the V/S without mode reversion.

FINAL APPROACH

FLIGHT PARAMETERS MONITOR

- Check altitude crossing at FAF as published on the chart
- If the FLS capability is F-APP + RAW, monitor raw data on conventional radio NAVAID approaches.
- The PM calls out if excessive deviation occurs:
 - F-LOC (LOC): ½ dot
 - F-G/S: ½ dot
- For additional information on the associated standard callouts, refer to PRO-NOR-SOP Standard Callout - Approach

AT ENTERED MINIMUM + 100 FT

ONE HUNDRED ABOVE MONITOR OR ANNOUNCE

AT ENTERED MINIMUM

MINIMUM..... MONITOR OR ANNOUNCE

Below minimum, the visual references must be the primary reference until landing.

- **If visual references are sufficient:**
CONTINUE, I HAVE CONTROL.....ANNOUNCE
At this point, P1 becomes PF in anticipation of landing.

When appropriate:

AP OFF

- *For Minimum Use Height of AP, refer to LIM-AFS Autopilot Function*

FD AS RQRD

- *The PF orders the PM to set both FDs OFF.*

- **If visual references are not sufficient:**
GO AROUND.....ANNOUNCE
- *Initiate a go around.*

MANAGEMENT OF DEGRADED NAVIGATION

- **For VOR, NDB, ILS G/S OUT, LOC ONLY approaches:**
 - If the FLS capability downgrades to **F-APP + RAW**:
 - The flight crew can continue to use FLS, provided that radio navaid raw data confirms that the lateral navigation is correct.
 - Crosscheck distances vs altitudes as published on the charts.
 - If the FLS capability downgrades to **RAW ONLY**:
 - For VOR and NDB approaches, the flight crew must select the LS pb to OFF and revert to **TRK-FPA** guidance.
 - For ILS G/S OUT, LOC ONLY approaches, the flight crew must disregard the F-G/S deviation and revert to vertical selected mode (the LOC deviation remains trustworthy). The flight crew can continue the approach with the localiser and altitude vs distance raw data.
- **For RNAV(GNSS) approaches with LNAV minima and LNAV/VNAV minima:**
 - Use the appropriate remaining AP/FD in the following cases:
 - **GPS PRIMARY LOST** on one ND
 - **NAV ACCUR DOWNGRAD** on one FMGS.
 - Discontinue the approach in the following cases, if external visual references are not sufficient to proceed visually:
 - **F-APP** capability lost
 - F-LOC deviation exceeds 1 dot
 - **NAV FM/GPS POS DISAGREE.**
- **For RNAV(GNSS) approaches with LNAV/VNAV minima:**
 - Discontinue the approach if the F-G/S deviation exceeds ½ dot below the F-G/S beam.

APPROACH USING FINAL APP GUIDANCE

Applicable to: ALL

GENERAL

The following items are to be performed in addition to previous SOP chapters in the following cases:

- RNAV(GNSS) approaches with LNAV and LNAV/VNAV minima
- Conventional approaches based on VOR or NDB using FINAL APP guidance.

AIRCRAFT EQUIPMENT

BAV operational approval to utilise FINAL APP requires that at least 1 FMS must be operative in GPS PRIMARY.

In addition, the following equipment is recommended:

1 MCDU, 1 FD, 1 PFD and 1 ND on the PF side, and both FCU channels.

For RNAV(GNSS) approaches, Refer to RNP APCH / RNAV(GNSS) for required equipment.

FLIGHT PREPARATION

For RNAV(GNSS) approaches, GPS PRIMARY availability should be confirmed.

DESCENT PREPARATION

WEATHER AND LANDING INFORMATION.....OBTAIN

- The FMS vertical profile does not take into account the effect of low OAT. Therefore, vertical managed guidance:
 - Must not be used when the actual OAT is below the minimum temperature indicated on the approach chart or defined by the Operator, or
 - May not be used when temperature corrections are required (FINAL APP mode may not engage).
- For RNAV (GNSS) approach with LNAV VNAV minima, use of QNH from a remote station is prohibited.

F-PLN A page CHECK

- 0.1 degree of difference between the MCDU and the charted final vertical path is acceptable
- 1 degree of difference between the MCDU and the charted final lateral track is acceptable
- 3 degree of difference between the MCDU and the charted final lateral track is acceptable for conventional radio NAVAID approach.

PROG page COMPLETE

- Insert the reference RWY threshold in the BRG/DIST field for position monitoring during approach.

GO AROUND STRATEGY..... REVIEW

- The briefing should include a review of the "Management of Degraded Navigation" chapter.

DESCENT

At 10 000 ft:

NAV ACCURACY.....CHECK

- If NAV accuracy is LOW, use TRK FPA mode for approach ([Refer to APPR using FPA guidance](#)).

- **For RNAV(GNSS) approach:**

GPS PRIMARY CHECK

- GPS PRIMARY must be available on at least 1 FMS.

BARO REF SET

- The vertical guidance requires a precise baro setting. The maximum acceptable discrepancy between altimeters is 100 ft.

INITIAL/INTERMEDIATE/FINAL APPROACH

POSITION MONITOR

- Check that ATC clearances allow the aircraft to fly through the capture area of vertical profile.

After radar vectoring, consider a DIR TO RDL IN to sequence the F-PLN.

APPR pb on FCU PRESS

APP NAV CHECK ARMED or ENGAGED

FINAL CHECK ARMED

- Check that the V/DEV scale is displayed on the PFD.
- At the Final Descent Point, a blue arrow on ND indicates that FINAL APP engagement conditions are met.

At the Final Descent Point:

FINAL APP CHECK ENGAGED

GO AROUND ALTITUDE SET

FLIGHT PARAMETERS MONITOR

- Monitor XTK error on ND.
- Monitor V/DEV on PFD.
- Crosscheck distances versus altitudes as published on the charts.
- If approaching on a conventional radio NAVAID procedure, monitor the lateral and vertical guidance using raw data.
- The PM calls out if excessive deviation occurs:
 - XTK > 0.1 NM
 - V/DEV > ½ dot

On the vertical scale, one dot corresponds to 100 ft. Thus ½ dot is 50 ft.

AT ENTERED MINIMUM + 100 FT

ONE HUNDRED ABOVE MONITOR OR ANNOUNCE

AT ENTERED MINIMUM

MINIMUM MONITOR OR ANNOUNCE

Below minimum, the visual references must be the primary reference until landing.

- **If visual references are sufficient:**
CONTINUE ANNOUNCE
AP OFF

- *The AP will automatically disengage at the MAP.*

FD OFF

- *The PF orders the PM to set both FDs OFF.*

TRK FPA SELECT
RUNWAY TRACK CHECK/SET

- *If needed, the PF orders the PM to set the runway track.*
- **If visual references are not sufficient:**
GO AROUND ANNOUNCE

- *Initiate a go around.*

MANAGEMENT OF DEGRADED NAVIGATION

- **For VOR and NDB approaches, be prepared to continue the approach with reference to appropriate raw data by reverting to:**
 - NAV FPA, if the vertical guidance is not satisfactory
 - TRK FPA, if the lateral guidance is not satisfactory.
- **For RNAV(GNSS) approaches with LNAV minima and LNAV/VNAV minima:**
 - Use the appropriate remaining AP/FD in the following cases:
 - GPS PRIMARY LOST on one ND
 - NAV ACCUR DOWNGRAD on one FMGS.
 - Discontinue the approach in the following cases, if external visual references are not sufficient to proceed visually:
 - GPS PRIMARY LOST on both NDs
 - XTK > 0.3 NM
 - NAV FM/GPS POS DISAGREE on ECAM
 - NAV ACCUR DOWNGRAD on both FMGS.
- **For RNAV(GNSS) approaches with LNAV/VNAV minima:**
 - Discontinue the approach in the case of deviation of 75 ft below the vertical path (V/DEV > ¾ dot).

APPROACH USING FPA GUIDANCE

Applicable to: ALL

GENERAL

The following items are to be performed in addition to previous SOP chapters in the following cases:

- RNAV(GNSS) approaches using mixed NAV FPA guidance with LNAV minima only
- Conventional approaches based on VOR and NDB using selected TRK FPA or mixed NAV FPA guidance
- ILS G/S OUT, LOC ONLY and back course localizer approaches.

The approach is flown in TRK FPA when:

- The approach is not stored in the database or
- NAV accuracy is LOW.

SURVEILLANCE RADAR APPROACH

It is acceptable to fly an SRA approach in HDG V/S.

AIRCRAFT EQUIPMENT

BAV operational approval to utilise NAV/FPA requires that at least 1 FMS must be operative in GPS PRIMARY.

In addition, the following equipment is recommended:

1 MCDU, 1 FD, 1 PFD and 1 ND on the PF side, and both FCU channels.

For RNAV(GNSS) approaches, Refer to RNP APCH / RNAV(GNSS) for required equipment.

FLIGHT PREPARATION

For RNAV(GNSS) approaches, GPS PRIMARY availability should be confirmed.

F-PLN A page CHECK

- For approaches using NAV FPA:
 - 1 degree of difference between the MCDU and the charted final lateral track is acceptable.
 - 3 degree of difference between the MCDU and the charted final lateral track is acceptable for conventional radio NAVAID approach.
- In all other cases, use TRK FPA mode for approach.

PROG page COMPLETE

- Insert the reference RWY threshold in the BRG/DIST field for position monitoring during approach.

GO AROUND STRATEGY REVIEW

- The briefing should include a review of the "Management of Degraded Navigation" chapter.

DESCENT

At 10 000 ft:

NAV ACCURACY.....CHECK

- If NAV accuracy is LOW, use TRK mode for approach.

- **For RNAV(GNSS) approach:**

GPS PRIMARY.....CHECK

- GPS PRIMARY must be available on at least 1 FMS.

INITIAL/INTERMEDIATE/FINAL APPROACH

LATERAL GUIDANCE MODE SET FOR APPROACH
Arm NAV or LOC mode as appropriate.

- **For LOC ONLY and ILS G/S OUT:**

LOC pb-sw.....PRESS

- Press the LOC pb-sw when cleared for approach and on the intercept trajectory for the final approach course.

Note: In NAV mode, the aircraft may leave the F-PLN to capture the LOC.

LOC.....CHECK ARMED

CAUTION

Do not press the APPR pb

- **For back course localizer approaches:**

TRK FPA MODE.....USE FOR APPROACH

LATERAL PATH INTERCEPT

- Monitor NAV or LOC engagement as appropriate.

TRK FPA pb (Bird) SELECT

FPA FOR FINAL APPROACH SET

At 0.3 nm from the Final Descent Point:

FPA selector PULL

FPA MODE CHECK ENGAGED

- Check NAV FPA, TRK FPA or LOC FPA is engaged.

POSITION/FLIGHT PATH..... MONITOR/ADJUST

GO AROUND ALTITUDE..... SET

- Set when below the go around altitude to avoid unexpected altitude capture.

FLIGHT PARAMETERS..... MONITOR

- Crosscheck distances versus altitudes as published on the charts.
- If approaching on a conventional radio NAVAID procedure, monitor the lateral and vertical guidance using raw data.
- For approaches using NAV FPA, monitor XTK error on ND to check the lateral guidance.
- The PM calls out if excessive lateral deviation occurs:
 - Approach using NAV MODE: XTK > 0.1 NM
 - Approach using LOC MODE: LOC ½ dot
 - Approach using TRK MODE:
 - VOR: ½ dot or 2.5 °
 - NDB: 5 °

AT ENTERED MINIMUM + 100 FT

ONE HUNDRED ABOVE MONITOR OR ANNOUNCE

AT ENTERED MINIMUM

MINIMUM..... MONITOR OR ANNOUNCE

Below minimum, the visual references must be the primary references until landing.

- **If visual references are sufficient:**
 CONTINUE.....ANNOUNCE
 AP..... OFF
 FD..... OFF

- The PF orders the PM to set both FDs OFF.

RUNWAY TRACK CHECK/SET

- If needed, the PF orders the PM to set the runway track.

- **If visual references are not sufficient:**
 GO AROUND ANNOUNCE

- Initiate a go around.

MANAGEMENT OF DEGRADED NAVIGATION

- **For VOR and NDB approaches in NAV FPA, if lateral guidance is not satisfactory:**
 - Be prepared to continue the approach with reference to appropriate raw data by reverting to TRK FPA.
- **For RNAV(GNSS) approaches, with LNAV minima:**
 - Use the appropriate remaining AP FD in the following cases:

- GPS PRIMARY LOST on one ND
- NAV ACCUR DOWNGRAD on one FMGS
- Discontinue the approach in the following cases, if external visual references are not sufficient to proceed visually:
 - GPS PRIMARY LOST on both NDs
 - XTK > 0.3 NM
 - NAV FM/GPS POS DISAGREE on ECAM
 - NAV ACCUR DOWNGRAD on both FMGS

CIRCLING APPROACH

Applicable to: ALL

GENERAL

The circling approach is the visual phase on an instrument approach to bring an aircraft in to position for landing on a runway which is not suitably located for straight-in approach.

CAUTION

The flight crew must conduct the flight within the circling area, while maintaining required visual references at all times.

APPROACH PREPARATION

For a circling approach, the approach preparation should include the following additional items in the FMS programming.

F-PLN

Introduce the instrument approach procedure, including the missed approach procedure for instrument approach.

SEC F-PLN

The landing runway must be inserted into the SEC F-PLN.

Update the SEC F-PLN as follows:

- Copy the active F-PLN
- Revise the landing runway.

INSTRUMENT APPROACH

The flight crew flies a stabilized approach at "F" speed, configuration 3 and landing gear down.

CIRCLING APPROACH

- **At the Circling MDA(H) at the latest:**
Perform a level off
- **At MAP, if the flight crew finds no visual reference:**
Initiate a go around
- **When required conditions for circling are satisfied:**
Select TRK FPA

Proceed to downwind leg

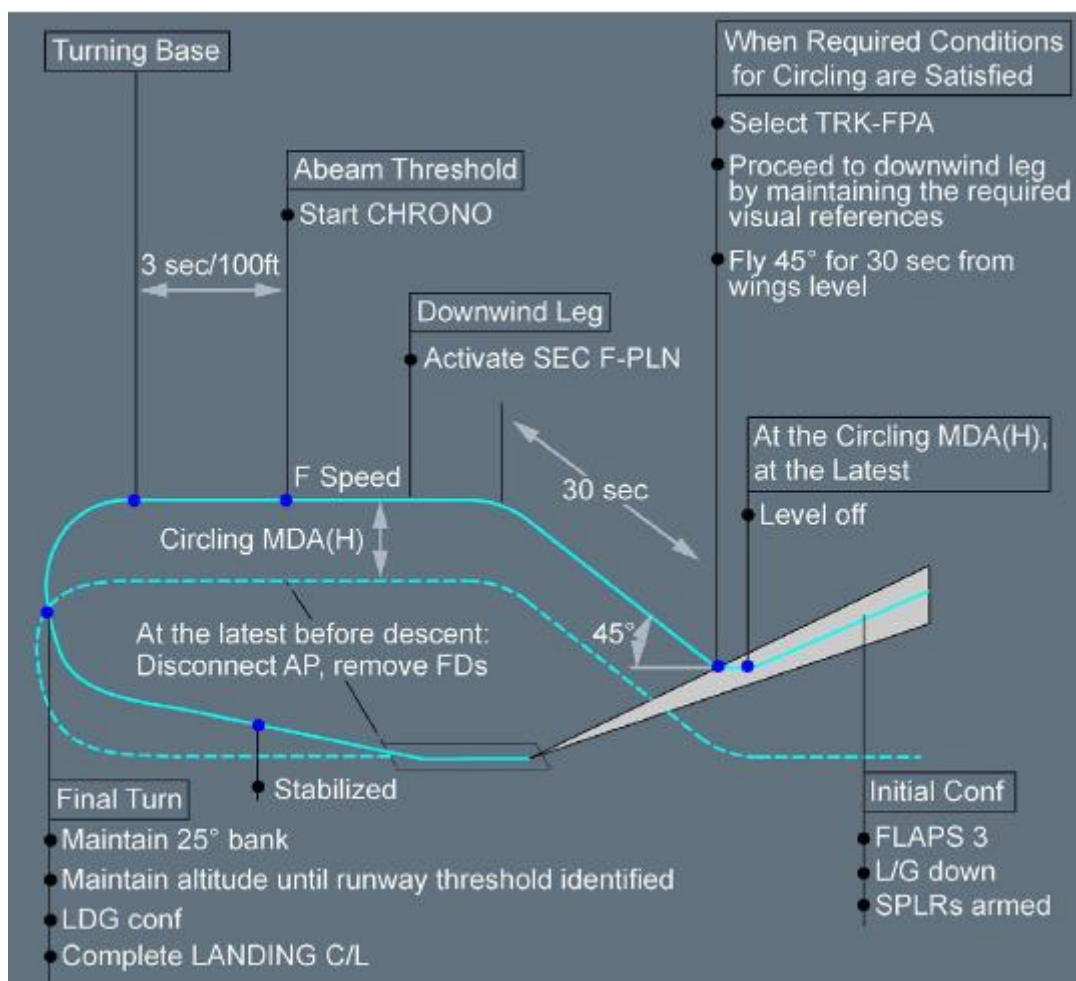
At any time in the downwind leg, activate the SEC F-PLN

Disconnect the AP and remove the FDs at the latest before starting the descent toward the runway

Set the landing configuration when appropriate, but ensure early stabilization in final.

If, at any time during the circling procedure, the required visual references are lost, initiate a go around following the missed approach of the initial instrument approach (unless otherwise specified).

LOW VISIBILITY CIRCLING APPROACH PATTERN



RNAV VISUAL APPROACH

Applicable to: ALL

GENERAL

The aircraft navigates using the RNAV system, but the position is monitored by visual reference to the ground, obstacles and other traffic.

RNAV visual approach must be stored and retrievable from the Navigation Database.

EQUIPMENT REQUIRED

- 1 FMS
- 1 GPS or 2 DME to update FM position
- Additional requirement if indicated on the approach chart.

FMGC GUIDANCE MODE

- **If no required accuracy is published:**
The use of FMGC guidance mode is at flight crew discretion.
- **If RNAV 1 or RNP 1 is required on the published approach chart:**
The flight crew should use adequate FMGC guidance modes.

Note: The use of lateral and vertical managed guidance modes reduces the crew workload and improves energy management.

For RNAV VISUAL approach including RF legs, refer to FCTM for RF leg flying technique.

DESCENT PREPARATION

For approach data insertion in the FMS, keep the BARO/MDA field empty on the PERF APPR Page.

DESCENT

For RNAV VISUAL approaches requiring GPS, check that GPS PRIMARY is available on at least 1 FMS.

FINAL APPROACH

The flight crew must disconnect the AP at the latest at the Minimum Use Height of the AP.

VISUAL APPROACH

Applicable to: ALL

GENERAL

Perform the approach on a nominal 3 ° glideslope using visual references. Approach to be stabilized as per the OM A Stabilised Approach criteria.

Method:

- The AP 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.

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.

However, visual references must be used.

Therefore, at the beginning of the downwind leg:

Manually ACTIVATE APPR

Select FDs to OFF

Select TRK FPA to have FPV displayed

Check A/THR active.

Extend the downwind leg to 3 s/100 ft ($\pm$ 1 s/1 kt of headwind / tailwind).

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).

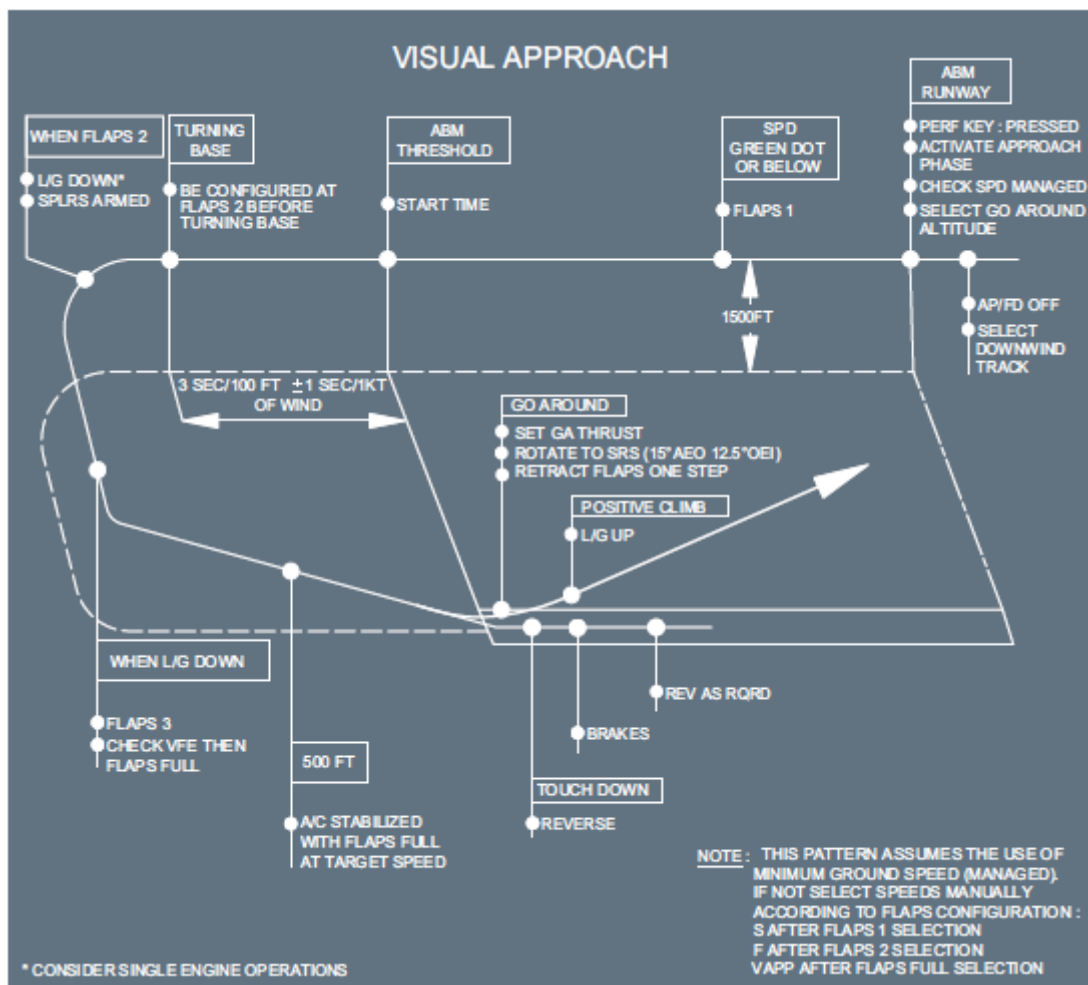
Ensure that the aircraft is stabilized as per the OM A Stabilised Approach criteria.

If the aircraft is not stabilized, the flight crew must initiate a go around, unless they think that only small corrections are necessary to rectify minor deviations from stabilized conditions due, amongst others, to external perturbations.

Avoid any tendency to “duck under” in the late stages of the approach.

Avoid destabilizing the approach in the last 100 ft, in order to have the best chance of performing a good touchdown at the desired position.

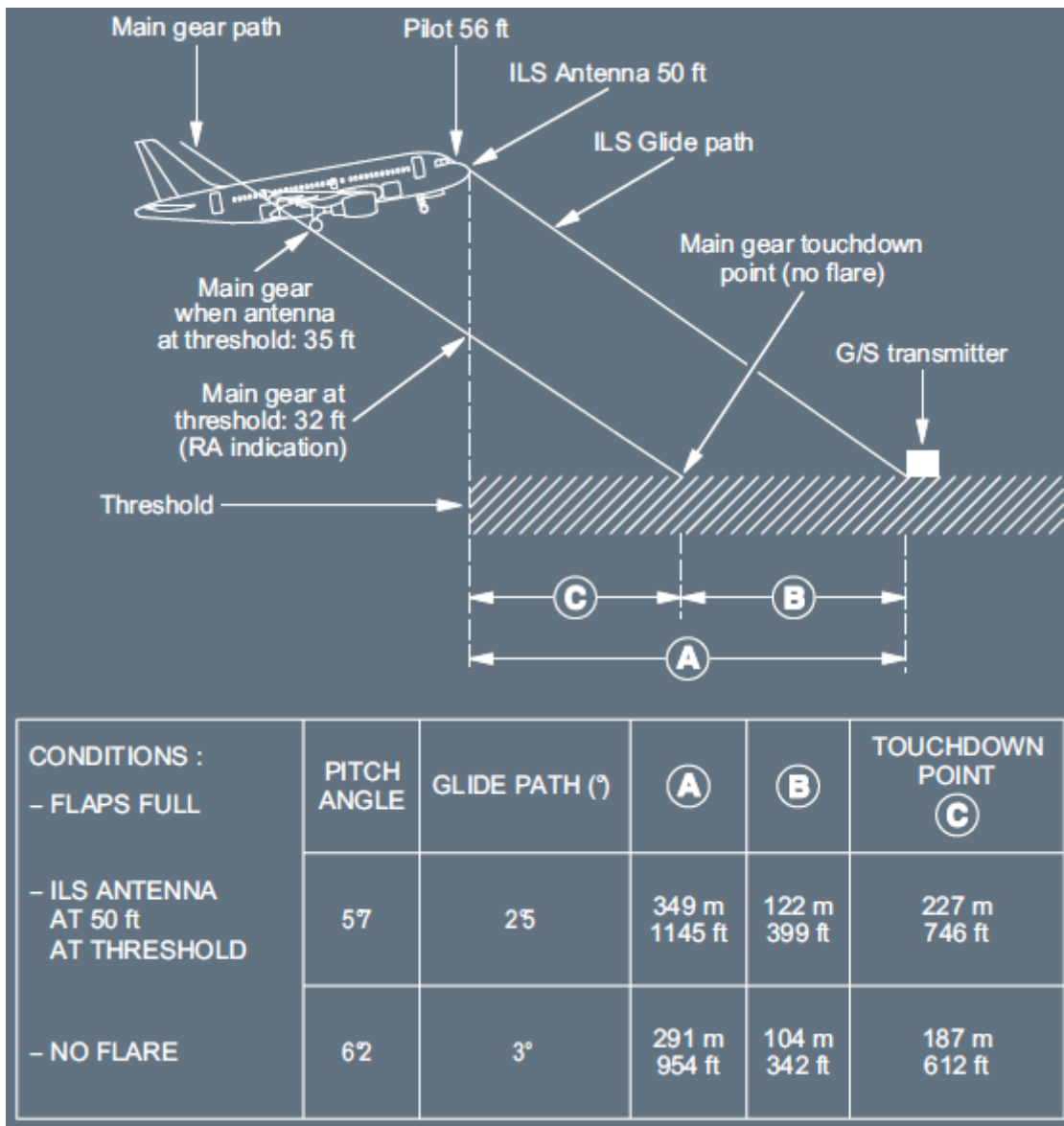
VISUAL APPROACH (1 OR 2 ENGINES) PATTERN



Landing

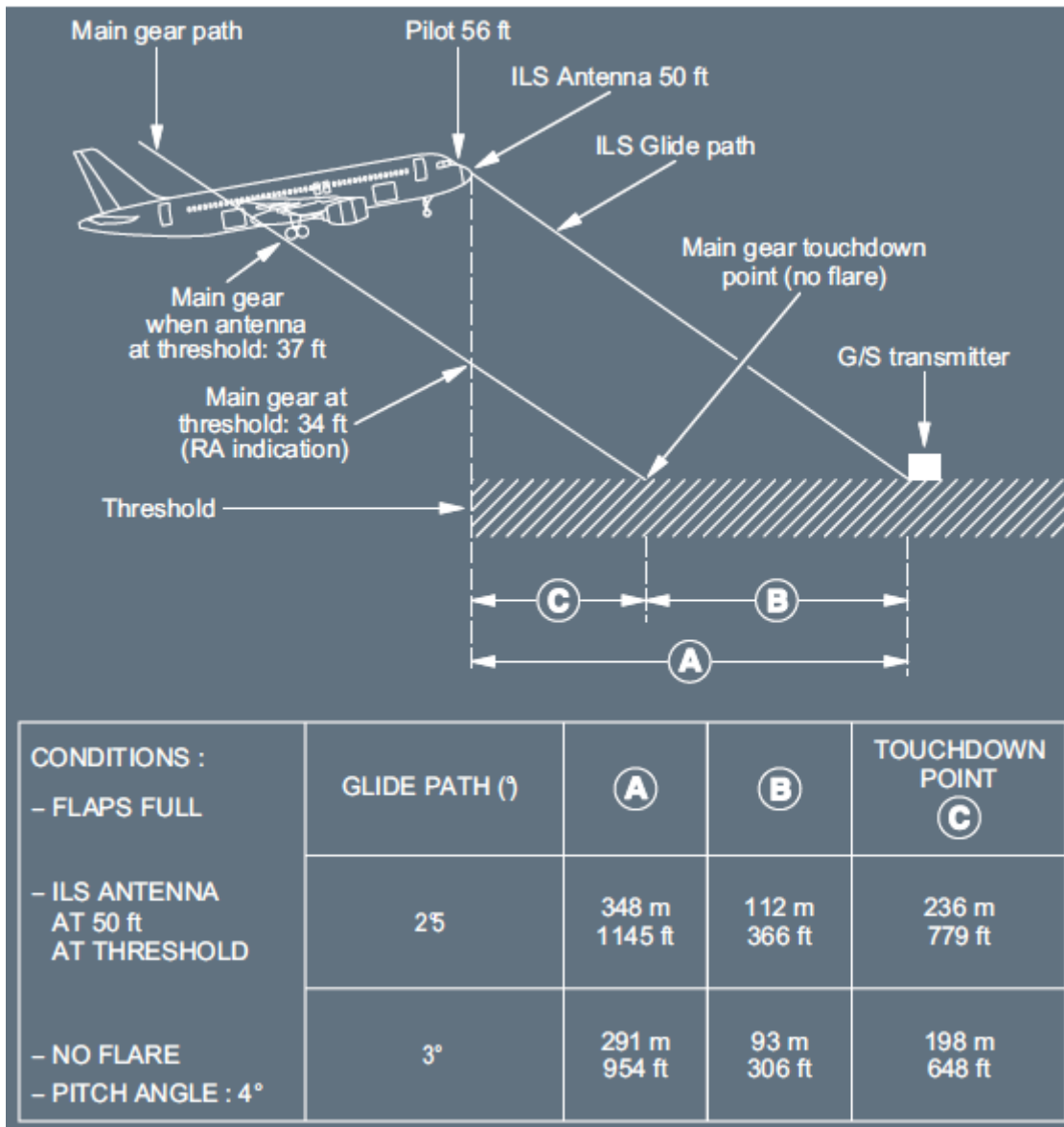
ILS/MLS FINAL APPROACH AND LANDING GEOMETRY

Applicable to: A319



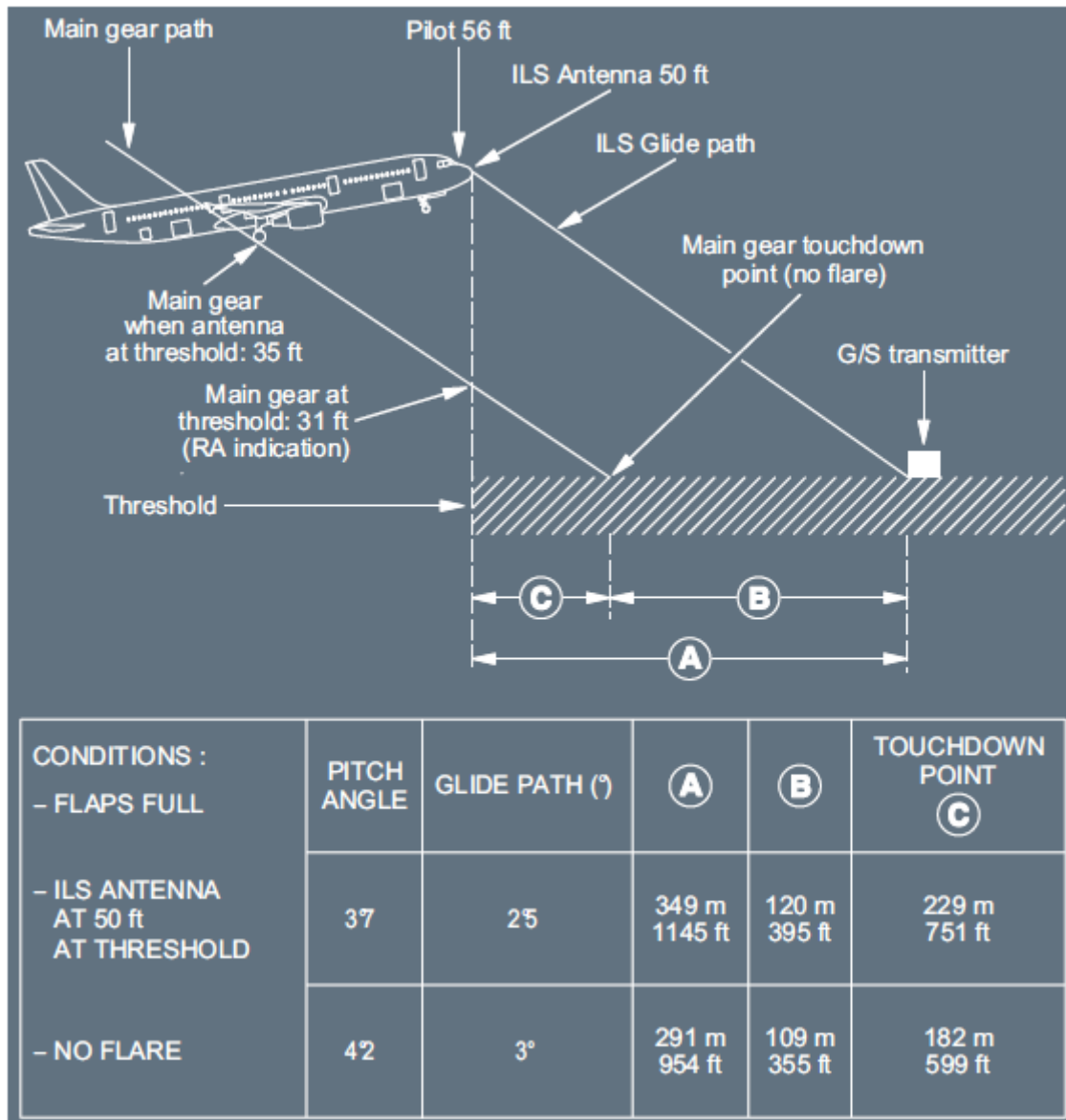
ILS FINAL APPROACH AND LANDING GEOMETRY

Applicable to: A320



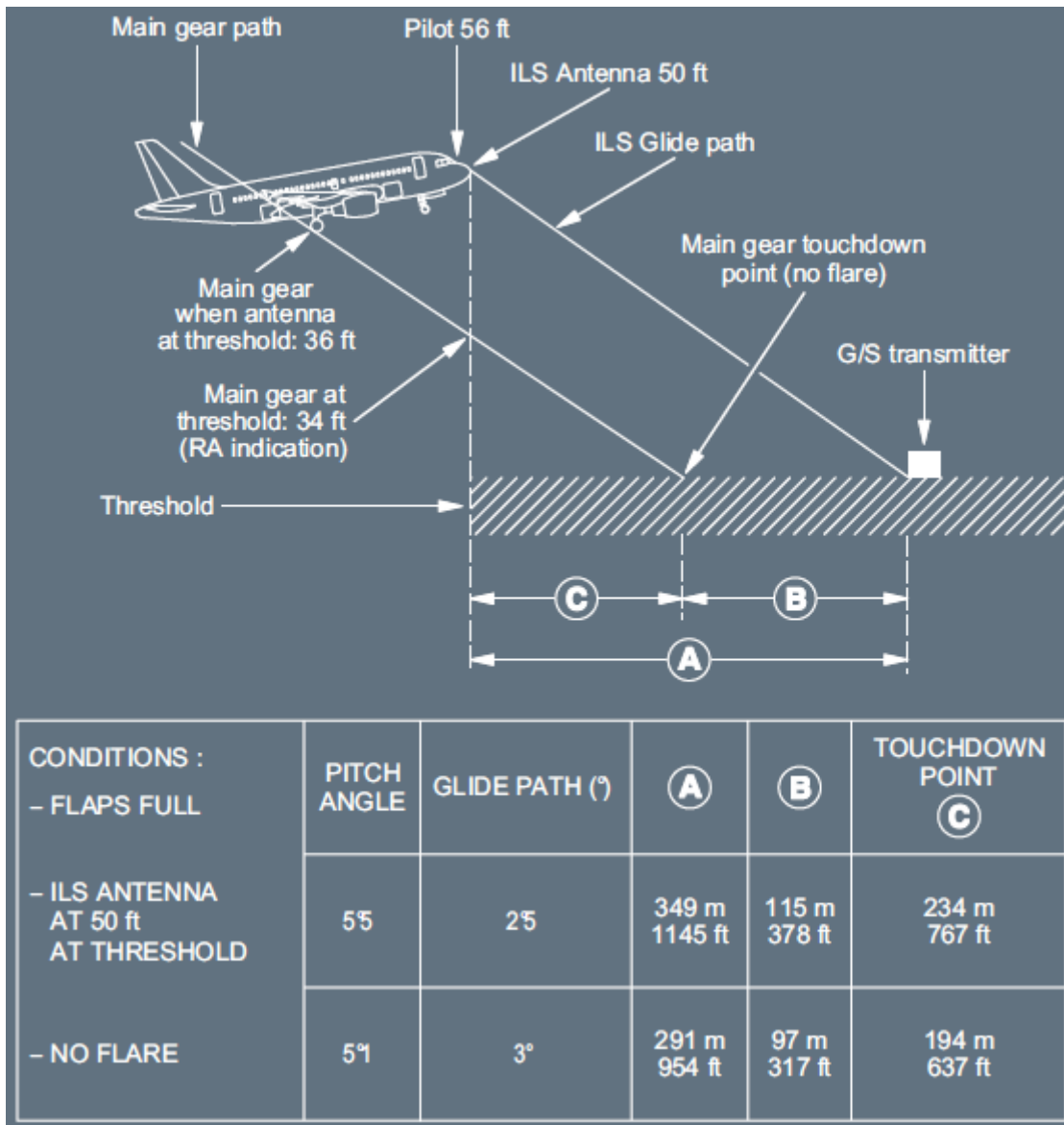
ILS FINAL APPROACH AND LANDING GEOMETRY

Applicable to: A321



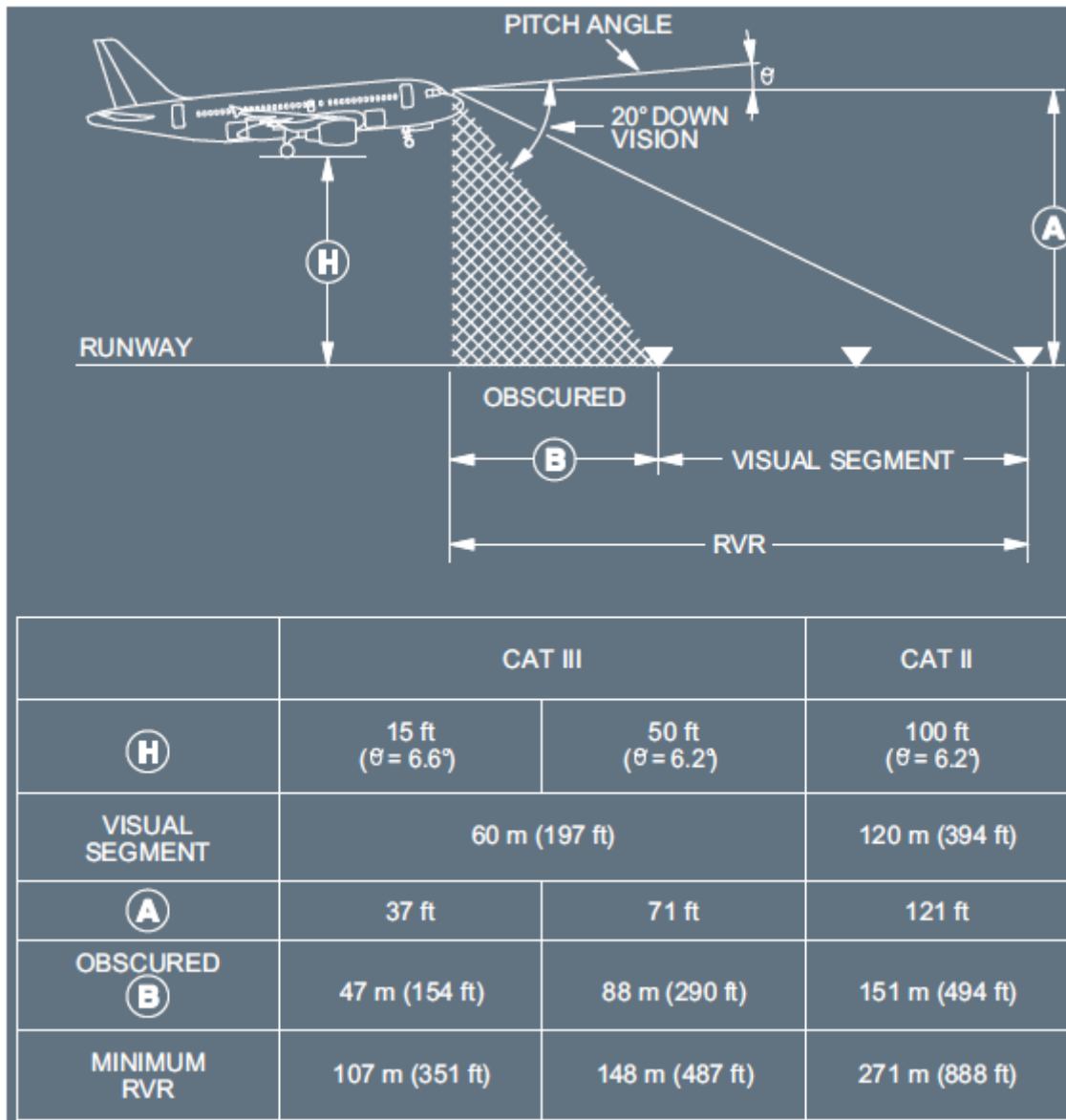
ILS FINAL APPROACH AND LANDING GEOMETRY

Applicable to: A318



MINIMUM VISUAL GROUND SEGMENTS (FLARE PHASE)

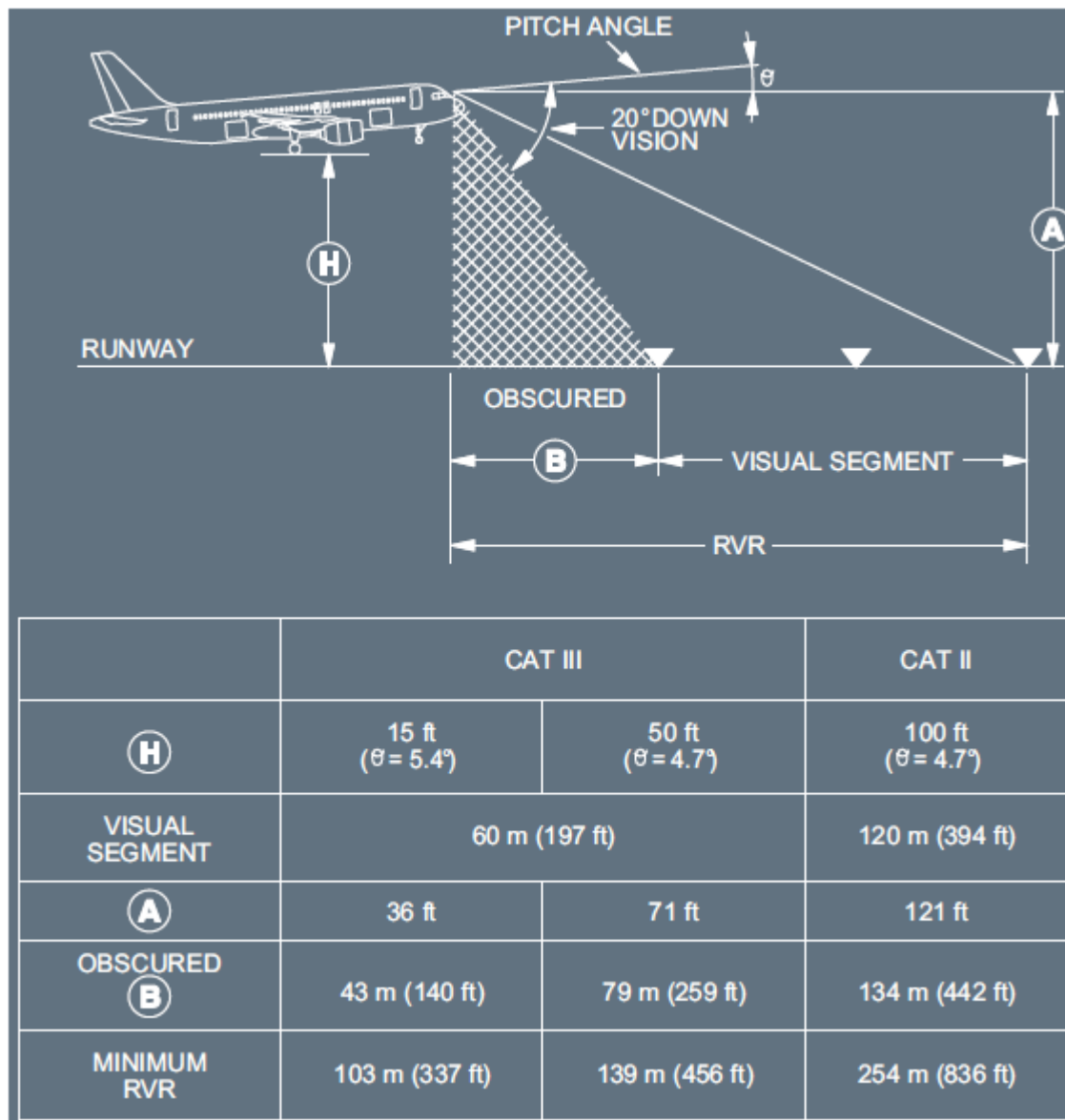
Applicable to: A319



Note: This drawing shows that, for a CAT III landing (60 m minimum visual segment), the minimum RVR is 107 m at 15 ft.

MINIMUM VISUAL GROUND SEGMENTS (FLARE PHASE)

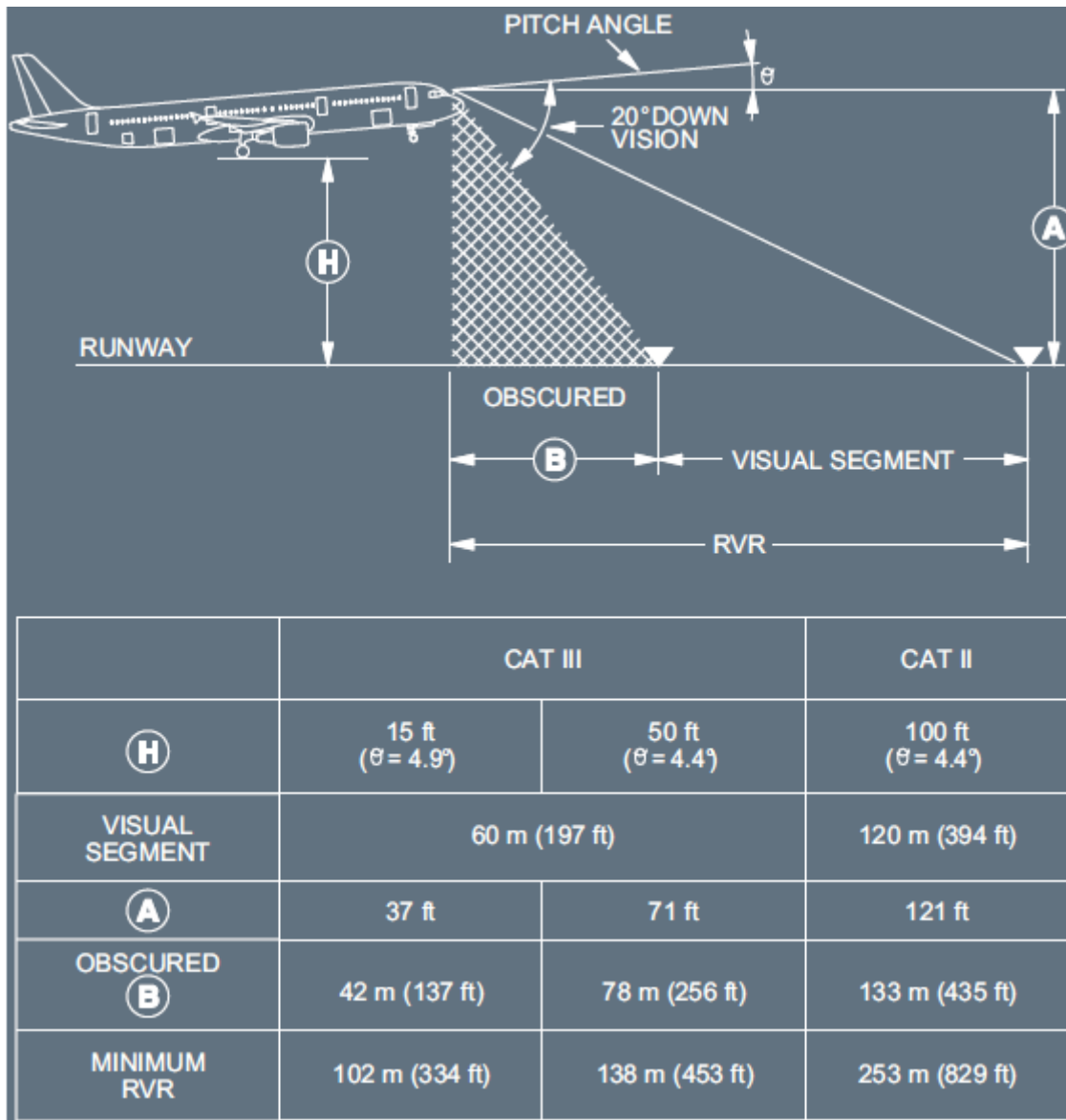
Applicable to: A320



Note: This drawing shows that, for a CAT III landing (60 m minimum visual segment), the minimum RVR is 103 m at 15 ft.

MINIMUM VISUAL GROUND SEGMENTS (FLARE PHASE)

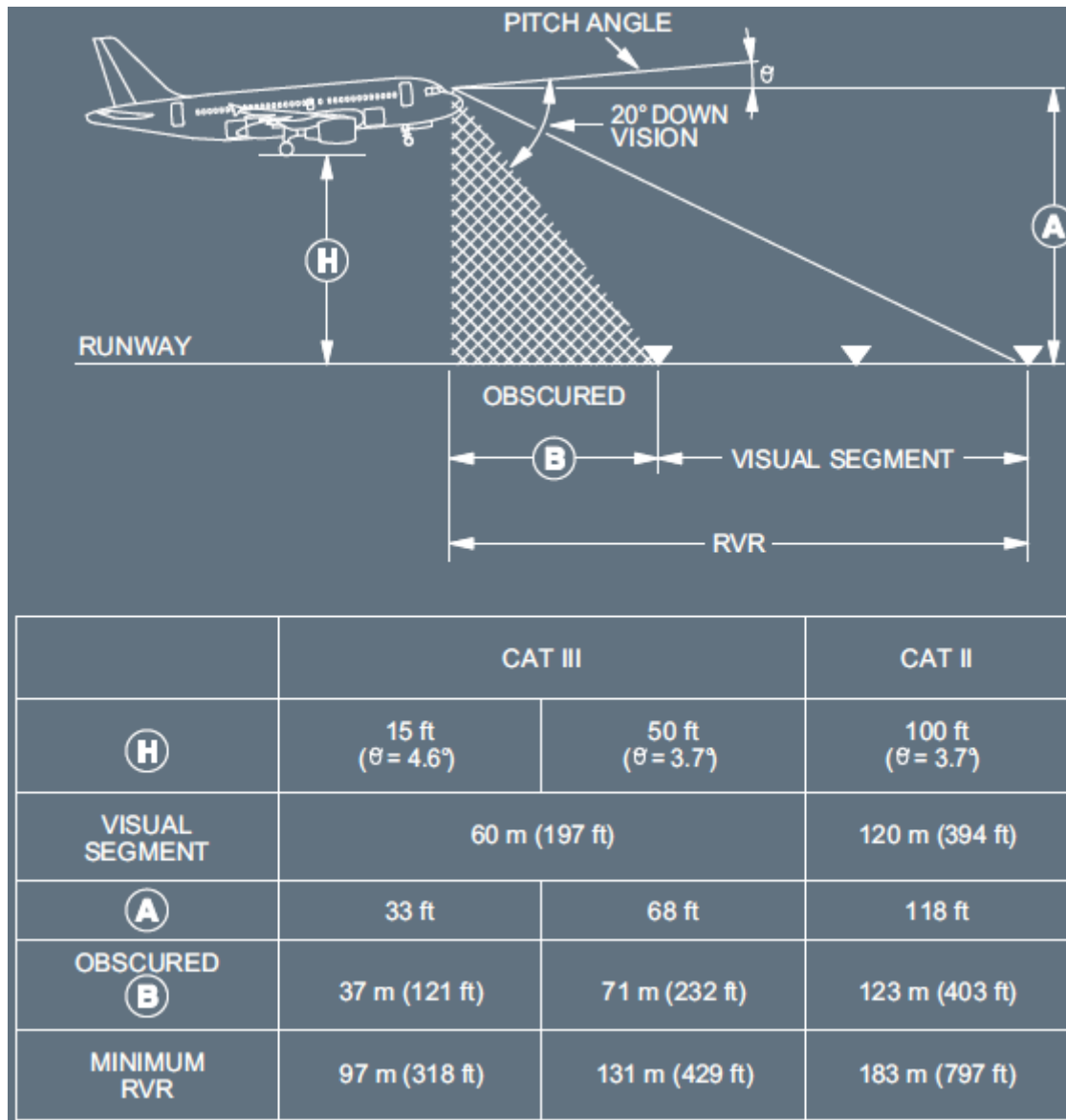
Applicable to: A321



Note: This drawing shows that, for a CAT III landing (60 m minimum visual segment), the minimum RVR is 102 m at 15 ft.

MINIMUM VISUAL GROUND SEGMENTS (FLARE PHASE)

Applicable to: A318



Note: This drawing shows that, for a CAT III landing (60 m minimum visual segment), the minimum RVR is 97 m at 15 ft.

LANDING

Applicable to: A319

FLARE

The cockpit cut-off angle is 20 °.

- **In stabilized approach conditions, the flare height is approximately 30 ft:**

FLARE PERFORM
ATTITUDE MONITOR

The PM should monitor the attitude, and call out:

- "PITCH, PITCH", if the pitch angle reaches 10 °
- "BANK, BANK", if the bank angle reaches 7 °.

THRUST levers..... IDLE

If autothrust is engaged, it automatically disconnects when the pilot sets both thrust levers to the IDLE detent.

In manual landing conditions, the "RETARD" callout is triggered at 20 ft radio height, in order to remind the pilot to retard the thrust levers.

Note: *The ground spoilers extension is inhibited if:*

- Both thrust levers remain above the idle detent, or
- One thrust lever is above idle and one thrust lever is at idle detent.

GROUND CLEARANCE

Avoid flaring high.

A tailstrike occurs, if the pitch attitude exceeds 15.5 ° (13.5 ° with the landing gear compressed).

A wingtip or engine scrape occurs, if the roll angle exceeds 18 ° (16 ° with the landing gear compressed).

Be aware of the pitch-up tendency, with ground spoiler extension.

Applicable to: A320

FLARE

The cockpit cut-off angle is 20 °.

- **In stabilized approach conditions, the flare height is approximately 30 ft:**

FLARE PERFORM
ATTITUDE MONITOR

The PM should monitor the attitude, and call out:

- "PITCH, PITCH", if the pitch angle reaches 10 °
- "BANK, BANK", if the bank angle reaches 7 °.

THRUST levers..... IDLE

If autothrust is engaged, it automatically disconnects when the pilot sets both thrust levers to the IDLE detent.

In manual landing conditions, the "RETARD" callout is triggered at 20 ft radio height, in order to remind the pilot to retard the thrust levers.

Note: *The ground spoilers extension is inhibited if:*

- Both thrust levers remain above the idle detent, or
- One thrust lever is above idle and one thrust lever is at idle detent.

GROUND CLEARANCE

Avoid flaring high.

A tailstrike occurs if the pitch attitude exceeds 13.5 ° (11 ° with the landing gear compressed).

A wingtip or engine scrape occurs if the roll angle exceeds 20 ° (16 ° with the landing gear compressed).

Be aware of the pitch-up tendency, with ground spoiler extension.

Applicable to: A321

FLARE

The cockpit cut-off angle is 20 °.

- **In stabilized approach conditions, the flare height is approximately 30 ft:**
 FLARE PERFORM
 ATTITUDE MONITOR

The PM 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

If autothrust is engaged, it automatically disconnects when the pilot sets both thrust levers to the IDLE detent.

In manual landing conditions, the "RETARD" callout is triggered at 20 ft radio height, in order to remind the pilot to retard the thrust levers.

Note: *The ground spoilers extension is inhibited if:*

- *Both thrust levers remain above the idle detent, or*
- *One thrust lever is above idle and one thrust lever is at idle detent.*

GROUND CLEARANCE

Avoid flaring high.

A tailstrike occurs, if the pitch attitude exceeds 11 ° (9.5 ° with the landing gear compressed).

A wingtip or engine scrape occurs, if the roll angle exceeds 18 ° (16 ° with the landing gear compressed).

Be aware of the pitch-up tendency, with ground spoiler extension.

Applicable to: A318

FLARE

The cockpit cut-off angle is 20 °.

- **In stabilized approach conditions, the flare height is approximately 30 ft:**

FLARE PERFORM
ATTITUDE MONITOR

The PM should monitor the attitude, and call out:

- "PITCH, PITCH", if the pitch angle reaches 10 °
- "BANK, BANK", if the bank angle reaches 7 °.

THRUST levers..... IDLE

If autothrust is engaged, it automatically disconnects when the pilot sets both thrust levers to the IDLE detent.

In manual landing conditions, the "RETARD" callout is triggered at 20 ft radio height, in order to remind the pilot to retard the thrust levers.

Note: *The ground spoilers extension is inhibited if:*

- Both thrust levers remain above the idle detent, or
- One thrust lever is above idle and one thrust lever is at idle detent.

GROUND CLEARANCE

Avoid flaring high.

A tailstrike occurs if the pitch attitude exceeds 17 ° (15.5 ° with the landing gear compressed).

A wingtip or engine scrape occurs if the roll angle exceeds 18 ° (16 ° with the landing gear compressed).

Be aware of the pitch-up tendency, with ground spoiler extension.

Applicable to: ALL

AT TOUCHDOWN

DEROTATION INITIATE

- Lower the nosewheel without undue delay.
- The PM continues to monitor the attitude.

ALL THRUST LEVERS REV MAX or REV IDLE

The flight crew must select reverse thrust immediately after main landing gear touchdown.

The flight crew must immediately select REV MAX, if any of the following occurs at any time during the landing:

- An emergency
- The deceleration is not as expected
- A failure affects the landing performance
- A long flare or a long touchdown
- An unexpected tailwind.

A small pitch up may occur during thrust reversers deployment before nose landing gear touchdown. However, the flight crew can easily control this pitch up.

As soon as the flight crew selects reverse thrust, they must perform a full-stop landing.

GROUND SPOILERS CHECK/ANNOUNCE

Check that the WHEEL SD PAGE displays the ground spoilers extended after touchdown.

If no ground spoilers are extended:

- Verify and confirm that both thrust levers are set to IDLE or REV detent.
- Set both thrust reverser levers to REV MAX, and fully press the brake pedals.

Note: *If ground spoilers are not armed, ground spoilers extend at reverser thrust selection.*

REVERSERS CHECK/ANNOUNCE

Check that the ECAM E/WD displays that the reverse deployment is as expected (REV green).

DIRECTIONAL CONTROL MONITOR/ENSURE

- Monitor directional control, if the rollout is automatic.
- Ensure directional control, if rollout is manual. Use rudder pedals for directional control.
- Do not use the nosewheel steering control handle before reaching taxi speed.
- During rollout, the flight crew should avoid sidestick inputs (either lateral or longitudinal).
- If directional control problems are encountered, the flight crew should reduce thrust to reverse idle until directional control is satisfactory.

BRAKES AS RQRD

- Monitor the autobrake, if it is ON. When required, brake with the pedals
- Although the green hydraulic system supplies the braking system, if pedals are pressed rapidly, a brake pressure indication appears briefly on the BRAKE PRESS indicator.

- Braking may begin before the nosewheel has touched down, if required for performance reasons. However, when comfort is the priority, the flight crew should delay braking until the nosewheel has touched down.

Note: If no ground spoilers are extended, the autobrake is not activated.

DECELERATION CHECK/ANNOUNCE

The deceleration is felt by the flight crew, and confirmed by the speed trend on the PFD.

AT 70 KT

SEVENTY KNOTS ANNOUNCE
BOTH THRUST LEVERS REV IDLE

It is better to reduce thrust when passing 70 kt. However, high levels of reverse thrust may be used in order to control aircraft speed in the case of an emergency.

CAUTION

Avoid the use of high levels of reverse thrust at low airspeed, unless required due to an emergency. The distortion of the airflow, caused by gases reentering the compressor, can cause engine stalls that may result in excessive EGT.

BEFORE 20 KT

AUTO BRK DISENGAGE

Disengage the autobrake to avoid some brake jerks at low speed.

The flight crew should use brake pedals to disengage the autobrake.

END OF ROLL OUT

REVERSERS STOW

- When reaching taxi speed, and before leaving the runway, deselect the reversers.
- On snow-covered grounds, the reversers should be stowed when the aircraft speed reaches 25 kt.
- When deselecting the reversers, be careful not to apply forward thrust by moving the thrust levers beyond the FWD IDLE position.

CAUTION

Except in an emergency, do not use the reverse thrust to control the aircraft speed while on taxiways.

On taxiways, the use of reversers, even when restricted to idle thrust, would have the following effects:

- The engines may ingest fine sand and debris that may be detrimental to the engines and airframe systems.
- On snow-covered areas, snow will recirculate into the air inlet, and may cause an engine flameout or rollback.

AUTOLAND

Applicable to: ALL

For an autoland, the following items must be performed in addition to previous.

AT 350 FT RA

PFD CHECK

If the ILS/GLS → /MLS → course pointer and the runway track differ by more than 5°, autoland is not authorized.

AT 40FT RA

FLARE mode CHECK ENGAGED

Monitor flare by flight instrument.

If NO FLARE mode at 30ft, discontinue the approach or perform a manual landing if visual references are acquired.

AT 30FT RA

THRUST IDLE CHECK

Monitor thrust reduction.

AT 10FT RA

BOTH THRUST LEVERS IDLE

Retard thrust levers at the "RETARD" autocalloout.

LATERAL GUIDANCE MONITOR

Monitor the lateral guidance by using external references.

AT TOUCHDOWN

Note: In the case of NWS or Anti-Skid failure, set the AP OFF at touchdown.

ROLL OUT mode CHECK ENGAGED

BOTH THRUST LEVERS REV MAX or REV IDLE

The flight crew must select reverse thrust immediately after main landing gear touchdown.

The flight crew must immediately select REV MAX, if any of the following occurs at any time during the landing:

- *An emergency*
- *The deceleration is not as expected*
- *A failure affects the landing performance*
- *A long flare or a long touchdown*
- *An unexpected tailwind.*

A small pitch up may occur during thrust reversers deployment before nose landing gear touchdown. However, the auto-flight system will control this pitch up.

As soon as the flight crew selects reverse thrust, they must perform a full-stop landing.

GROUND SPOILERS CHECK/ANNOUNCE

Check that the WHEEL SD PAGE displays the ground spoilers extended after touchdown.

If no ground spoilers are extended:

- *Verify and confirm that both thrust levers are set to IDLE or REV detent.*
- *Set both thrust reverser levers to REV MAX, and fully press the brake pedals.*

Note: *If ground spoilers are not armed, ground spoilers extend at reverser thrust selection.*

REVERSERS CHECK/ANNOUNCE

Check that the ECAM E/WD displays that the reverse deployment is as expected (REV green).

DIRECTIONAL CONTROL MONITOR/ENSURE

- *Monitor directional control, if the rollout is automatic.*
- *Ensure directional control, if rollout is manual. Use rudder pedals for directional control.*
- *Do not use the nosewheel steering control handle before reaching taxi speed.*
- *During rollout, the flight crew should avoid sidestick inputs (either lateral or longitudinal).*
- *If directional control problems are encountered, the flight crew should reduce thrust to reverse idle until directional control is satisfactory.*

BRAKES AS RQRD

- *Monitor the autobrake, if it is ON. When required, brake with the pedals*
- *Although the green hydraulic system supplies the braking system, if pedals are pressed rapidly, a brake pressure indication appears briefly on the BRAKE PRESS indicator.*
- *Braking may begin before the nosewheel has touched down, if required for performance reasons. However, when comfort is the priority, the flight crew should delay braking until the nosewheel has touched down.*

Note: *If no ground spoilers are extended, the autobrake is not activated.*

DECELERATION CHECK/ANNOUNCE

The deceleration is felt by the flight crew, and confirmed by the speed trend on the PFD.

AT 70 KT

SEVENTY KNOTS ANNOUNCE

BOTH THRUST LEVERS REV IDLE

It is better to reduce thrust when passing 70 kt. However, high levels of reverse thrust may be used in order to control aircraft speed in the case of an emergency.

CAUTION

Avoid the use of high levels of reverse thrust at low airspeed, unless required due to an emergency. The distortion of the airflow, caused by gases reentering the compressor, can cause engine stalls that may result in excessive EGT.

BEFORE 20 KT

AUTO BRK DISENGAGE

Disengage the autobrake to avoid some brake jerks at low speed.

The flight crew should use brake pedals to disengage the autobrake.

END OF ROLL OUT

BOTH THRUST LEVERS FWD IDLE

- *When reaching taxi speed, and before leaving the runway, deselect the reversers.*
- *On snow-covered grounds, the reversers should be stowed when the aircraft speed reaches 25 kt.*
- *When deselecting the reversers, be careful not to apply forward thrust by moving the thrust levers beyond the FWD IDLE position.*

CAUTION	<i>Except in an emergency, do not use the reverse thrust to control the aircraft speed while on taxiways.</i>

On taxiways, the use of reversers, even when restricted to idle thrust, would have the following effects:

- *The engines may ingest fine sand and debris that may be detrimental to the engines and airframe systems.*
- *On snow-covered areas, snow will recirculate into the air inlet, and may cause an engine flameout or rollback.*

APs OFF

Disengage the APs at the end of the roll out (when leaving the runway at the latest)

Go-Around

GO AROUND WITH FD

Applicable to: A318, A319, A320CEO and A321CEO

Apply the following three actions simultaneously:

THRUST LEVERS TOGA

If TOGA thrust is not required, set the thrust levers to TOGA detent then retard the thrust levers as required. This enables to engage the GO-AROUND phase, with associated AP/FD modes.

Note: *If the thrust levers are not set briefly to TOGA detent, the FMS does not engage the GO-AROUND phase, and flying over, or close to the airport will sequence the Destination waypoint in the F-PLN.*

ROTATION PERFORM

Initiate rotation towards 15 ° of pitch with all engines operative (approximately 12.5 ° if one engine is out) to get a positive rate of climb, then follow the SRS Flight Director pitch bars orders.

When near the ground, avoid excessive rotation rate in order to prevent a tail strike.

GO AROUND ANNOUNCE

FLAPS lever SELECT AS RQRD

Retract one step of flaps.

FMA ANNOUNCE

The following modes are displayed: MAN TOGA / SRS / GA TRK or NAV / A/THR (in blue).

Depending on the guidance modes during approach, NAV mode is either automatically armed or automatically engaged.

POSITIVE CLIMB ANNOUNCE

L/G UP ORDER

L/G SELECT UP

NAV or HDG mode AS RQRD

Reselect NAV or HDG, as required (minimum height 100 ft).

AP AS RQRD

Note: *Go-around may be flown with both autopilots engaged. Whenever any other mode engages, AP 2 disengages.*

Applicable to: A320NEO and A321NEO

Simultaneously apply the following three actions:

THRUST LEVERS.....TOGA THEN FLX/MCT

Set the thrust levers to the TOGA detent to ensure engagement of SRS GA mode. Then, set the thrust levers to FLX/MCT to engage the GA SOFT mode.

At any time, if TOGA thrust is desired, set the thrust levers to TOGA detent.

Note: *If the thrust levers are not set briefly to TOGA detent, the FMS does not engage the GO-AROUND phase, and flying over, or close to the airport will sequence the Destination waypoint in the F-PLN.*

ROTATION PERFORM

Initiate rotation towards 15° of pitch with all engines operative (approximately 12.5° if one engine is out) to get a positive rate of climb, then follow the SRS Flight Director pitch bars orders. When near the ground, avoid excessive rotation rate in order to prevent a tail strike.

GO AROUND.....ANNOUNCE

FLAPS lever.....SELECT AS RQRD

Retract one step of flaps.

FMA CHECK/ANNOUNCE

The following modes are displayed: MAN GA SOFT / SRS / GA TRK or NAV / A/THR (in blue).

If the FMA does not display MAN GA SOFT or MAN TOGA, immediately set the thrust levers to the TOGA detent.

Depending on the guidance modes during approach, NAV mode is either automatically armed or automatically engaged.

POSITIVE CLIMB.....ANNOUNCE

L/G UP ORDER

L/G SELECT UP

NAV or HDG mode.....AS RQRD

Reselect NAV or HDG, as required (minimum height 100ft).

AP AS RQRD

Note: *Go-around may be flown with both autopilots engaged. Whenever any other mode engages, AP 2 disengages.*

Applicable to: ALL

AT GO-AROUND THRUST REDUCTION ALTITUDE

THRUST levers CL

LVR CLB flashing on FMA.

AT GO-AROUND ACCELERATION ALTITUDE

Monitor that the target speed increases to green dot.

- **If the target speed does not increase to green dot:**
ALT knob CHECK and PULL
- **At F speed:**
FLAPS 1 ORDER
FLAPS 1 SELECT
- **At S speed:**
FLAPS 0 ORDER
FLAPS 0 SELECT
GND SPLRS DISARM
NOSE sw OFF
RWY TURN OFF sw OFF
OTHER EXTERIOR LIGHTS AS RQRD

The flight crew can maintain the LAND LIGHTS selector set to ON, according to airline policy or regulatory recommendations.

Note: Consider the next step:

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

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

After Landing

AFTER LANDING

Applicable to: ALL

GROUND SPOILERS DISARM

LAND LIGHTS selector RETRACT

OTHER EXTERIOR LIGHTS AS RQRD

External lights can be turned off, unless they are needed.

Set the NAV & LOGO to ON, as required, to turn on the navigation and logo lights.

RADAR OFF/STBY

PREDICTIVE WINDSHEAR SYSTEM OFF

Switching the radar and predictive windshear system to OFF after landing avoids risk of radiating persons at the gate area.

ENG MODE selector NORM

FLAPS RETRACT

Set the FLAPS 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.

*On ground, hot weather conditions may cause overheating to be detected around the bleed ducts in the wings, resulting in “**AIR L (R) WING LEAK**” warnings. Such warnings may be avoided during transit by keeping the slats in Configuration 1 when the OAT is above 30 °C.*

To avoid damage on the RTL (Rudder Travel Limit Unit) mechanical stop, the SLATS/FLAPS should be retracted before all ADIRS are set to OFF simultaneously.

TCAS SET on standby

ATC AS RQRD

ATC is set in accordance with airport requirements.

APU START

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

Note: *Prolonged use of the APU may cause a fuel imbalance. Pay particular attention to the fuel imbalance limitation for the next take-off.*

Applicable to: A318

ANTI ICE AS RQRD

If engine anti-ice is used, take care to control taxi speed, especially on wet or slippery surfaces. (N1 ground idle is increased).

Applicable to: A319, A320 and A321

ANTI ICE AS RQRD

- *If engine anti-ice is used, take care to control taxi speed, especially on wet or slippery surfaces. (N1 ground idle is increased).*
- *During ground operation, when in icing conditions and the OAT is plus 3 °C or less, the following procedure should be applied for ice shedding:*
-

CAUTION

If, during thrust increase, the aircraft starts to move, immediately retard the thrust levers to IDLE.

If ground surface conditions and the environment permit, the flight crew should accelerate the engines to minimum 50 % of N1 at intervals not greater than 15 min. There is no requirement to maintain the high thrust settings.

Applicable to: ALL

BRAKE TEMPERATURE CHECK

- *Check brake temperature on the WHEEL SD PAGE for discrepancies and high temperature.*
- *If brake fans are installed :*
Brake fans selection should be delayed for a minimum of about 5 min, or done just before stopping at the gate (whichever occurs first), to allow thermal equalization and stabilization and thus avoid oxidation of brake surface hot spots. Selecting the brake fans before reaching the gate prevents the brake fans from blowing carbon brake dust on the ground personnel.

However, when turnaround times are short, or brake temperatures are likely to exceed 500 °C, use the brake fans, disregarding possible oxidation phenomenon.

AFTER LANDING CHECKLIST COMPLETE

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

Applicable to: A318, A319, A320CEO and A321CEO

ONE ENGINE TAXI ARRIVAL

Consider One Engine Taxi Arrival Supplementary Procedure.

- **After high thrust operations:**
ENGINE MINIMUM COOLING TIME CONSIDER

- **When the APU indicates AVAIL and taxiing in a straight line:**

Note: 1. *APU start is not required prior to ENG2 shutdown when aircraft is capable of Single Engine Taxi without the APU (SETWA)*
2. *During engine shutdown, a slight jerk forward may occur if the brakes are applied while the aircraft is moving.*

ENG 2 SHUT DOWN
Y ELEC PUMP ON

If One Engine Taxi Arrival is not possible, consider single pack on ground operation

- **If one PACK is sufficient to supply air after landing:**
ONE PACK OFF

Change between the packs on each flight, in order to prevent excessive wear of one pack.

Applicable to: A320NEO and A321NEO

ONE ENGINE TAXI ARRIVAL

Consider One Engine Taxi Arrival Supplementary Procedure.

- **After high thrust operations:**
ENGINE MINIMUM COOLING TIME CONSIDER
- **When taxiing in a straight line:**
Note: A slight jerk forward may occur if the brakes are applied while the aircraft is moving.
ENG 2 SHUT DOWN
Y ELEC PUMP ON

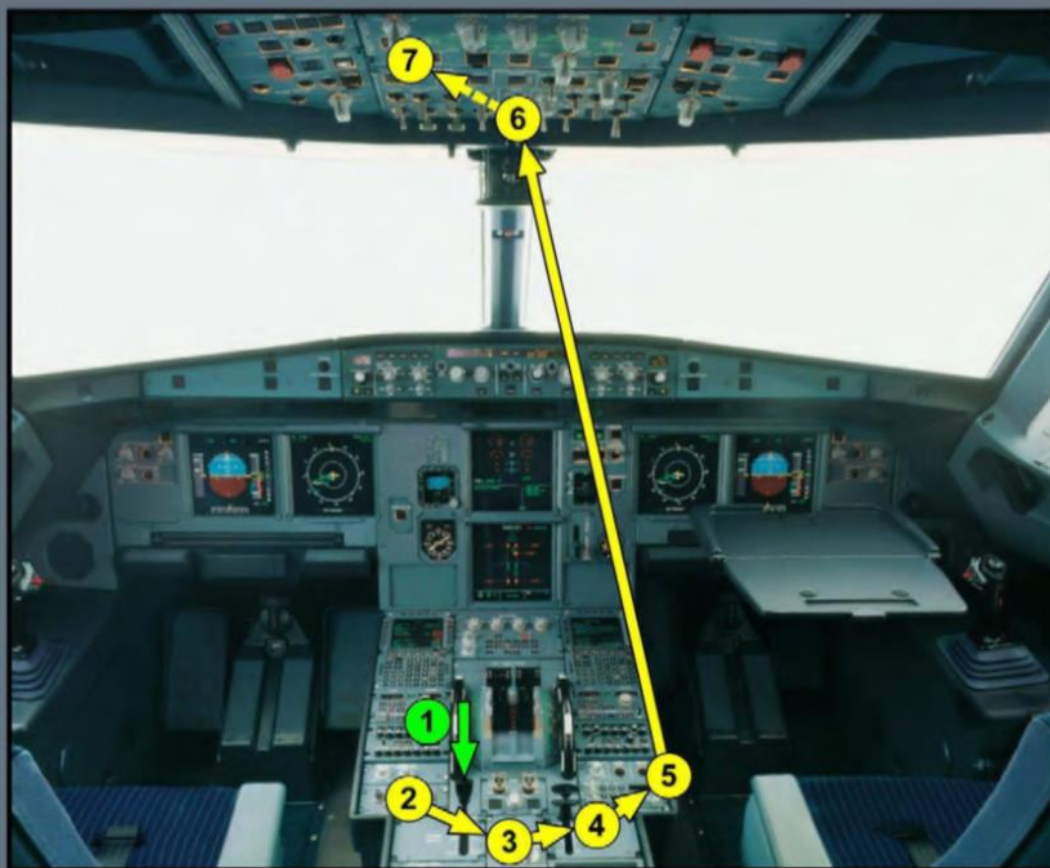
If One Engine Taxi Arrival is not possible, consider single pack on ground operation

- **If one PACK is sufficient to supply air after landing:**
ONE PACK OFF

Change between the packs on each flight, in order to prevent excessive wear of one pack.

Applicable to: ALL

AFTER LANDING – FLOW PATTERN



PF ACTIONS

1 GRND SPLRS.....DISARM

PM ACTIONS

- 2** RADAR/PREDICTIVE WINDSHEAR....OFF
- 3** ENG MODE SEL.....NORM
- 4** FLAPS.....RETRACT
- 5** { ATC.....AS RQRD
TCAS.....SET on standby
- 6** APU.....START
- 7** ANTI ICE.....AS RQRD

Parking

PARKING

Applicable to: A320 NEO, A321NEO

CAUTION

With brakes temperature above 200 °C, brake vibrations may be experienced. The flight crew must report any occurrence of abnormal brake vibrations in the logbook.

Applicable to: ALL

Prior to performing this check, consider "GROUND OPERATIONS IN HEAVY RAIN"

SLIDES DISARM ORDER

PM makes the PA "CABIN CREW, DOORS TO MANUAL AND CROSSCHECK" immediately prior to arrival at the parking position.

ACCU PRESS indicator CHECK

The ACCU PRESS indication must be in the green band. In case of low accumulator pressure, chocks are required before engine 1 shutdown.

PARKING BRAKE handle ON

BRAKES PRESS indicator.....CHECK

Check for normal indications.

ANTI-ICE..... OFF

ONE ENGINE TAXI ARRIVAL

Y ELEC PUMP OFF

Applicable to: A319, A320CEO and A321 CEO

● **If APU is not available**

EXT PWR ON

● **No less than 3 min after high thrust operations:**

ENG 1 MASTER sw and ENG 2 MASTER sw..... OFF

Check that engine parameters decrease.

The DOOR/OXY SD PAGE is displayed on the lower ECAM display.

Note: *The flight crew must operate the engines at or near idle thrust for a cooling period of 3min before engine shutdown, in order to thermally stabilize the engines.*

Idle reverse thrust and normal thrust to maneuver during taxi (i.e. at or near idle), are not considered as high thrust operations. Therefore, both of the following applies:

- *If the flight crew uses idle reverse thrust for landing and normal thrust to maneuver during taxi after landing, the cooling period starts when the flight crew retards the thrust lever during the flare*
- *If the flight crew uses maximum reverse for landing, the cooling period starts when the flight crew sets the thrust lever to idle reverse during the landing rollout.*

However, if operationally necessary, all engines can be shut down when the aircraft arrives at the gate, regardless of the time necessary for landing.

Before engine shutdown, routine cooling periods that last less than the required time, can result in engine degradation.

Applicable to: A318

- **If APU is not available**
EXT PWR ON
- **No less than 3 min after high thrust operations:**
ENG 1 MASTER sw and ENG 2 MASTER sw..... OFF

CAUTION

If JP4 fuel is used at ambient temperatures higher than 10 °C, dry motor the engines for 2 min after engine shutdown. This dry motor period should start approximately 90 s after the master lever is selected OFF.

Check that engine parameters decrease.

The DOOR/OXY SD PAGE is displayed on the lower ECAM display.

Note: *The flight crew must operate the engines at or near idle thrust for a cooling period of 3min before engine shutdown, in order to thermally stabilize the engines.*

Idle reverse thrust and normal thrust to maneuver during taxi (i.e. at or near idle), are not considered as high thrust operations. Therefore, both of the following applies:

- *If the flight crew uses idle reverse thrust for landing and normal thrust to maneuver during taxi after landing, the cooling period starts when the flight crew retards the thrust lever during the flare*
- *If the flight crew uses maximum reverse for landing, the cooling period starts when the flight crew sets the thrust lever to idle reverse during the landing rollout.*

However, if operationally necessary, all engines can be shut down when the aircraft arrives at the gate, regardless of the time necessary for landing.

Before engine shutdown, routine cooling periods that last less than the required time, can result in engine degradation.

Applicable to: A320NEO and A321NEO

- **If APU is not available**
EXT PWR ON
- **No less than 3 min after high thrust operations:**
ENG 1 MASTER sw and ENG 2 MASTER sw..... OFF

Check that engine parameters decrease.

The DOOR/OXY SD PAGE is displayed on the lower ECAM display.

Note: *The flight crew must operate the engines at or near idle thrust for a cooling period of 3min before engine shutdown, in order to thermally stabilize the engines.*

Idle reverse thrust and normal thrust to maneuver during taxi (i.e. at or near idle), are not considered as high thrust operations. Therefore, both of the following applies:

- *If the flight crew uses idle reverse thrust for landing and normal thrust to maneuver during taxi after landing, the cooling period starts when the flight crew retards the thrust lever during the flare*
- *If the flight crew uses maximum reverse for landing, the cooling period starts when the flight crew sets the thrust lever to idle reverse during the landing rollout.*

Before engine shutdown, routine cooling periods that last less than the required time, can result in engine degradation.

Applicable to: ALL

SLIDES CHECK DISARMED

Check slides disarmed on the DOOR/OXY SD PAGE. Warn the cabin crew, if any slide is not disarmed.

SEAT BELTS sw OFF
BEACON lights OFF

Turn off the BEACON lights, when all engines are spooled down.

OTHER EXTERIOR LIGHTS AS RQRD

Applicable to: A318, A319 and A320CEO

FUEL PUMPS OFF

Applicable to: A320NEO, A321CEO and A321NEO

FUEL PUMPS/CTR XFR VALVES OFF
Switch off the fuel pumps and the center tank transfer valves.

Applicable to: ALL

ELECTRICAL POWER APU/EXT

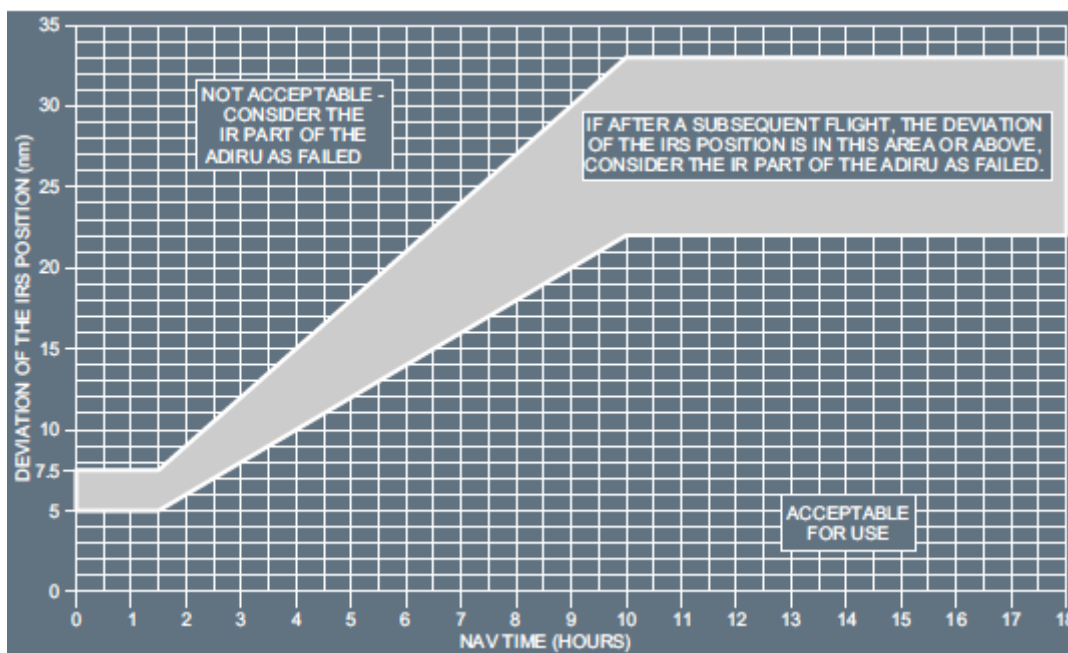
Transfer to EXTERNAL POWER if available.

APU/APU BLEED AS RQRD

The APU bleed may be selected ON if it is necessary to condition the cabin after shutdown while the passengers are disembarking.

ATC.....SET on standby
IRS PERFORMANCE CHECK

- The NAV TIME is the cumulated block time since the latest IRS alignment (fast or complete).
- On the MCDU POSITION MONITOR page, read the deviation of each IRS position from the FMGC position and check that the value does not exceed the following:



FUEL QUANTITY.....CHECK

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.

STS pb (ECAM Control panel)..... PRESS

Check the STATUS page.

(BRAKE FAN) OFF

Switch off, when not required.

DUs.....DIM

Dim EFIS, ECAM and MCDU display units.

PARKING CHECKLIST..... COMPLETE

Applicable to: A318

REPORT SEVERE ICING CONDITIONS

Report severe icing conditions in the log book, requiring inspections of the fan acoustic panels of the engines during the walkaround.

Applicable to: ALL

FREEZING FOG

In freezing fog, ice may build up on the back of the fan blades. Request from Engineering a check of the blades on arrival.

Securing the Aircraft

SECURING THE AIRCRAFT

Applicable to: ALL

GENERAL

Prior to performing this check, COLD WEATHER should be taken into account.

PARKING BRAKE

PARK BRK handle CHECK ON

To reduce hydraulic leak rate in the brake accumulator, keep the parking brake on.

OXYGEN CREW SUPPLY

OXYGEN CREW SUPPLY pb..... OFF

ADIRS

ALL IR MODE selectors OFF

After the shutdown of the ADIRS, the flight crew must wait 10 s before the shutdown of the electrical supply. This time ensures that the ADIRS memorize the most recent data.

EXTERIOR LIGHTS

EXTERIOR LIGHTS..... OFF

APU

APU BLEED pb-sw OFF

APU MASTER SW pb-sw OFF

Switch off the APU if EXTERNAL POWER is ON, or if electrical services are no longer required.

EMER EXIT LT sw OFF

SIGNS sw OFF

EXTERNAL POWER

EXT PWR pb..... AS RQRD

BAT 1 AND 2

BAT 1 pb-sw and BAT 2 pb-sw OFF

Wait until the APU flap is fully closed (about 2 min 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, APU fire extinguishing is not available.

SECURING THE AIRCRAFT CHECKLIST

SECURING THE AIRCRAFT CHECKLIST COMPLETE

Standard Callouts

COMMUNICATIONS AND STANDARD TERMS

Applicable to: ALL

Standard phraseology is essential to ensure effective crew communication. The phraseology should be concise and exact. The following Chapter lists the callouts that should be used as standard. They supplement the callouts identified in the SOP.

These standard Airbus callouts are also designed to promote situational awareness, and to ensure crew understanding of systems and their use in line operation.

CHECKLIST CALLOUTS

Applicable to: ALL

- "CHECK": A command for the other pilot to check an item.
- "CHECKED": A response that an item has been checked.
- "CROSSCHECKED": A callout verifying information from both pilot stations.

If a checklist needs to be interrupted, announce: "HOLD CHECKLIST AT ____" and "RESUME CHECKLIST AT ____" for the continuation.

Upon completion of a checklist announce: "____CHECKLIST COMPLETE".

ACTIONS COMMANDED BY PF

Applicable to: ALL

GENERAL

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 and MCDU must be checked on the PFD and ND (eg.: "FL 350 blue", "FL 200 magenta"). Ensure that the correct FCU knob is used, then verify indications 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__FT"
- "SET FL ____"
- "SET HDG ____"

MANAGE/PULL

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

The "PULL" command means pulling an FCU knob to engage a selected mode or target. Example:

- "PULL HDG 090" (HDG/TRK knob is pulled and turned).

- “MANAGE NAV” (HDG/TRK knob is pushed).
- “FL 190 PULL” (ALT knob is turned and pulled).
- “FL 190 MANAGE” (ALT knob is turned and pushed).
- “PULL SPEED 250 KNOTS” (SPD/MACH knob is pulled and turned).
- “MANAGE SPEED” (SPD/MACH knob is pushed).

Note: If the value was previously set, there is no requirement to repeat the figure. Simply call e.g. PULL HDG: PULL SPEED: FL PULL.

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

V/S Plus (or Minus) 700 PULL, or

FPA Minus 3 ° PULL (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 (The HDG-V/S / TRK-FPA pb is pushed.)

FMA

Applicable to: ALL

- First, the PF should announce all changes to the active modes without the associated color, (e.g. green, white): “NAV”, “AP1”.
- Then the PM should announce all changes to the armed modes or the displayed altitude/FL with the associated color (e.g. blue, magenta): “ALT blue, FL120”, “LOC blue”.

Modes with a capture sub-mode require only one call (e.g. call ALT* or ALT).

Flying the aircraft and making selections takes priority over announcing the FMA.

If an FMA call is missed by either pilot then the other should call, “Your FMA.”

ALTITUDE

Applicable to: ALL

The PM calls out "one thousand to go" when passing 1 000 ft before the cleared altitude or FL, and the PF calls out "checked".

FLAPS OR GEAR CALLOUTS

Applicable to: ALL

FLAPS CALLOUTS

FLAPS CONFIGURATION	CALLOUT
1	"FLAPS ONE"
1 + F	"FLAPS ONE"
0	"FLAPS ZERO"

The reply will be given when selecting the new flap position.

e.g.:

	CALLOUT	REMARK
PF	"FLAPS ONE"	
PM	"FLAPS ONE"	PM replies and checks the speed: - Above the S or F speed and accelerating (Takeoff) - Below VFE Next and decelerating (Approach) PM then selects the FLAPS lever position and checks the blue number on the ECAM flaps indicator to confirm the correct selection has been made.

GEAR CALLOUTS

	CALLOUT	REMARKS
PF	"GEAR UP (DOWN)"	
PM	"GEAR UP (DOWN)"	The PM replies and checks the speed, then selects the L/G lever position and checks the red lights on the LDG GEAR indicator to confirm gear operation.

FLIGHT PARAMETERS IN APPROACH

Applicable to: A318, A319 and A320

The PM will make callouts for the following conditions during final approach. Attitude callouts also to be made through to landing.

- "SPEED" if the speed decreases below the speed target -5 kt or increases above the speed target +10 kt.
- "SINK RATE" when the descent rate exceeds 1 000 ft/min.
- "BANK" when bank angle becomes greater than 7 °.
- "PITCH" when pitch attitude becomes lower than -2.5 ° or higher than +10 °.
- "LOC" or "GLIDE" when either localizer or glide slope deviation is:
 - ½ dot LOC
 - ½ dot GS.
- "CROSS TRACK" when the XTK is greater than 0.1 NM.
- "V/DEV" when the vertical deviation is greater than ½ dot.
- "COURSE" when greater than ½ dot or 2.5 ° (VOR) or 5 ° (ADF).
- "___ FT HIGH (LOW)" at altitude checks points.

FLIGHT PARAMETERS IN APPROACH

Applicable to: A321

The PM will make callouts for the following conditions during final approach. Attitude callouts also to be made through to landing.

- "SPEED" if the speed decreases below the speed target -5 kt or increases above the speed target +10 kt.
- "SINK RATE" when the descent rate exceeds 1 200 ft/min.
- "BANK" when bank angle becomes greater than 7 °.
- "PITCH" when pitch attitude becomes lower than -2.5 ° or higher than +7.5 °.
- "LOC" or "GLIDE" when either localizer or glide slope deviation is:
 - ½ dot LOC
 - ½ dot GS.
- "CROSS TRACK" when the XTK is greater than 0.1 NM.
- "V/DEV" when the vertical deviation is greater than ½ dot.
- "COURSE" when greater than ½ dot or 2.5 ° (VOR) or 5 ° (ADF).
- "___ FT HIGH (LOW)" at altitude checks points.

FLIGHT PARAMETERS IN GO-AROUND

Applicable to: ALL

During a go-around, the PM will make a callout for the following conditions:

- "BANK": If the bank angle becomes greater than 7 °,
- "PITCH": If the pitch attitude becomes greater than 20 ° up or less than 10 ° up,
- "SINK RATE": If there is no climb rate.

PF/PM DUTIES TRANSFER

Applicable to: ALL

To transfer control, flight crewmembers must use the following callouts:

- To give control: The pilot calls out "YOU HAVE CONTROL". The other pilot accepts this transfer by calling out "I HAVE CONTROL", before assuming PF duties.
- To take control: The pilot calls out "I HAVE CONTROL". The other pilot accepts this transfer by calling out "YOU HAVE CONTROL", before assuming PM duties.

ABNORMAL AND EMERGENCY CALL OUTS

Applicable to: ALL

ECAM PROCEDURES

1. "ECAM ACTION" is commanded by PF when required.
2. "CLEAR ___ (title of the system) ?" is asked by the PM for confirmation by the PF, that all actions have been taken/reviewed on the present 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. For status page; REMOVE STATUS will be used.
4. "ECAM ACTIONS COMPLETE" is the announcement by the PM that all APPLICABLE ACTIONS have been completed.

5. Should the PF require an action from the PM during ECAM procedures, the order "STOP ECAM" will be used. When ready to resume the ECAM the order "CONTINUE ECAM" will be used.

MEMORY ITEMS

The aim of such callouts is to callout the appropriate procedure by calling out, in most cases, the title of the procedure. This will allow the crew to be aware of the situation and be prepared to properly react (crew coordination, task sharing and communication).

GPWS

As soon as avoidance manoeuvre is envisaged.

"PULL UP TOGA"

REACTIVE WINDSHEAR

"WINDSHEAR TOGA"

UNRELIABLE SPEED INDICATION

"UNRELIABLE SPEED"

TCAS

As soon as "TRAFFIC" warning is triggered

"TCAS, I have control"

EMERGENCY DESCENT

"EMERGENCY DESCENT"

LOSS OF BRAKING

"LOSS OF BRAKING"

STALL RECOVERY

As soon as any stall indication is recognized.

"STALL, I have control"

STALL WARNING AT LIFT-OFF

"STALL, TOGA 15°"

SUMMARY FOR EACH PHASE

Applicable to: ALL

TO REMOVE GROUND SUPPLY

EVENT	PF or PM	GND Mech
Initial ground contact	FLIGHT DECK TO GROUND	
External ____ disconnection	REMOVE EXTERNAL ____	EXTERNAL ____ REMOVED

BEFORE ENGINE START/PUSHBACK

EVENT	PF	PM
Before start up clearance received	BEFORE START CHECKLIST	DOWN TO THE LINE
After start up clearance received	BELOW THE LINE	BEFORE START CHECKLIST COMPLETE

PUSHBACK/ENGINE START

EVENT	PF	Headset Operative
When ready for pushback	ARE WE READY TO PUSH?	GROUND CHECKS COMPLETED, READY TO PUSH
Pushback clearance received from ATC	PUSH APPROVED, FACE ____ BRAKES RELEASED	PUSH APPROVED FACE _____ RELEASE BRAKES
When ready to start engines	ARE WE CLEAR TO START ENGINES? STARTING ENG(S)_____	CLEAR TO START ENG(S) _____
When pushback completed	BRAKES SET TO PARK	SET BRAKES TO PARK
When headset operative no longer required	CLEAR TO DISCONNECT, AWAITING VISUAL CLEARANCE	DISCONNECTING, AWAIT VISUAL CLEARANCE FROM LEFT/RIGHT

AFTER ENGINE START		
EVENT	PF	PM
All engines started and stabilized and GND is disconnected	AFTER START CHECKLIST	AFTER START CHECKLIST COMPLETE

TAXI		
EVENT	PF	PM
When taxi clearance obtained	CLEAR LEFT (RIGHT) SIDE	CLEAR RIGHT (LEFT) SIDE
Brake check	BRAKE CHECK	PRESSURE ZERO
Flight control check in the following sequence (the check is possible before the start of taxi)	FLIGHT CONTROL CHECK	
1. Elevators		FULL UP, FULL DOWN, NEUTRAL
2. Ailerons/Spoilers		FULL LEFT, FULL RIGHT, NEUTRAL
3. Rudder	RUDDER	FULL LEFT, FULL RIGHT, NEUTRAL
After PM has checked their flight controls		FLIGHT CONTROL CHECK COMPLETE
During taxi	BEFORE TAKEOFF CHECKLIST	DOWN TO THE LINE
Line up on the runway	BELOW THE LINE	BEFORE TAKEOFF CHECKLIST COMPLETE

TAKEOFF		
EVENT	PF	PM
Setting thrust levers to initial stabilization value	TAKEOFF	
Before passing 80 kt		THRUST SET
At 100 kt	CHECKED	ONE HUNDRED KNOTS
At V1		V1
At VR		ROTATE
Gear retraction	GEAR UP	POSITIVE CLIMB GEAR UP
Checklist	AFTER TAKEOFF/CLIMB CHECKLIST	DOWN TO THE LINE
When cleared to a Flight Level	BELOW THE LINE	AFTER TAKEOFF/CLIMB CHECKLIST COMPLETE

MALFUNCTION BEFORE V1 AT TAKEOFF

EVENT	CAPT	F/O
If CONTINUE decision	CONTINUE	
If STOP decision	STOP	
	PF	PM
REV green on EWD		REVERSE GREEN ⁽¹⁾
Deceleration		DECEL ⁽²⁾

⁽¹⁾ In case of failure or if no reverse deployment, NO REVERSE ENGINE__ or NO REVERSE.

⁽²⁾ In case of failure or no positive deceleration, NO DECEL.

DECEL callout means that the deceleration is felt by the crew, and confirmed by the speed trend on the PFD.

Climb and Descent

EVENT	PF	PM
Barometric setting change and subsequent altimeter cross-check	SET STANDARD (QNH)	STANDARD or (____) SET AND CROSSCHECKED
Cleared above MSA	CLEARANCE ABOVE MSA	MSA ____ FT ⁽¹⁾
Cleared below MSA	CLEARANCE BELOW MSA	MSA ____ FT ⁽²⁾
FL100/10 000 ft & FL200	ALTIMETER CHECK	FL100/10 000 ft or FL200, CLIMBING/DESCENDING ____, QNH ____ / STD SET
1000 ft to cleared altitude	CHECKED	1000 TO GO

⁽¹⁾ PM replies with a response to justify the continuation of flight whilst beneath MSA.

⁽²⁾ PM replies with a response to justify the continuation of the descent below MSA

APPROACH

EVENT	PF	PM
Activation of Approach Phase	ACTIVATE APPROACH PHASE	APPROACH PHASE ACTIVATED
Approach checklist	APPROACH CHECKLIST	DOWN TO THE LINE
When cleared to an altitude	BELOW THE LINE	APPROACH CHECKLIST COMPLETE
RA alive	POSITION CHECK ⁽¹⁾⁽²⁾	[Cognitively assess aircraft position and justify continued approach if appropriate] ⁽³⁾
At GS* or below GA altitude for NPA	SET/CHECK GA ALTITUDE	
FAF	FINAL APPROACH FIX, ALTITUDE CHECKED	FINAL APPROACH FIX, ALTITUDE CHECKED
Having performed glideslope check	GLIDESLOPE CHECKED	GLIDESLOPE CHECKED
Landing checklist	LANDING CHECKLIST	LANDING CHECKLIST COMPLETE

⁽¹⁾ Crew awareness, crew should now keep RA in scan to landing.

⁽²⁾ PM monitors pin-programmed auto callout, or announces if inoperative.

⁽³⁾ Both pilots will check aircraft position relative to terrain position. PM justifies continuing the approach with a positive statement after comparing significant factors in relation to terrain.

MANUAL LANDING

EVENT	PF	PM
Visual reference achieved		VISUAL ⁽⁶⁾
1 000 ft RA		ONE THOUSAND ⁽¹⁾ STABLE, or SPEED, or UNSTABLE, GO AROUND
Before 500 ft RA if stable		STABLE, MANLAND __ BARO ⁽⁶⁾
500 ft RA not stable		FIVE HUNDRED ⁽¹⁾ UNSTABLE, GO AROUND
100 ft above MDA/DH	ONE HUNDRED ABOVE ⁽²⁾	
MDA no visual reference	MINIMUMS ⁽²⁾	GO AROUND
MDA visual reference	MINIMUMS ⁽²⁾	CONTINUE, I HAVE CONTROL ⁽⁵⁾⁽⁷⁾
HANDOVER OF CONTROL⁽⁵⁾		
After touchdown Ground spoilers extended		SPOILERS ⁽³⁾
REV green on EWD		REVERSE GREEN ⁽⁴⁾
Deceleration		DECEL ⁽⁸⁾
At 70 kts		SEVENTY KNOTS

⁽¹⁾ PM monitors pin-programmed auto callout, or announces if inoperative.

⁽²⁾ PF monitors the pin-programmed auto callout, or announces if inoperative.

⁽³⁾ If the spoilers are not extended, call NO SPOILER.

⁽⁴⁾ If no reverse deployment, call NO REVERSE ENGINE__ or NO REVERSE, as appropriate.

⁽⁵⁾ At this point P1 becomes PF in anticipation of landing.

⁽⁶⁾ Once visual call made no need to call MANLAND __ BARO.

⁽⁷⁾ If AP disconnected by PF for manual landing, 'CAT 1' FMA call may be omitted.

⁽⁸⁾ DECEL Callout means that the deceleration is felt by the crew, and confirmed by the speed trend on the PFD.
 If no positive deceleration, NO DECEL.

AUTOMATIC LANDING

EVENT	PF	PM
1000 feet RA		ONE THOUSAND ⁽¹⁾ STABLE, or SPEED, or UNSTABLE, GO AROUND
Before 500 ft RA if stable		STABLE, AUTOLAND ____ RADIO or AUTOLAND (CAT 3B no DH) I HAVE CONTROL ⁽⁵⁾
500 ft RA not stable		FIVE HUNDRED ⁽¹⁾ UNSTABLE, GO AROUND
100 ft above DH		ONE HUNDRED ABOVE ⁽¹⁾
DH visual reference	CONTINUE	MINIMUMS ⁽¹⁾
DH no visual reference	GO AROUND FLAPS	MINIMUMS ⁽¹⁾
After touchdown Ground spoilers extended REV green on EWD		SPOILERS ⁽³⁾ REVERSE GREEN ⁽⁴⁾
Deceleration		DECEL ⁽⁶⁾
At 70 kt		SEVENTY KNOTS

⁽¹⁾ PM monitors pin-programmed auto callout, or announces if inoperative.

⁽²⁾ PM monitors 'LAND', 'FLARE' and 'ROLLOUT' FMAs, and calls "NO LAND" or "NO FLARE" or "NO ROLLOUT" if the modes do not engage.

⁽³⁾ If the spoilers are not extended, call NO SPOILER.

⁽⁴⁾ If no reverse deployment, call NO REVERSE ENGINE__ or NO REVERSE, as appropriate.

⁽⁵⁾ At this point P1 becomes PF in anticipation of landing.

⁽⁶⁾ DECEL Callout means that the deceleration is felt by the crew, and confirmed by the speed trend on the PFD. If no positive deceleration, NO DECEL.

DISCONTINUED APPROACH		
EVENT	PF	PM
Discontinued approach decision	CANCEL APPROACH	

GO AROUND

EVENT	PF	PM
GO AROUND decision	GO AROUND FLAPS	
Flaps retraction		FLAPS ____
Gear retraction	GEAR UP	POSITIVE CLIMB GEAR UP
Checklist	AFTER TAKEOFF/CLIMB CHECKLIST	 DOWN TO THE LINE
When cleared to a Flight Level	BELOW THE LINE	AFTER TAKEOFF/CLIMB CHECKLIST COMPLETE

AFTER LANDING		
EVENT	PF	PM
Checklist	AFTER LANDING CHECKLIST	AFTER LANDING CHECKLIST COMPLETE

PARKING		
EVENT	PF	PM
Checklist	PARKING CHECKLIST	PARKING CHECKLIST COMPLETE

SECURING THE AIRCRAFT		
EVENT	PF	PM
Checklist	SECURING THE AIRCRAFT CHECKLIST	SECURING THE AIRCRAFT CHECKLIST COMPLETE

PRO-NOR-SRP – SYSTEMS RELATED PROCEDURES
PRO-NOR-SRP-01 -- FMS

APPROACH

TASK SHARING DURING CAT I, CAT II AND CAT III APPROACH AND LANDING

Applicable to: A319

The limitations section of the FCOM provides all limitations regarding CAT I, CAT II, and CAT III approaches and landings. This includes precautions to be taken when performing autoland on CAT I ILS beam with good visibility.

Anytime a precision approach is performed the PM must announce that a flight parameter is being exceeded, if:

- During glide beam capture:
 - Pitch attitude becomes less than -2.5 ° or greater than +10 ° (nose up).
 - Vertical speed exceeds + 500 ft/min or -1 250 ft/min.
- During final approach:
 - Speed goes below speed target - 5 kt or above speed target + 10 kt ("SPEED")
 - Pitch attitude goes below -2.5 ° or above 10 ° ("PITCH")
 - Bank angle becomes greater than 7 ° ("BANK")
 - Descent rate becomes greater than 1 200 ft/min ("SINK RATE")
 - There is too much LOC or GLIDE deviation ("LOCALIZER" or "GLIDE").

If the flight crew suspects that autopilot guidance is not effective, they should:

- Use the instinctive disconnect pushbutton to disconnect the autopilot, or
- Perform an automatic go-around.

The flight crew may perform a CAT II/CAT III approach, if:

- The FMA displays the corresponding category
- The required systems and functions are operative
- The airport is approved for the intended operations
- They are qualified to perform the specific approach.

CAT III APPROACH

AUTO CALL OUT RA is mandatory.

A/THR in SPEED MODE is mandatory.

Note: AUTO CALL OUT is not mandatory for CAT 2 approach: The PM may perform this function.

TASK SHARING DURING CAT I, CAT II AND CAT III APPROACH AND LANDING**Applicable to: A320**

The limitations section of the FCOM provides all limitations regarding CAT I, CAT II, and CAT III approaches and landings. This includes precautions to be taken when performing autoland on CAT I ILS beam with good visibility.

Anytime a precision approach is performed the PM must announce that a flight parameter is being exceeded, if:

- During glide beam capture:
 - Pitch attitude becomes less than -2.5 ° or greater than +10 ° (nose up).
 - Vertical speed exceeds + 500 ft/min or -1 250 ft/min.
- During final approach:
 - Speed goes below speed target - 5 kt or above speed target + 10 kt ("SPEED")
 - Pitch attitude goes below -2.5 ° or above 10 ° ("PITCH")
 - Bank angle becomes greater than 7 ° ("BANK")
 - Descent rate becomes greater than 1 200 ft/min ("SINK RATE")
 - There is too much LOC or GLIDE deviation ("LOCALIZER" or "GLIDE").

If the flight crew suspects that autopilot guidance is not effective, they should:

- Use the instinctive disconnect pushbutton to disconnect the autopilot, or
- Perform an automatic go-around.

The flight crew may perform a CAT II/CAT III approach, if:

- The FMA displays the corresponding category
- The required systems and functions are operative
- The airport is approved for the intended operations
- They are qualified to perform the specific approach.

CAT III APPROACH

AUTO CALL OUT RA is mandatory.

A/THR in SPEED MODE is mandatory.

Note: AUTO CALL OUT is not mandatory for CAT 2 approach: The PM may perform this function.

TASK SHARING DURING CAT I, CAT II AND CAT III APPROACH AND LANDING**Applicable to: A321**

The limitations section of the FCOM provides all limitations regarding CAT I, CAT II, and CAT III approaches and landings. This includes precautions to be taken when performing autoland on CAT I ILS beam with good visibility.

Anytime a precision approach is performed the PM must announce that a flight parameter is being exceeded, if:

- During glide beam capture:
 - Pitch attitude becomes less than -2.5 ° or greater than +7.5 ° (nose up).
 - Vertical speed exceeds + 500 ft/min or -1 250 ft/min.
- During final approach:
 - Speed goes below speed target - 5 kt or above speed target + 10 kt ("SPEED")
 - Pitch attitude goes below -2.5 ° or above 7.5 ° ("PITCH")
 - Bank angle becomes greater than 7 ° ("BANK")
 - Descent rate becomes greater than 1 200 ft/min ("SINK RATE")
 - There is too much LOC or GLIDE deviation ("LOCALIZER" or "GLIDE").

If the flight crew suspects that autopilot guidance is not effective, they should:

- Use the instinctive disconnect pushbutton to disconnect the autopilot, or
- Perform an automatic go-around.

The flight crew may perform a CAT II/CAT III approach, if:

- The FMA displays the corresponding category
- The required systems and functions are operative
- The airport is approved for the intended operations
- They are qualified to perform the specific approach.

CAT III APPROACH

AUTO CALL OUT RA is mandatory.

A/THR in SPEED MODE is mandatory.

Note: AUTO CALL OUT is not mandatory for CAT 2 approach: The PM may perform this function.

TASK SHARING FOR CAT I APPROACH (OR BETTER)

Applicable to: ALL

PF	PM
- At 350 ft AGL (or RA) Check ILS/MLS course on PFD - At Decision Altitude + 100 ft Monitor or “HUNDRED ABOVE”⁽¹⁾ - At Decision Altitude Monitor or “MINIMUM”⁽¹⁾ - If external visual references are sufficient	Commence outside scanning “LAND”
HANDOVER OF CONTROL	
If automatic landing not performed Disconnect the APs and perform the landing At “RETARD” annunciation, retard thrust levers to IDLE if not yet performed Refer to TASK SHARING FOR CAT III APPROACH/LANDING WITHOUT DH: From 40ft RA to touchdown Executes go around	Monitor auto callouts or announce as appropriate: 300 ft 200 ft 100 ft 50 ft 30 ft 20 ft 10 ft - If automatic landing performed: - If external visual references are <u>not</u> sufficient “GO AROUND”

⁽¹⁾ - CAT I minimum (DH or DA) is always BARO-referenced and must be entered in the BARO field of the PERF APPR page.

- Pin programming enables operators to select the required callouts.

TASK SHARING FOR LTS CAT I AND CAT II APPROACH

Applicable to: ALL

BAV policy is to Autoland for LTS CAT 1 and CAT 2 approaches. Refer to TASK SHARING FOR CAT III APPROACH WITH DH

Note: For LTS CAT 1, CAT I minimum (DA) is always BARO-referenced and must be entered in the BARO field of the PERF APPR page.

TASK SHARING FOR CAT III APPROACH WITH DH

Applicable to: ALL

PF	PM
Check ILS/MLS course on PFD Commence outside scanning	• At 350 ft RA Check LAND on FMA
	• At Decision Height + 100 ft Monitor auto callout "HUNDRED ABOVE"
	• At Decision Height Monitor auto callout "MINIMUM"
• If external visual references are sufficient "LAND"	
	• At 40 ft RA Check FLARE on FMA
Monitor thrust reduction and flare by flight instruments	• At 30 ft RA Monitor auto callouts
Auto callout "RETARD" RETARD both thrust levers to IDLE Monitor lateral guidance by external reference	• At 10 ft RA Monitor engines parameters
	• At TOUCH DOWN Select and control reverse thrust Check ROLL OUT on FMA Check spoilers extension, reverse green, deceleration and announce Announce 70 kt
Disengage the APs at the end of the Roll out (when leaving the runway at the latest)	
• If external visual references are <u>not</u> sufficient: "GO-AROUND, FLAPS" and execute	

TASK SHARING FOR CAT III APPROACH/LANDING WITHOUT DH

Applicable to: ALL

PF	PM
Check ILS/MLS course on PFD	• At 350 ft RA Check LAND on FMA Monitor auto callout⁽¹⁾ • At 40 ft RA Check FLARE on FMA • At 30 ft RA Monitor auto callout⁽¹⁾ • At 10 ft RA Monitor engines parameters
Monitor thrust reduction and flare by flight instruments Auto callout “RETARD” RETARD both thrust levers to IDLE Monitor lateral guidance by external reference	• At TOUCH DOWN Select and control reverse thrust Check ROLL OUT on FMA Check spoilers extension, reverse green, deceleration and announce Announce 70 kt
Disengage the APs at the end of the Roll out (when leaving the runway at the latest)	

⁽¹⁾ In case of CAT III without DH, the pilot should enter “NO” in the DH field of the MCDU to avoid false “HUNDRED ABOVE” or “MINIMUM” auto callouts which would not be applicable.

LANDING CATEGORIES

Applicable to: ALL

Each FMGC computes its own landing category : CAT1, CAT2, CAT3 single, and CAT3 dual and displays the corresponding landing category on the FMAs.

Each category depends upon the availability of aircraft systems and functions.

When the landing capability downgrades, a triple click aural warning is activated.

FAIL-OPERATIONAL AUTOMATIC LANDING SYSTEM

An automatic landing system is fail-operational if, in the event of a failure below alert height, the remaining part of the automatic system allows the aircraft to complete the approach, flare, and landing. A CAT 3 DUAL system is a fail-operational automatic landing system.

Note: In the event of a failure, the automatic landing system operates as a fail-passive system.

FAIL-PASSIVE AUTOMATIC LANDING SYSTEM

An automatic landing system is fail-passive if, in the event of a failure, there is no significant out-of-trim condition or deviation of flight path or attitude, but the landing is not completed automatically. A CAT3 single system is a fail-passive automatic landing system.

Note: With a fail-passive automatic landing system the pilot assumes control of the aircraft after a failure.

Below 100 ft (radio altimeter), the FMGS freezes the landing capability until LAND mode is disengaged or both APs are off.

Therefore a failure occurring below 100 ft does not change the category of the system.

ALERT HEIGHT

The alert height is the height above touch down, above which a CAT3 autoland would be discontinued and a missed approach executed, if a failure occurred in either the airplane systems or the relevant ground equipments.

Below the alert height, if such a failure occurs, the flare, touchdown and roll out may be accomplished using the remaining automatic system.

WARNING FOR ILS/MLS APPROACH

Applicable to: ALL

AUTOLAND WARNING

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 glide signal above 100 ft (transmitter or receivers), or
- The difference between both radio altimeter indications is greater than 15 ft, or
- The FMGS detects a long flare.

When the Autoland light comes on, Autoland must be discontinued (Refer to [FAILURES AND ASSOCIATED ACTIONS BELOW 1 000 FT DURING AN LTS CAT I AND CAT II APPROACH](#), refer to [FAILURES AND ASSOCIATED ACTIONS BELOW 1 000 FT CAT III WITH DH](#), refer to [FAILURES AND ASSOCIATED ACTIONS BELOW 1 000 FT FOR CAT III WITHOUT DH](#)).

WARNING OF EXCESSIVE BEAM DEVIATION

This warning is a flashing of the LOC and G/S scales on the PFD and ND ROSE ILS. It occurs whenever:

- G/S deviation is greater than 1 dot (above 100 ft RA).
- LOC deviation is greater than 1/4 dot (above 15 ft RA).

WARNING ASSOCIATED WITH ILS/MLS "LANDING CAPABILITY"

Any downgrading in the aircraft's capability for automatic approach and landing sounds a triple-click aural warning.

FAILURE OF BOTH LOCALIZER AND GLIDESLOPE RECEIVERS

The PFD and ND (rose LS mode) display red LOC and G/S flags (if the LS pushbutton has been pressed green). LOC and G/S scales disappear from the PFD.

If LOC or G/S modes are engaged and at least one AP/FD is engaged

- The AP disengages.
- The FD reverts to its HDG-V/S or TRK-FPA modes.

FAILURE OF LOCALIZER OR GLIDESLOPE TRANSMITTER (WHEN CAPTURED)

- The corresponding index is lost.
- The LOC and G/S scales flash.
- The corresponding FD bar flashes.

Above 200 ft RA, if the transmitter failure lasts less than 7 s, the FMA retains the LOC and G/S modes (or the LAND mode) and the APs are able to regain these modes. If the failure lasts longer than 7 s, the AP disengages and the FD reverts to its basic modes. Below 200 ft RA, if the transmitter failure occurs, the AUTOLAND warning appears, indicating that the crew must perform a GO AROUND (if insufficient visual references) with one or 2 APs engaged.

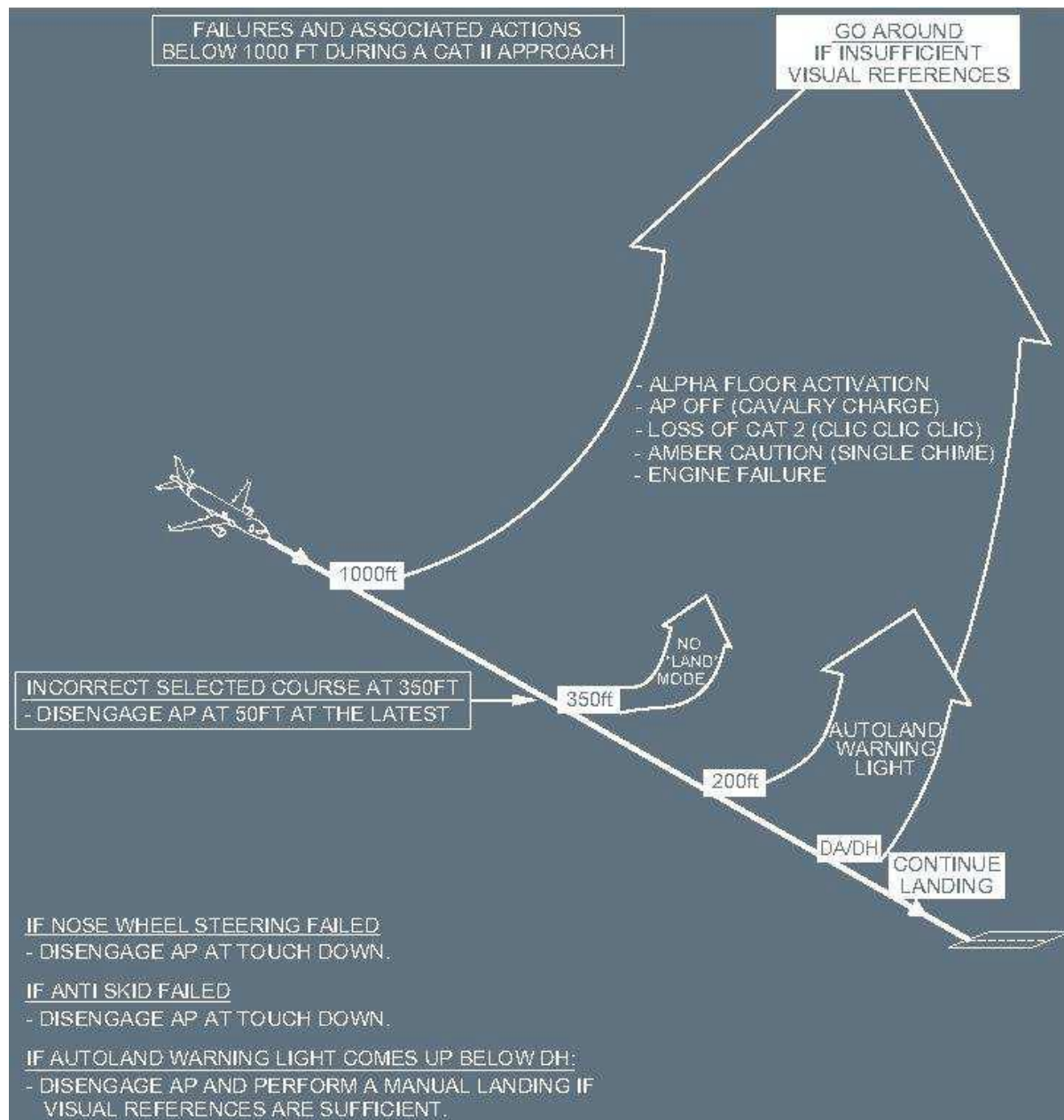
FAILURES AND ASSOCIATED ACTIONS ABOVE 1 000 FT FOR CAT II OR CAT III

Applicable to: ALL

FAILURE (for multiple failures, the most limiting applies)	ACTION TO BE PERFORMED ABOVE 1 000 ft	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 re-engage	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 PFDs	Check with standby horizon, use switching to recover (no switching below 1 000 ft)	CAT III SINGLE (if the warning disappears) CAT I (if not)
AMBER “CHECK HDG” ON TWO PFDs AND TWO NDs	Check with standby compass, use switching to recover (no switching below 1 000 ft)	
RED “HDG” ON ONE PFD AND ONE ND	Use switching to recover (no switching below 1 000 ft)	
RED “ATT” ON ONE PFD		
RED “SPD” ON ONE PFD		
DIAGONAL LINE ON ONE PFD AND ONE ND	Use switching to recover (no switching below 1 000 ft)	CAT III DUAL (if the diagonal line disappears) CAT I (if not)
RED “RA” ON TWO PFDs	AP and FD not available	CAT I (minimum RVR as per regulation)
SLATS/FLAPS FAILURE (LESS THAN CONF 3)		CAT I Disengage AP at or above 500 ft

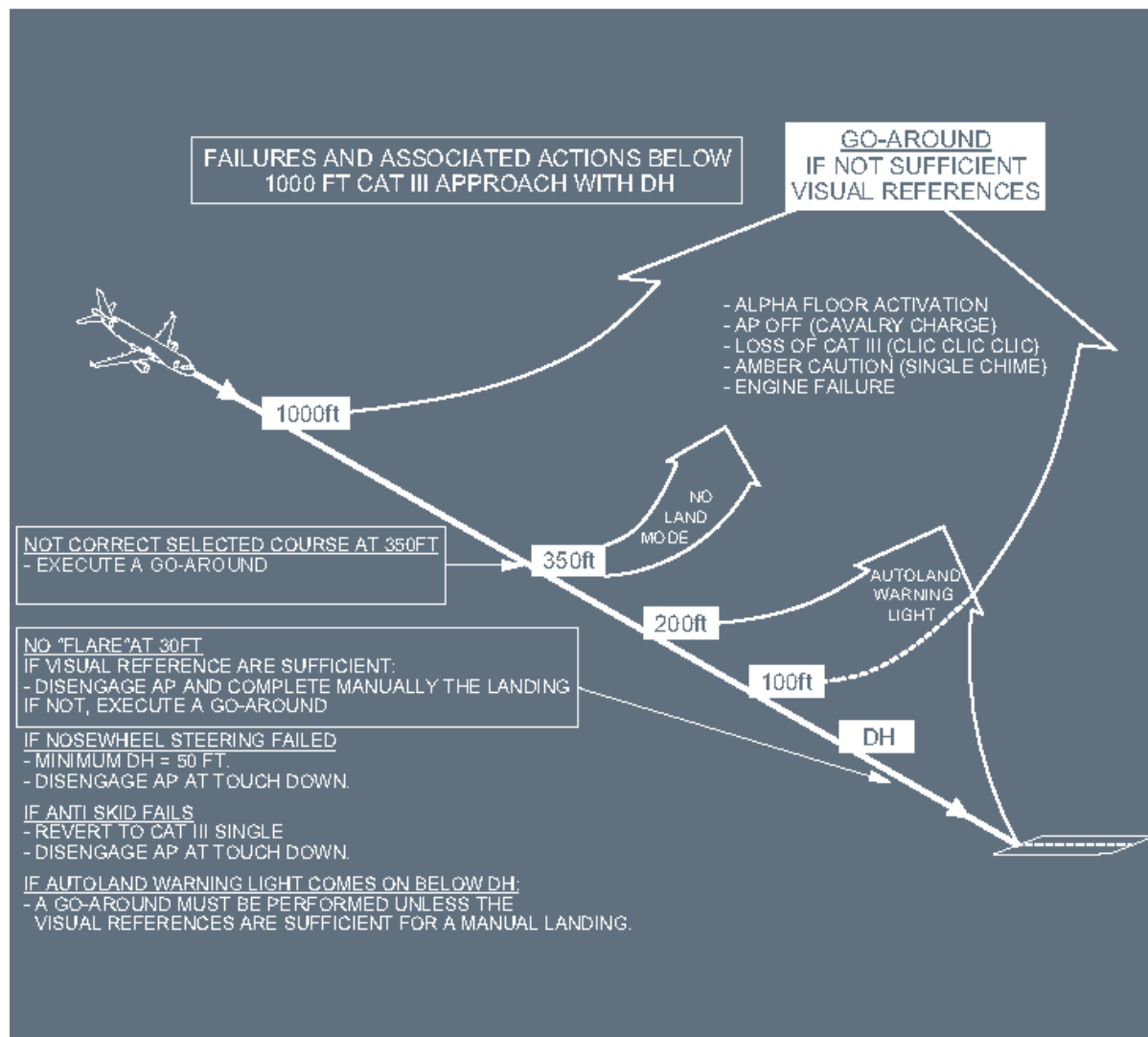
FAILURES AND ASSOCIATED ACTIONS BELOW 1 000 FT DURING AN LTS CAT I AND CAT II APPROACH

Applicable to: ALL



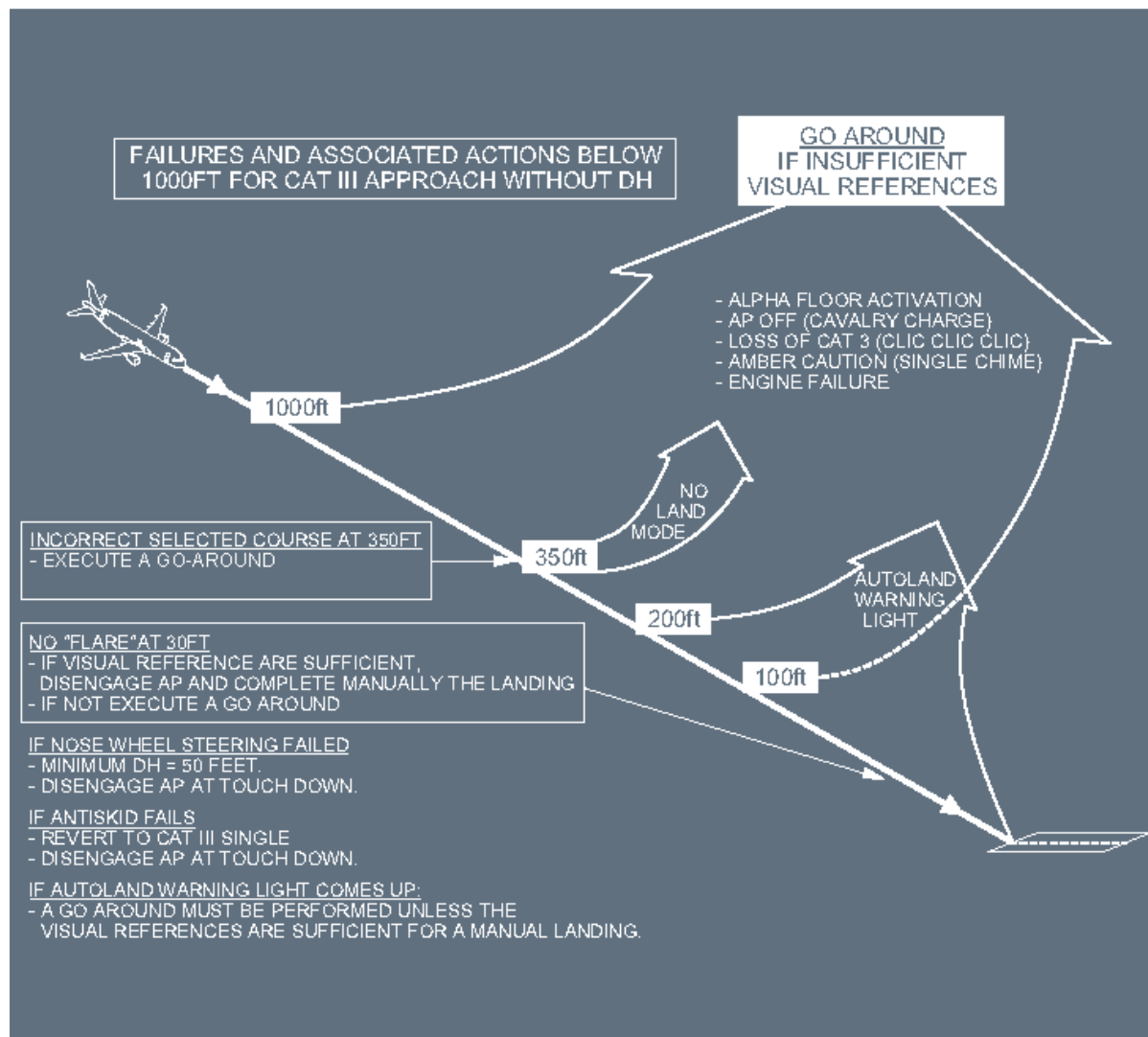
FAILURES AND ASSOCIATED ACTIONS BELOW 1 000 FT CAT III WITH DH

Applicable to: ALL



FAILURES AND ASSOCIATED ACTIONS BELOW 1 000 FT FOR CAT III WITHOUT DH

Applicable to: ALL



BACK-COURSE LOCALIZER APPROACH - PROCEDURE

Applicable to: ALL

The pilot must fly a back-course localizer approach with the ND in its ILS rose mode.

PROCEDURE

PRESS the RAD NAV key.

ENTER the ILS IDENT.

If the ILS is in the database, the system tunes the proper frequency and the front course.

Note: This may trigger the “RWY/ILS MISMATCH” message. Disregard it.

- **If the ILS is not in the database:**

SET the appropriate frequency and SET the FRONT CRS in the CRS field.

On the EFIS control panel, SELECT the ILS ROSE mode.

The display shows the correct LEFT/RIGHT information for the beam deviation.

CAUTION

DO NOT select ILS via the LS pushbutton: Doing so makes the PFD show reverse deviations.
DO NOT arm the LOC or APPR modes.

The flight director may be used with the TRK-FPA or HDG-VS modes.

PRO-SPO – SPECIAL OPERATIONS
PRO-SPO-40 – EXTENDED RANGE OPERATIONS
General**ETOPS ENGINEERING REQUIREMENTS****Applicable to: A318**

The system design and the reliability of the engine installation of this airplane comply with the criteria for Extended Twin Operations (ETOPS) flights set forth in AMC20-6 rev. 2 (EASA) or FAR 25.1535 (FAA), when the aircraft is configured, maintained and operated in accordance with the Airbus CMP (Configuration, Maintenance and Procedure) document.

ETOPS PRE-DEPARTURE INSPECTION

Before any ETOPS operation, engineering will conduct an ETOPS pre-departure inspection.

DISPATCH WITHOUT BA ENGINEERING CHECKS

In the event that an aircraft has to depart from an airfield at which there is no BAV approved engineer authorised to conduct an ETOPS Transit Check, the Captain may be authorised to conduct an 'Alleviated ETOPS Transit Check' on authority from Maintrol.

VERIFICATION FLIGHTS

Verification flights must be carried out in any of the following circumstances:

- After an engine/propulsor change.

Note: After an engine/propulsor change Engineering will request that a full power take-off is carried out. The successful completion of the full power take-off must be recorded in the Tech Log.

- After an engine fuel or oil system major component change, or if the same system has been disturbed on both engines.
- After a primary system has failed if it cannot be confirmed that the subsequent maintenance action has rectified the original failure.
- After certain failures which are altitude related or give intermittent indications in flight, and which are significant to airworthiness.
- After release from an 'S' check or higher maintenance check.

Verification flights are not required following rectification action on defects which are allowable in the MEL.

Verification flights may be carried out on any of the following types of operation:

- A non-ETOPS revenue flight.
- A non-revenue verification flight.
- During the first 60 minutes of an ETOPS flight (if the aircraft is within ETOPS flying time of an adequate airfield).

The duration/altitude of the verification flight must be adequate to demonstrate the ETOPS serviceability of the system which has been the subject of the maintenance action.

ETOPS SIGNIFICANT SYSTEMS

ETOPS significant systems are those that have a fundamental influence on flight safety and can be adversely affected by an engine shutdown.

Confirmation of serviceability is especially important for the ETOPS significant systems (listed below) to ensure that the problem has been diagnosed and the rectification action taken in accordance with the Maintenance Manual has eliminated the defect.

A list of ETOPS significant systems by ATA chapter is given below.

VERIFICATION FLIGHT CONTROL

If advice is required the Duty Engineering Control Manager may be consulted.

If a Verification Flight is required this must be recorded in the Tech Log by raising a Performance ADD which includes the words 'ETOPS Verification Flight Required' and gives details of the reason for the verification flight. The Captain must record that the flight has been satisfactory before the aircraft is considered acceptable for ETOPS (this includes completion of the Tech Log, Action Taken and Certification entries). If the flight is made in accordance with the 60/60 rule (first 60 minutes within 60 minutes of a suitable airfield), the aircraft's acceptability must be assessed by the Captain within 60 minutes after take-off. If it is satisfactory, the aircraft may be considered suitable for ETOPS and the flight may continue as an ETOPS flight. If not, the flight must remain within 60 minutes of an adequate alternate. In either case, an appropriate AML Pt 1 entry will be made after landing.

The crew must inform Operations Control of the success/failure of the verification flight at the earliest opportunity.

DISPATCH OF VERIFICATION FLIGHT UNDER 60/60 RULE

An ETOPS plan will be provided. An ATC flight plan will be filed for ETOPS routing.

If verification successful, aircraft should continue on ETOPS route.

If verification unsuccessful, re-clearance must be obtained to remain non-ETOPS (fuel permitting) or return to the departure airfield. The Company must be advised of success/failure of verification at earliest opportunity.

Operational Limitations

DEFINITIONS

Applicable to: A318

For the purpose of OPS CAT.OP.MPA.140, EASA AMC20-6 rev2 and FAR 121-161, Extended-Range Operations are those intended to be conducted over a route that contains a point beyond 60 min from an adequate airport at the selected one-engine-inoperative speed in still air and ISA (or prevailing delta ISA) conditions.

An adequate airport is an airport which satisfies the aircraft performance requirements applicable at the expected landing weight, and sufficiently equipped to be safely used. In particular, at the anticipated time of use, it should be available and equipped with the necessary services, including ATC, weather information, nav aids and emergency services.

An ETOPS (en-route) alternate airport is a confirmed adequate airport which satisfies the dispatch weather minima requirements for ceiling and visibility within the required validity period.

AREA OF OPERATION

Applicable to: A318

The ETOPS area of operations is the airspace within which the distance to an ETOPS adequate airport is less than the ETOPS Max Diversion distance.

The ETOPS maximum diversion distance from an adequate airport must be determined for ISA (or prevailing delta ISA) and no-wind conditions, taking into account aircraft performance with one engine inoperative and the remaining engine operating at MCT.

To determine the ETOPS maximum diversion distance from an adequate airport, the operator must define a One Engine Inoperative diversion speed for performance computation.

The A318 speed is 400 kt TAS.

The same approved one-engine-inoperative diversion speed must be considered for :

- Establishing the area of operation,
- Calculating the single-engine fuel planning,
- Conducting the diversion in case of engine failure (conditions permitting).

The operator has to define an aircraft weight at diversion that is considered for the ETOPS Maximum Diversion Distance calculation. This aircraft weight can be taken as a representative but conservative value of the aircraft gross weight at the critical point of the route or at the various critical points of all the routes included in a given sector.

The approved one-engine-inoperative descent and cruise speed must be chosen so that the associated net flight path clears the en-route obstacles with the regulatory margin. However, a speed other than the approved one-engine-inoperative speed may be used as the basis for obstacle clearance as long as the fuel required with that speed is covered by the critical fuel scenario.

When the one-engine-inoperative diversion speed is chosen, the maximum distance from a diversion airport, can be directly determined.

For the A318 this is 1 200 nm. The area of possible ETOPS operation can then be drawn on plotting charts.

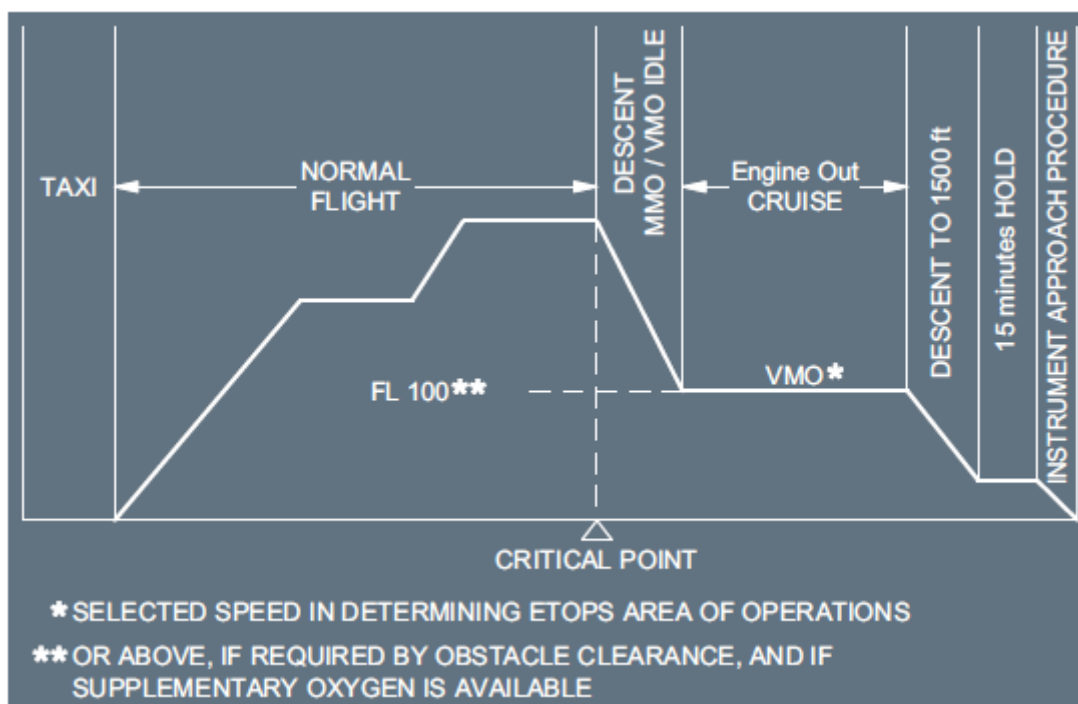
Dispatch Consideration

ETOPS FUEL SCENARIOS

Applicable to: A318

According to EASA AMC20-6 rev 2 and FAA121.646 for establishing the ETOPS critical fuel reserves, the operator must consider three diversion scenarios:

- Pressurization Failure + Engine Failure



- Pressurization Failure

Same Flight Profile as above, but all engines operating and Diversion Cruise Speed* set to LRC.

- Engine Failure

Same Flight Profile as above, but standard descent speed and Diversion Cruise at the FL** appropriate to gross engine out ceiling at the selected ETOPS diversion speed.

- FAA Fuel Requirements

For the first two scenarios, involving depressurization, the required block fuel must be calculated in accordance with the operator's ETOPS fuel policy and using the regulatory ETOPS critical fuel reserves.

Depending on the approved one-engine-inoperative speed selected for the single-engine diversion strategy, either of these two scenarios may result in the higher fuel requirement.

The scenario resulting in the higher fuel requirement is called the ETOPS critical fuel scenario, and the associated minimum block fuel requirement is the ETOPS critical fuel plan.

Note that, it is not necessary to calculate the 3rd scenario (engine failure), as this scenario is never critical, due to the higher diversion flight level.

COMMUNICATION AND NAVIGATION FACILITIES

Applicable to: A318

The aircraft communication system has three VHF transceivers and two HF radios ensuring full compliance with ETOPS requirements on any kind of route. The aircraft navigation system meets the ETOPS requirements for en route navigation. The aircraft has three ADIRUs which, in conjunction with 2 FMGCs comply with MNPS criteria and this combination of systems is approved as the sole means of navigation for flight up to the maximum aircraft range.

FUEL AND OIL SUPPLY

Applicable to: A318

The aircraft fuel and oil supply must be adequate to allow the aircraft to reach its destination or a planned alternate after the combined failures of an engine and pressurization or the failure of pressurization alone at the critical point on the route.

ETOPS CRITICAL FUEL RESERVES

Applicable to: A318

For the computation of the ETOPS critical fuel reserves and of the complete ETOPS critical fuel planning according to EASA AMC 20-6 rev 2 and FAR 121.646, the diversion fuel must include the following fuel provisions:

- Fuel burn-off from the critical point to the end of descent at the alternate airport
- Fuel for 15 min of holding at 1 500 ft and green dot speed at the alternate
- Fuel for an instrument approach and landing
- Fuel to account for errors in wind forecasting (5 % wind speed factor on actual forecast wind speeds or 5 % fuel if actual forecast wind speeds are not used)
- Fuel to account for aircraft deterioration (use a demonstrated performance factor or 5 %)
- Fuel to account for any Configuration Deviation List (CDL) or MEL item
- Fuel to account for Icing Effects (if forecast) for the critical mission
- Fuel to account for APU use (only for the one-engine-inoperative scenario, if APU is operative)

WIND ERRORS

A 5 % wind speed factor (i.e. an increment to headwind or a decrement to tailwind) on the actual forecast wind should be used to account for potential errors. However if the operator is not using the actual forecast wind based on a wind model acceptable to the certification authorities then 5 % of the fuel for the critical scenario is required as a reserve fuel.

ICING

The most critical scenario must be compensated for the greater of:

- A. The effect of airframe icing during 10 % of the time during which icing is forecast, including ice accumulation on unprotected surfaces, and the fuel used by engine and wing anti-ice during this period.
- B. Fuel for engine and wing anti-ice for the entire time during which icing is forecast.

Note: The ETOPS icing fuel reserve is always limited by (B)

Unless a reliable icing forecast is available, icing may be presumed to occur when the Total Air Temperature (TAT) is less than +10 °C, or if the outside air temperature is between 0 °C and -20 °C with a relative humidity of 55 % or more.

APU

Fuel consumption of 80 kg/h / or 176 lb/h (APU GEN ON, APU BLEED OFF).

In view of our experience, Airbus recommends that the operator includes a contingency fuel provision from departure to the Critical Point (CP), when computing the ETOPS critical fuel planning.

Diversion During Extended Range Operations

DIVERSION DECISION MAKING

Applicable to: A318

The technical criteria governing a re-routing or diversion decision can be classified into four categories, as follows :

- Loss of MNPS capability, before entering the MNPS area (as applicable).
- Weather minima at diversion airport(s) going below the company/crew en-route minima, before reaching the ETOPS Entry Point, or diversion airport(s) becoming unsuitable for any reason.
- Failure cases requiring a diversion to the nearest airport (cases leading to a LAND ASAP message on the ECAM and/or in the QRH).
- Failure cases resulting in increased fuel consumption, exceeding the available fuel reserves.

Comments and Recommendations

- Electrical generation

If one IDG fails, a diversion is required in case of:

- Blue hydraulic circuit low level, low pressure or overheat, or
- APU no start, or
- APU or APU generator inoperative, or
- Second IDG failure.

- Fuel system

Some failure cases may lead to fuel gravity feeding which implies flight at lower altitude or to some fuel being unusable. The flight crew's evaluation of the actual situation and the fuel remaining may lead to the decision that a diversion is required.

- Hydraulic system:

If low level, low air pressure or overheat on blue hydraulic circuit, a diversion is required in case of:

- One IDG failure, or
- APU no start, or
- APU/APU GEN failure.

- APU:

If APU/APU GEN fails, a diversion is required in case of:

- Blue hydraulic circuit low level, low air pressure or overheat, or
- One IDG failure.

DIVERSION PERFORMANCE DATA

Applicable to: A318

Chapter PER-OEI-GEN contains three single engine descent and cruise procedures:

1. The standard strategy,
2. The obstacle strategy,
3. Fixed speed strategies (ETOPS).

For ETOPS operations, any one of the above diversion strategies can be used provided that the selected strategy and speed schedule are used in :

- Establishing the area of operation (maximum diversion distance),
- Calculating the diversion fuel requirements for the single-engine ETOPS fuel scenario,
- Demonstrating the applicable obstacle clearance requirements (net flight path and net ceiling).

During the diversion, the flight crew is expected to use the planned speed schedule.

However, based on the evaluation of the actual situation, the pilot in command has the authority to deviate from this planned one-engine-inoperative speed.

GUIDELINES FOR DIVERSION PROCEDURE

Applicable to: A318

Complete the related failure procedure,

- Inform ATC,
- Initiate the descent,
- Determine which en route alternate is the most suitable (per company procedure),
- Divert to the chosen en route alternate,
- Comply with the pre-planned diversion strategy and speed schedule, or adjust the speed schedule, as dictated by the evaluation of the actual situation.

Procedures

GENERAL

Applicable to: A318

The SOP (refer to chapter PRO-NOR-SOP – Standard Operating Procedures) and the ABNORMAL and EMERGENCY procedures apply. For ETOPS flights, the flight crew must complete them using the additional procedures below.

COCKPIT PREPARATION

Applicable to: A318

FUEL

Before each flight, the flight crew must check that the fuel crossfeed valve is operating correctly :

FUEL X FEED ON

On the ECAM FUEL page, check that the fuel crossfeed valve is open (indication is inline green).

FUEL X FEED OFF

Check that the fuel crossfeed valve is closed.

NORMAL PROCEDURES

Applicable to: A318

EN-ROUTE MINIMA

Once the ETOPS flight has been dispatched, suitability of an en-route alternate airfield in terms of weather conditions is determined by reference to the normal AOM.

If weather conditions at an en-route alternate deteriorate to the point that, in the event of a diversion there, a successful approach and landing is in doubt, Captains should consider re-routing so that any diversion could be made to a more suitable airfield.

EQUAL TIME POINTS

Equal Time Points (ETPs) for the nominated ETOPS alternates are published on the CIRRUS Flight plan.

CROSS-CHECKING CLEARED ROUTE

Refer to [MNPS Route Checking and Waypoint Crossing Procedure](#).

NAVIGATION ACCURACY CHECK

Navigation accuracy should be checked as HIGH on the PROG page of the MCDU at least every hour. In an MNPS area, waypoint passage is a convenient point.

WAYPOINT CROSSING PROCEDURE

Refer to [MNPS Route Checking and Waypoint Crossing Procedure](#).

FUEL MANAGEMENT

During a flight that contains an ETOPS segment, a fuel check should be performed at each waypoint of the ETOPS portion of the flight. If the flight is re-routed away from the CIRRUS routing, fuel checks should be performed when the distance to destination (from MCDU F-PLN A page) is equal to that of a waypoint on the original CIRRUS routing.

On ETOPS sectors, full use should be made of meteorological information to monitor the weather of the declared ETOPS and other en-route alternates.

FUEL TEMPERATURE

Fuel temperature should be maintained at least 3 °C above fuel freeze point. Monitor in order to pre-empt ECAM FUEL LO TEMP in order to allow time to negotiate a lower FL or higher Mach number.

POST FLIGHT REPORTING

Complete an ASR for any operationally significant events (e.g. diversion, unexpected weather deterioration at en-route alternate, aircraft defect, etc.).

ABN AND EMER PROCEDURES

Applicable to: A318

ELECTRICAL EMERGENCY CONFIGURATION

In case of electrical emergency configuration, it may be better to study the STATUS on the paper checklist, after having applied ECAM actions.

The flight crew must complete the ECAM procedure using the following:

FUEL

As all fuel pumps are lost, the engines are fed by gravity. Refer to GRVTY FUEL FEEDING Procedure.

ENGINE ANTI-ICE

Engine anti-ice valves are permanently open, although the ECAM memo ENG A. ICE is not displayed on the ECAM (except if the ENG A. ICE pb is at ON).

WING ANTI-ICE

If only one ENG BLEED is available, PACK 1 must be switched OFF, to avoid having both packs and wing anti-ice supplied by a single bleed source.

BLUE HYDRAULIC CIRCUIT LOW LEVEL OR LOW PRESSURE OR OVERHEAT

Start the APU to ensure availability of the APU generator.

ENGINE OR IDG FAILURE

Start the APU and use the APU electrical channel.

Performance

GENERAL

Applicable to: A318

The two following cases result in a fuel consumption increase:

- RAT extended
- In electrical emergency configuration, the engine anti-ice valves are permanently open.

MAXIMUM DIVERSION DISTANCE

Applicable to: A318



This is agreed with VATSIM/IVAO to be 1 200 nm, based upon the following assumptions:

- ISA conditions
- No wind
- Optimum diversion level after engine failure
- Single engine diversion speed schedule.

Note: Obstacles do not have to be considered to determine if a route is or is not an ETOPS route.

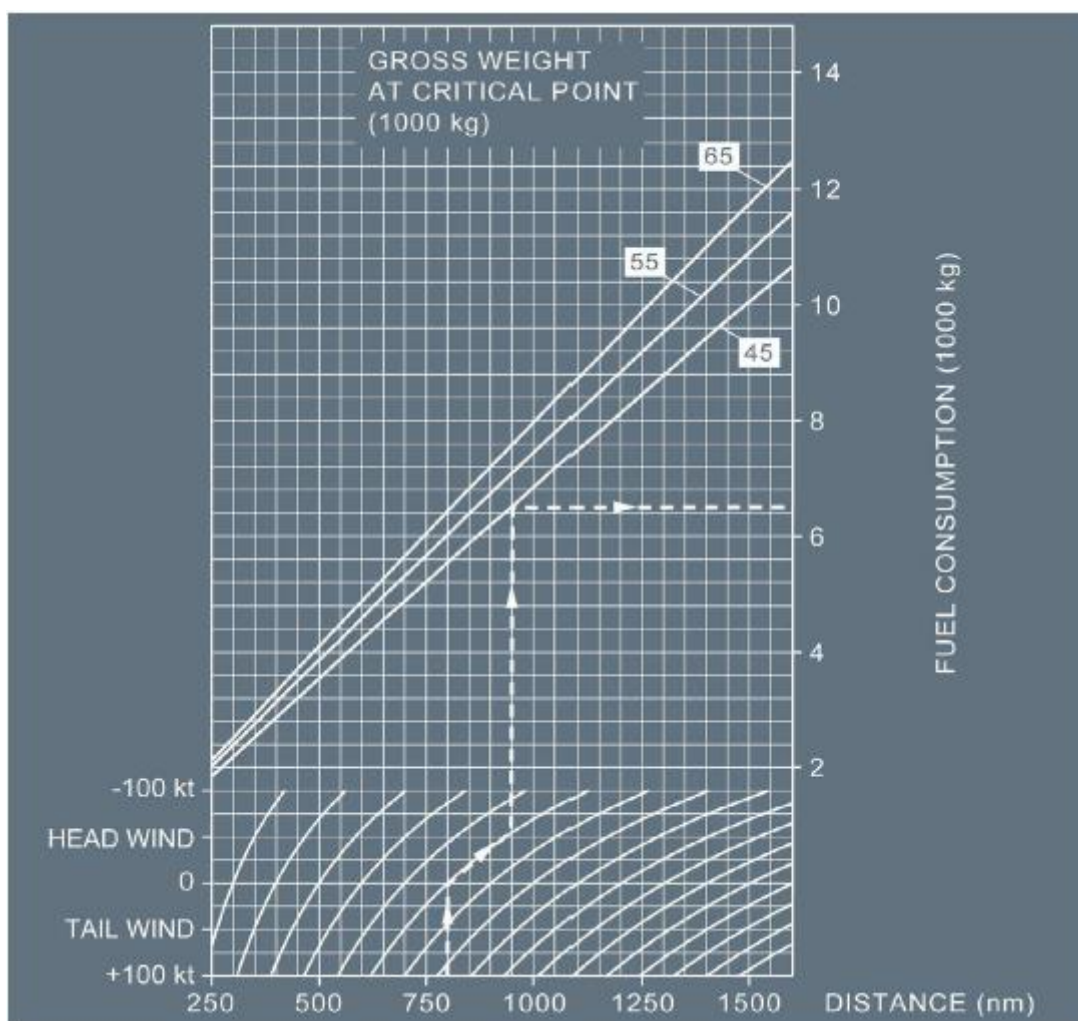
ETOPS FUEL FROM CRITICAL POINT TO LANDING - ALL ENGINES - CRUISE AT LRC

Applicable to: A318

Assumptions:

- Emergency descent
- Long range cruise at FL 100
- Final descent 250 kt
- Holding 15 min at FL 15
- IFR procedure

Not included: 5 % correction on wind value - Anti icing if icing is forecast - performance factor.



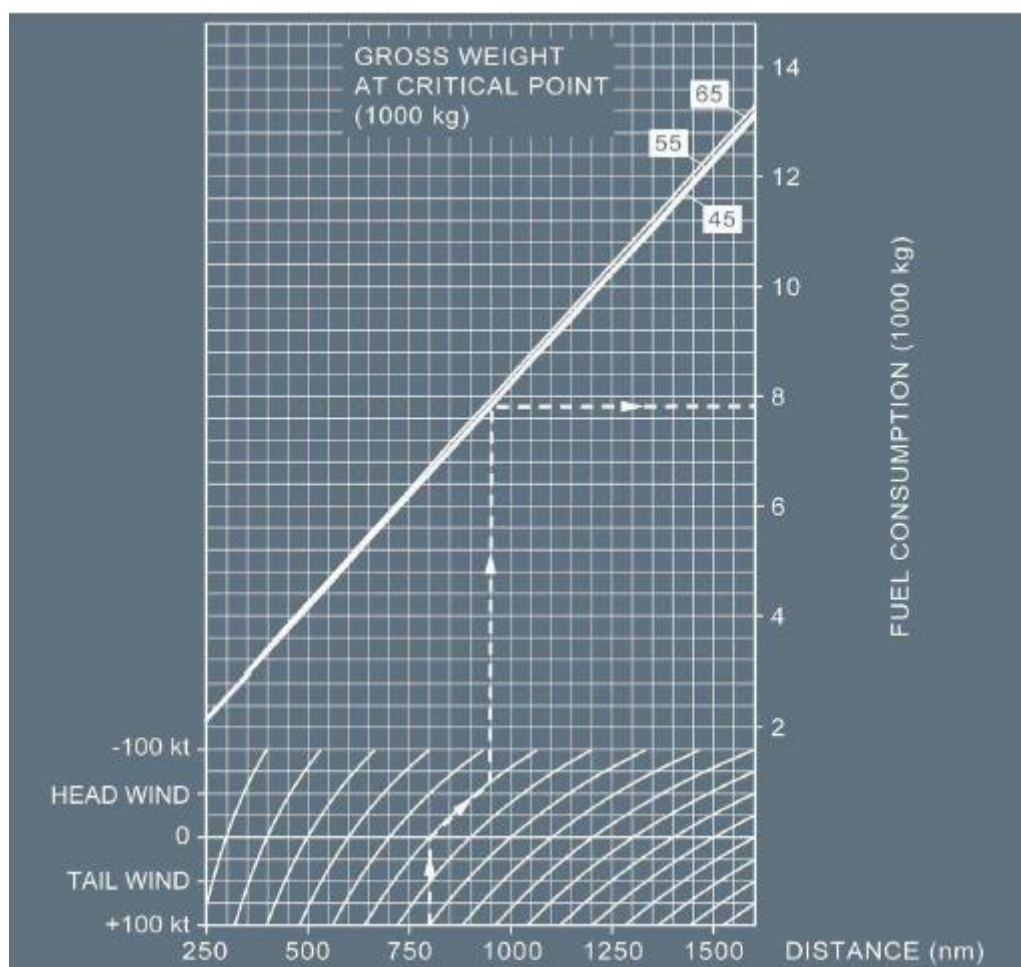
ETOPS FUEL FROM CRITICAL POINT TO LANDING - ONE ENGINE OUT - CRUISE AT 350KT

Applicable to: A318

Assumptions:

- Emergency descent
- Cruise 350 kt at FL 100
- Final descent 250 kt
- Holding 15 min at FL 15
- IFR procedure
- APU fuel burn.

Not included: 5 % correction on wind value - Anti icing if icing is forecast - performance factor.



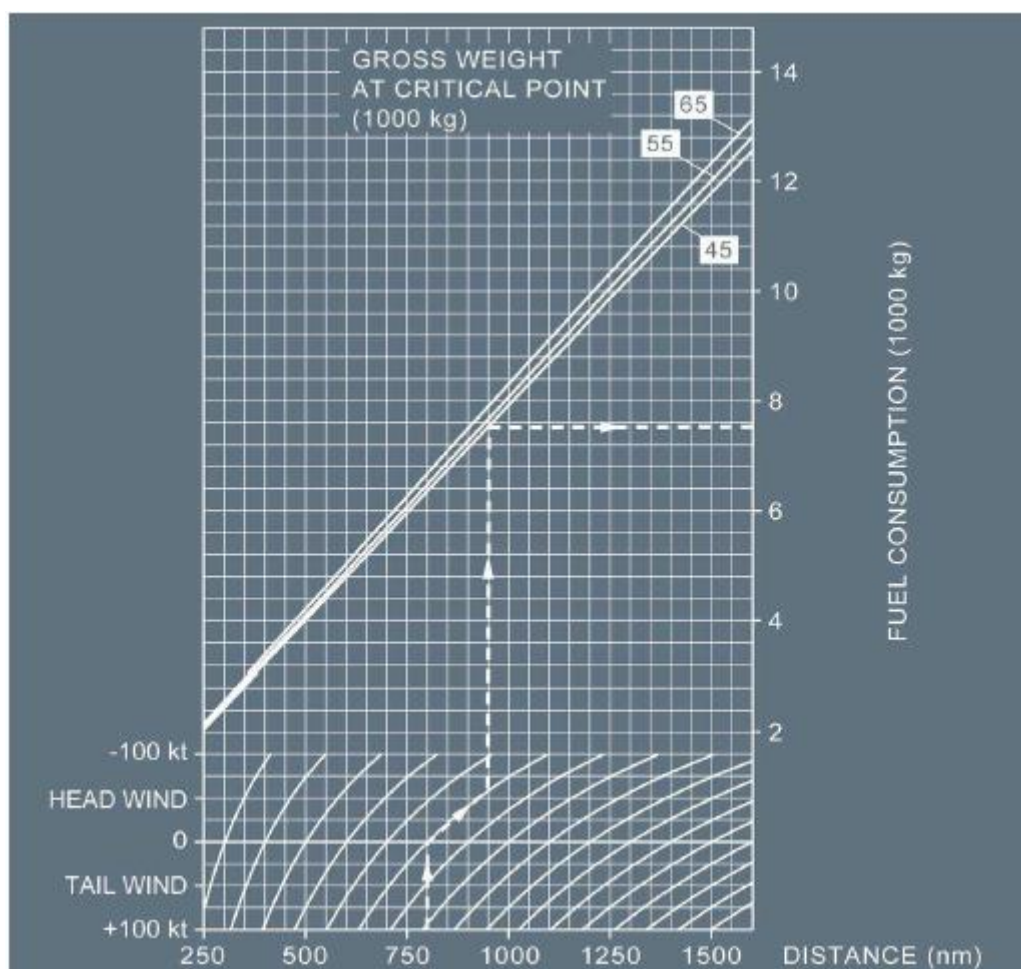
ETOPS FUEL FROM CRITICAL POINT TO LANDING - ONE ENGINE OUT - CRUISE AT 320KT

Applicable to: A318

Assumptions:

- Emergency descent
- Cruise 320 kt at FL 100
- Final descent 250 kt
- Holding 15 min at FL 15
- IFR procedure
- APU fuel burn.

Not included: 5 % correction on wind value - Anti icing if icing is forecast - performance factor.



ETOPS FUEL REQUIREMENT FROM CRITICAL POINT TO LANDING - EXAMPLE

Applicable to: A318

Assumptions:

- Aircraft weight at critical point: 55 000 kg
- Diversion speed: 320 kt
- Diversion time: 120 min
- Distance from Critical point to diversion airport: 700 nm
- Wind: 50 kt headwind
- Forecast icing condition on diversion: 40 min
- Aircraft perf factor: 5 %

For the determination of the ETOPS fuel requirement, the greatest fuel quantity of the two following scenarios must be considered (the scenario Engine failure only is never limiting):

1. Pressurization failure - One Engine Inoperative - 320 kt

- Determine the corrected wind for diversion taking into account the 5 % wind speed factor: $50 \times 1.05 = 52.5$ kt
- Enter the following ETOPS fuel requirement graph: Refer to [ETOPS Fuel From Critical Point to Landing - One Engine Out - Cruise at 320kt](#)
- Determine the corresponding fuel consumption: 6 500 kg
- Determine the final ETOPS fuel requirement, sum of perf factor fuel, icing fuel and fuel determined the step before:
 - Fuel for icing condition (Total anti-ice scenario is limiting): $5 \% \times 40 / 120 = 1.67 \%$
 - Fuel for perf factor: 5 %
 - Final ETOPS fuel requirement: $6\,500 \times 1.0167 \times 1.05 = 6\,939$ kg

2. Pressurization failure - All Engines Operative - LRC speed

- Determine the corrected wind for diversion taking into account the 5 % wind speed factor: $50 \times 1.05 = 52.5$ kt
- Enter the following ETOPS fuel requirement graph: Refer to [ETOPS Fuel From Critical Point to Landing - All Engines - Cruise at LRC](#)
- Determine the corresponding fuel consumption: 6 200 kg
- Determine the final ETOPS fuel requirement, sum of perf factor fuel, icing fuel and fuel determined the step before:
 - Fuel for icing condition (total anti-ice scenario is limiting): $10 \% \times 40 / 120 = 3.33 \%$
 - Fuel for perf factor: 5 %
 - Final ETOPS fuel requirement: $6\,200 \times 1.0333 \times 1.05 = 6\,727$ kg

The final ETOPS fuel requirement for this diversion is 6 939 kg. The limiting scenario is a pressurization failure and One Engine Inoperative at a diversion speed of 320 kt.

PRO-SPO-51 – Required Navigation Performance (RNP)

GENERAL

Applicable to: ALL

GENERAL

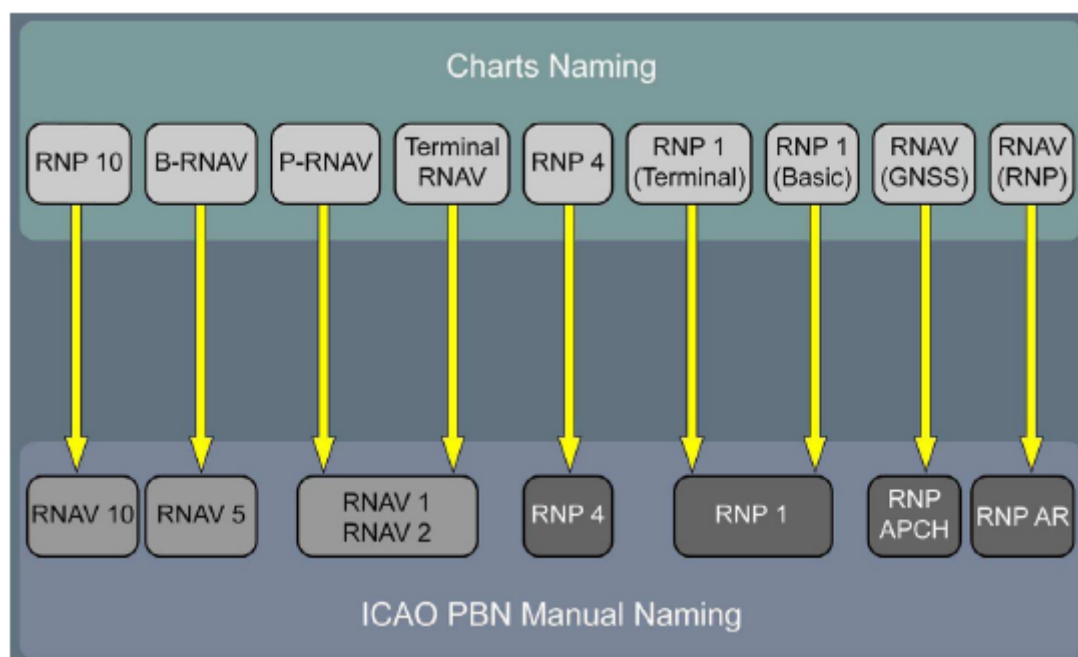
The Performance Based Navigation (PBN) concept implies that the aircraft follows the defined track with a requested navigation performance. The PBN includes RNAV and RNP operations.

Contrary to RNAV operations, RNP operations require that the aircraft system monitors the navigation performance and alerts the flight crew if the requested navigation performance is no longer achieved.

For RNAV and RNP operations, an operational approval from the airline's national authorities may be required.

The AFM provides regulatory compliances associated with PBN operations.

PBN NAMING VS. CHARTS NAMING



RNAV/RNP CAPABILITY

Before the aircraft enters an RNAV/RNP airspace, RNAV/RNP capability is based on:

- The required RNAV/RNP equipment that is described in each RNAV/RNP section of the FCOM
- Navigation Accuracy HIGH displayed on the MCDU PROG page
- Any specific local requirements published in the Aeronautical Information Publication (AIP).

When the aircraft flies in RNAV/RNP airspace, RNAV/RNP capability is based on:

- Navigation Accuracy HIGH displayed on the MCDU PROG page
- Any specific local requirements published in the Aeronautical Information Publication (AIP).

MNPS ROUTE CHECKING AND WAYPOINT CROSSING PROCEDURE

The following procedures shall be applied in MNPS or Oceanic airspace.

1. Uplink the planned route and check against CIRRUS.
2. When a clearance (or re-clearance) is received for MNPS/oceanic airspace the following procedure must be completed in full.
3. Any flight crew member relieving another in MNPS airspace must complete the PF tasks in full. This may not be delegated.

CAUTION	ATC Clearances must be entered into the FMGC and checked rigorously, to avoid Gross Navigational Errors.

Pilot Flying	Pilot Monitoring				
Cross-checking cleared route:					
	Read and Acknowledge text ATC clearance				
Listen and transcribe voice ATC clearance	Listen and transcribe voice ATC clearance				
	Validate and Check Clearance vs FMGC: • Oceanic Entry Point • NAT Track, referring to TMI (if applicable) • Exit point • Flight level and Mach number • Check each waypoint <table border="1" style="margin-left: 20px;"> <tr> <td style="background-color: #FFD700;">CAUTION</td><td>The ND truncates waypoints so must NOT be used for checking.</td></tr> </table> • Named alphabetic waypoints that are in the database (e.g. NEDUL) can be checked directly from FMGC F-PLN A page • Alphanumeric waypoints, including unnamed waypoints (e.g. N48W030) must be checked using lat/long from FMGC Lat Rev page against lat/long from from either CIRRUS FMS page (if cleared on planned route) or ATC clearance. <u>If required, modify FMGC</u> <table border="1" style="margin-left: 20px;"> <tr> <td style="background-color: #FFD700;">CAUTION</td><td>Erroneous waypoint entry is a significant cause of GNEs. Use all available resources (CIRRUS, Lido, SFC) to ensure accurate translation of ATC clearance into FMGC waypoints.</td></tr> </table> • Translate ATC-format to FMGC lat/long format with care	CAUTION	The ND truncates waypoints so must NOT be used for checking.	CAUTION	Erroneous waypoint entry is a significant cause of GNEs. Use all available resources (CIRRUS, Lido, SFC) to ensure accurate translation of ATC clearance into FMGC waypoints.
CAUTION	The ND truncates waypoints so must NOT be used for checking.				
CAUTION	Erroneous waypoint entry is a significant cause of GNEs. Use all available resources (CIRRUS, Lido, SFC) to ensure accurate translation of ATC clearance into FMGC waypoints.				

	- When entering unnamed waypoints (eg. 5520N), exercise extreme caution. Entering the letter in the wrong position totally changes the position of the waypoint. - If the waypoint is not in database, always enter both degrees and minutes and an oblique (e.g. 55N030W is inserted as 5500.0N/03000.0W)
<u>Independently validate and check FMGC against clearance:</u> - Oceanic Entry Point - NAT Track, referring to TMI (if applicable) - Exit point - Flight level and Mach number - Check each waypoint: CAUTION The ND truncates waypoints so must NOT be used for checking. - Named alphabetic waypoints that are in the database (e.g. NEDUL) can be checked directly from FMGC F-PLN A page - Alphanumeric waypoints, including unnamed waypoints (e.g. N48W030) must be checked using lat/long from FMGC Lat Rev page against lat/long from either CIRRUS FMS page (if cleared on planned route) or ATC clearance.	
Starting at first MNPS waypoint, read aloud each MNPS waypoint sequentially from MCDU.	Check each waypoint read by PF directly against the clearance.
	Amend master CIRRUS to reflect cleared route
Amend en-route chartage to reflect cleared route	Amend en-route chartage to reflect cleared route
	Revise ETPs
Waypoint Crossing Procedure:	
Confirm: 'To' waypoint matches clearance - Aircraft is in NAV - Aircraft turns towards next waypoint	
Cross-checking cleared route:	
	Check: - IRS positions & NAV accuracy 'To' waypoint matches clearance - Aircraft is in NAV - Aircraft turns towards next waypoint - Record ATA & FOB on CIRRUS - Position Report (if RQRD) and Revise ETA with ATC as needed

ADDITIONAL INFORMATION

CHECKING WAYPOINTS USING FULL LAT/LONG FROM FMGC:



Line select lateral revision for relevant waypoint

Read expanded lateral and longitudinal position co-ordinates



RNP APCH / RNAV(GNSS)

Applicable to: ALL

GENERAL

RNP APCH operations correspond to RNAV(GNSS) or RNAV(GPS) operations.

For these operations, the GPS is required to support the RNP value of 0.3 nm.

REQUIRED RNP APCH EQUIPMENT

The minimum equipment required to perform RNP APCH operations is:

- One FMS
- One GPS
- One MCDU
- One FD
- One PFD on the PF side
- One ND on the PF side
- Two FCU channels

PROCEDURE

Refer to [PRO-NOR-EXP Approach using FINAL APP Guidance - General](#)

Refer to [PRO-NOR-EXP Approach using FPA Guidance - General](#)

PRO-SPO-60 – Operations on Narrow Runways

GENERAL

Applicable to: ALL

This chapter gives the limitations, procedures and performance for operations from/to runways with a width below 45 m.

BAVirtual has operational approval from VATSIM/IVAO to operate on Narrow Runways subject to the limitations in the chapter and additionally:

- The Commander must be PF for TO and LDG
- The Commander must have successfully completed Narrow RWY training.

LIMITATIONS

Applicable to: ALL

Minimum runway width..... 30 m

Dispatch from/to narrow runways is not allowed in case of:

- Nose wheel steering inoperative
- One brake or more inoperative

Autoland is not allowed.

PROCEDURES

Applicable to: ALL

Diversion to a 45 m wide runway is recommended in case of :

- Rudder jam
- Rudder pedal jam
- Yaw damper system fault
- Rudder Travel Limit system fault
- All failures leading to the loss of the nose wheel steering (HYD Yellow system loss, double hydraulic failure, double BSCU fault, double LGCIU fault)

Maximum demonstrated crosswind for takeoff and landing:

Dry runway 38 kt (gust included) for takeoff and landing
Wet runway 33 kt (gust included) for takeoff and landing
Contaminated runway 10 kt (gust included) for takeoff and landing

Note: These maximum demonstrated crosswind values are based on the assumption that the crew have been trained accordingly.

Operations on icy runways have not been demonstrated.

PERFORMANCE

Applicable to: ALL

For runways with a width above or equal to 40 m, the basic takeoff performance remains unchanged. For runways with a width below 40 m, adjustments to V-speeds may be necessary.

PRO-SPO-70 – High / Hot Airport Operations

GENERAL

Applicable to: A318

The purpose of this section is to give an additional procedure to improve the go-around climb performance (also called approach climb performance in the regulations). This procedure allows not to penalise the landing weight when operating in high and/or hot airport conditions.

This procedure provides the possibility of accelerating up to a target speed of 1.41 Vs1g when performing a go-around.

PROCEDURES

Applicable to: A318

APPROACH

During the approach briefing, calculate the increase in the go-around target speed for the landing weight (see table in the paragraph speed determination). Verify also that the landing weight is not higher than the maximum allowed (corresponding to 1.41 Vs1g).

Note: Approach and landing is systematically performed in CONF3.

GO-AROUND

Apply the following three actions simultaneously :

THRUST LEVERS TOGA
ANNOUNCE "GOAROUND-FLAPS 1"
ROTATION PERFORM

- 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 : TOGA (or MAN TOGA), SRS, GA TRK.

FLAPS 1..... SELECT

Retract two steps. Announce "FLAPS 1." when indicated.

ANNOUNCE "POSITIVE CLIMB"
ORDER "GEAR UP"
L/G UP SELECT
CONFIRM/ANNOUNCE "GEAR UP-FLAPS 1"

- **Immediately after positive climb is confirmed :**

TARGET SPEED ADJUST AND PULL

- Select and pull the predetermined target speed on the FCU.

Note: The speed selection on the FCU must be made when above 150 ft RA.

- This action disengages the SRS mode and reverts to OPEN CLB.
- Accelerate to the new target speed following FD bars.

- When the target speed is reached resume climb to the GA altitude following the FD bars.

NAV or HDG mode..... SELECT

Reselect NAV or HDG, as required.

- At go-around thrust reduction altitude (CLB or LVR CLB flashing on FMA)

THRUST LEVERS CL

- At go-around thrust acceleration altitude :

FCU SPEED PUSH or SELECT

- Push to select managed speed or select appropriate speed to accelerate.
- Retract flaps on schedule.

Note: Consider the next step :

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

SPEED DETERMINATION

Applicable to: A318

Refer to [APPROACH CLIMB LIMITED WEIGHT](#) to determine the increase in the go-around speed as a function of the landing weight, the altitude and the OAT.

The values provided in the table are, for each cell :



(M1)= Maximum go-around weight for 1.23 Vs1g

(V) = Go-around speed for 1.23 Vs1g

(M2)= Maximum go around weight for 1.14 Vs1g

Method to use the table:

- Determine the corrected maximum go-around weight for 1.23 Vs1g (corrected M1) using corrections at the bottom of following charts.
- If landing weight is lower than the corrected maximum go-around weight for 1.23 Vs1g (corrected M1), no target speed increment is necessary.
- If landing weight is higher than the corrected maximum go-around weight for 1.23 Vs1g (corrected M1), calculate the increase in the go-around target speed for the landing weight (see box placed at the bottom right of the following tables: Refer to APPROACH CLIMB LIMITED WEIGHT). Verify that the landing weight is not higher than the maximum allowed corresponding to 1.41 Vs1g (corrected M2), otherwise, the pilot should find a suitable diversion airport.

Example : ((Actual landing weight-corrected M1)/160*1)) + V = GA selected speed.

APPROACH CLIMB LIMITED WEIGHT

Applicable to: A318

APPROACH CLIMB LIMITING WEIGHT (1 000 kg)
ONE ENGINE OUT: CG=33 %
ONE ENGINE AT GO AROUND THRUST

High Air Conditioning
Anti ice OFF

CONF
1+F

PRESSURE ALTITUDE (FT)								
OAT (°C)	0	2000	4000	6000	8000	10000	12000	14000
< 10	77.8	77.3	75.3	73.2	70.4	67.4	64.2	60.8
	159	159	158	156	153	150	147	143
	83.4	82.5	80.8	78	75	71.9	68.3	64.6
20	77.5	77.0	75.1	73.0	70.2	67.3	64.0	59.3
	159	159	157	156	153	150	146	141
	83.1	82.2	80.6	77.8	74.8	71.8	68.1	63
22	77.5	76.9	75.0	72.9	70.2	67.3	63.5	58.2
	159	159	157	155	153	150	146	139
	83	82.1	80.5	77.7	74.8	71.7	67.6	61.9
24	77.4	76.9	75.0	72.9	70.2	67.2	62.3	57.1
	159	159	157	155	153	150	144	138
	82.9	82.1	80.5	77.7	74.8	71.7	66.2	61.9
26	77.4	76.9	74.9	72.9	70.1	66.6	61.0	55.9
	159	159	157	155	153	149	142	136
	82.9	82	80.4	77.7	74.7	71.1	64.9	59.5
28	77.3	76.8	74.9	72.8	70.1	65.2	59.7	
	159	159	157	155	153	147	141	
	82.8	82	80.4	77.6	74.7	69.5	63.6	
30	77.3	76.8	74.9	72.8	69.4	63.8	58.4	
	159	159	157	155	152	145	139	
	82.8	82	80.4	77.6	74	68.1	62.2	
32	77.2	76.7	74.9	72.8	68.0	62.3		
	159	159	157	155	150	143		
	82.8	81.9	80.4	77.6	72.5	66.5		
34	77.2	76.7	74.8	72.1	66.5	60.8		
	159	159	157	154	148	142		
	82.7	81.9	80.4	76.9	71	65		
36	77.2	76.7	74.8	70.6	64.9			
	159	159	157	153	148			
	82.7	81.9	80.3	75.1	69.5			
AIR CONDITIONING OFF ADD 1400 kg	ENGINE ANTI ICE ON			TOTAL ANTI ICE ON		SPEED INCREASE		
	SUBTRACT 200 kg			SUBTRACT 2700 kg		PER 170 kg Add 1 kt		

APPROACH CLIMB LIMITING WEIGHT (1 000 kg)
ONE ENGINE OUT: CG=33 %
ONE ENGINE AT GO AROUND THRUST
High Air Conditioning
Anti ice OFF
CONF
1+F

PRESSURE ALTITUDE (FT)								
OAT (°C)	0	2000	4000	6000	8000	10000	12000	14000
38	77.1 158 82.7	76.7 159 81.9	74.2 156 79.6	69.2 151 74	63.6 144 68.1			
40	77.1 158 82.6	76.6 159 81.8	72.9 155 78.2	67.9 149 72.6				
42	77.1 158 82.6	75.9 158 81.1	71.5 153 76.8	66.5 148 71.1				
44	77.0 158 82.5	74.6 156 79.7	70.2 152 75.3					
46	76.3 157 81.7	73.3 155 78.4	68.9 150 73.9					
48	75.0 156 80.3	72.0 153 77						
50	73.7 154 79	70.7 152 75.6						
52	72.5 153 77.8							
54	71.4 152 76.7							
55	70.8 151 76.1							
AIR CONDITIONING OFF ADD 1400 kg		ENGINE ANTI ICE ON SUBTRACT 200 kg		TOTAL ANTI ICE ON SUBTRACT 2700 kg		SPEED INCREASE PER 170 kg Add 1 kt		

PRO-SPO-80 – Steep Approach and Landing

GENERAL

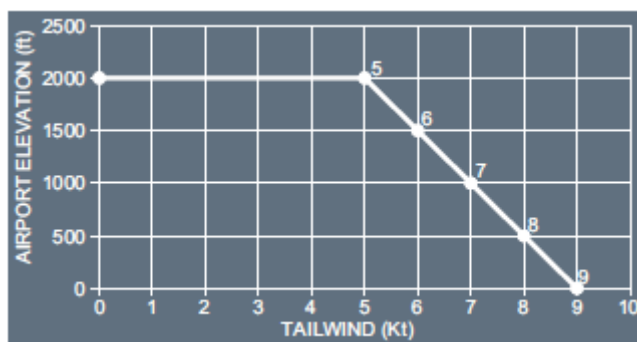
Applicable to: A318

This chapter provides the limitations, procedures and performance required in order to achieve Steep Approach and Landing (SAL) operations (flight path angle from -4.5 ° to -5.5 °).

LIMITATIONS

Applicable to: A318

- Flight Path Angle Range: -4.5 °/-5.5 °
- Maximum airport elevation for landing: 2 000 ft
- Maximum demonstrated crosswind for landing: 26 kt (gusts included).
- Tailwind limit for landing:



- Autoland is not authorized for steep approaches
- CAT II & CAT III are not authorized for steep approaches
- Steep approaches with one engine inoperative are not authorized
- Steep approaches in icing conditions with the wing anti-ice system inoperative are not authorized.

PROCEDURES

Applicable to: A318

DESCENT PREPARATION

FWC and FCDC STATUS.....CHECK

Before initiating a steep approach, check that at least one FWC and one FCDC are available.

- **On the MCDU PERF APPR page:**

LDG CONF CHECK FULL

The landing configuration for a steep approach is full.

VAPP SET

Increase the VAPP provided in the MCDU by 8 kt.

This is to compensate for spoiler 3 and 4 extension when the SAL function is active.

Note: 1. When the SAL function is active, the PFDs automatically display the increased VLS.

2. When computing the actual landing distances using the QRH, increase the landing distance as per correction table, to take into account the speed increment of 8 kt.

STEEP APPR pb PRESS

The STEEP APPR green memo appears on the ECAM, to confirm that the SAL function is armed and available.

APPROACH BRIEFING PERFORM

INITIAL/INTERMEDIATE APPROACH

- **Before final approach:**

Steep Approach configuration ESTABLISH

Steep Approach configuration is established when the following conditions are fulfilled:

- The landing gear is down
- FLAPS FULL
- The speed brake lever is in the FULL position.

Note: When the speed brake lever is set to the FULL position, the ground spoilers are armed and will automatically deploy at touchdown.

FINAL APPROACH

FLIGHT PARAMETERS.....CHECK

The basic callouts in the SOP ILS APPROACH section (Refer to [Flight Parameters in Approach](#)) apply except that, for a steep approach, the PM calls out, if the descent rate becomes more than 1 400 ft/min.

LANDING

Two "STANDBY" callouts automatically trigger at approximately 115 ft RA and 90 ft RA to remind the flight crew to maintain the aircraft descent path while the flight crew prepares for the flare. At approximately 65 ft RA, the "FLARE" callout automatically triggers to remind the flight crew to initiate the flare.

- **At 60 ft RA:**
ANNOUNCE "FLARE"

This is to confirm the "FLARE" automatic callout.

- **When the "FLARE" callout is triggered or announced by the PM:**
THR LEVERS IDLE
FLARE PERFORM

During the flare, spoilers 3 and 4 automatically retract from 30 ° to 8 °.

GO-AROUND

Initiate a go-around if a red warning or amber caution triggers below 2 000 ft AGL (except if an immediate landing is safer as, for example, in the case of smoke or fire)

In the case of a go-around, retract the SPEED BRAKE lever, to confirm the automatic retraction.

DISCONTINUED APPROACH

The speedbrakes do not retract automatically.

OPERATIONS IN ICING CONDITIONS

Applicable to: A318

When the SAL function is active, the minimum approach speed is the VLS displayed on the PFD, even if there is evidence of significant ice accretion on a structure that is not heated.

PRO-SPO-94 – Positioning Ferry Flights

GENERAL

Applicable to: ALL

The minimum operating crew for Positioning/Ferry flights is 2 pilots. There is no requirement to carry additional persons in the cabin for any reason.

- The following procedures should be completed to minimise the risk of fire/fumes:
- The aircraft cabin should have been cleaned and all bins, etc., emptied of any combustible material.
- A walk round of the cabin must be made to ensure there is no unsecured equipment or loose articles.
- No freight or Company stores should be carried in the cabin.
- All ovens and beverage makers should be switched off. The GALLEY or GALY and CAB switches on the electrical panel must be set to OFF. If the operating crew use gallery equipment, it must be checked at regular intervals during use and switched off when not required.
- A toilet smoke warning is likely to be spurious, but should be investigated. Smoke detectors are operational at all times.
- All cabin lights that generate heat or utilise a ballast unit and are switch controlled must be switched OFF (this includes reading and main cabin lights).
NO SMOKING and SEAT BELT sign switches must be set to OFF.
- Prior to taxiing:
A minimum number of doors should be armed to enable evacuation.

The doors must be disarmed as soon as possible after the engines are shut down.

Positioning/Ferry flights are limited to BAV pilots of **Senior Captain** rank only.

PRO-SUP – SUPPLEMENTARY PROCEDURES
PRO-SUP-10 – Operating Speeds Definition

GENERAL

Applicable to: ALL

This chapter shows the speed symbols and definitions.

The source of the computation is also given, when applicable.

CHARACTERISTIC SPEEDS

Applicable to: A320

The characteristic speeds displayed on the PFD are computed by the Flight Augmentation Computer (FAC), according to the FMS weight data (for PFD/MCDU display consistency and accuracy purposes), and aerodynamic data as a backup.

VLS (of normal landing configuration: CONF 3 or FULL), F, S, and Green Dot speeds are also displayed on the MCDU TAKEOFF and/or APPR pages.

The speeds displayed by the MCDU are computed by the FMS, based on the aircraft gross weight (which is computed according to the entered ZFW and the FOB), or the predicted gross weight (for approach or go-around).

VS: Stalling speed.

Not displayed.

For a conventional aircraft, the reference stall speed, VSmin, is based on a load factor that is less than 1 g. This gives a stall speed that is lower than the stall speed at 1 g. All operating speeds are expressed as functions of this speed (for example, VREF = 1.3 VSmin).

Because aircraft of the A320 family have a low-speed protection feature (alpha limit) that the flight crew cannot override, Airworthiness Authorities have reconsidered the definition of stall speed for these aircraft.

All the operating speeds must be referenced to a speed that can be demonstrated by flight tests. This speed is designated VS1g.

Airworthiness Authorities have agreed that a factor of 0.94 represents the relationship between VS1g for aircraft of the A320 family and VSmin for conventional aircraft types. As a result, Authorities allow aircraft of the A320 family to use the following factors:

- $V_2 = 1.2 \times 0.94 \text{ VS1g} = 1.13 \text{ VS1g}$
- $V_{\text{REF}} = 1.3 \times 0.94 \text{ VS1g} = 1.23 \text{ VS1g}$

These speeds are identical to those that the conventional 94 % rule would have defined for these aircraft. The A318, A319, A320, and A321 have exactly the same maneuver margin that a conventional aircraft would have at its reference speeds.

The FCOM uses VS for VS1g.

VLS: Lowest Selectable Speed.

Represented by the top of an amber strip along the airspeed scale on the PFD.

Computed by the FAC based on FMS weight data, and on aerodynamic data as a backup, and corresponds to 1.13 VS during takeoff or following a touch and go.

Becomes 1.23 VS, after retraction of one step of flaps.

Becomes 1.28 VS, when in clean configuration.

Note: If in CONF 0 VLS were 1.23 VS (instead of 1.28 VS), the alpha protection strip would hit the VLS strip on the PFD.

Above 20 000 ft, VLS is corrected for Mach effect to maintain a buffet margin of 0.2 g.

In addition, VLS increases when the speedbrakes are extended.

F: Minimum speed at which the flaps may be retracted at takeoff.

In approach, used as a target speed when the aircraft is in CONF 2 or CONF 3.

Represented by “F” on the PFD speed scale. Equal to about 1.23 VS of CONF 1 + F.

S: Minimum speed at which the slats may be retracted at takeoff.

In approach, used as a target speed when the aircraft is in CONF 1.

Represented by “S” on the PFD airspeed scale.

Equal to about 1.29 VS of clean configuration.

O: Green dot speed.

Engine-out operating speed in clean configuration.

(Best lift-to-drag ratio speed).

Also corresponds to the final takeoff speed.

Represented by a green dot on the PFD scale.

Below 20 000 ft equal to $2 \times \text{weight (tons)} + 80$

Above 20 000 ft, add 1 kt per 1 000 ft

CHARACTERISTIC SPEEDS

Applicable to: A319

The characteristic speeds displayed on the PFD are computed by the Flight Augmentation Computer (FAC), according to aerodynamic data.

VLS (of normal landing configuration: CONF 3 or FULL), F, S and Green Dot speeds are also displayed on the MCDU TAKEOFF and/or APPR pages.

The speeds displayed by the MCDU are computed by the FMS, based on the aircraft gross weight (which is computed according to the entered ZFW and the FOB), or the predicted gross weight (for approach or go-around).

VS: Stalling speed.

Not displayed.

For a conventional aircraft, the reference stall speed, VSmin, is based on a load factor that is less than 1 g. This gives a stall speed that is lower than the stall speed at 1 g. All operating speeds are expressed as functions of this speed (for example, VREF = 1.3 VSmin).

Because aircraft of the A320 family have a low-speed protection feature (alpha limit) that the flight crew cannot override, Airworthiness Authorities have reconsidered the definition of stall speed for these aircraft.

All the operating speeds must be referenced to a speed that can be demonstrated by flight tests. This speed is designated VS1g.

Airworthiness Authorities have agreed that a factor of 0.94 represents the relationship between VS1g for aircraft of the A320 family and VSmin for conventional aircraft types. As a result, Authorities allow aircraft of the A320 family to use the following factors :

$$V2 = 1.2 \times 0.94 \text{ VS1g} = 1.13 \text{ VS1g}$$

$$VREF = 1.3 \times 0.94 \text{ VS1g} = 1.23 \text{ VS1g}$$

These speeds are identical to those that the conventional 94 % rule would have defined for these aircraft. The A318, A319, A320 and A321 have exactly the same maneuver margin that a conventional aircraft would have at its reference speeds.

The FCOM uses VS for VS1g.

VLS: Lowest Selectable Speed.

Represented by the top of an amber strip along the airspeed scale on the PFD.

Computed by the FAC, based on aerodynamic data, and corresponds to 1.13 VS during takeoff, or following a touch and go.

Becomes 1.23 VS, after retraction of one step of flaps.

Becomes 1.28 VS, when in clean configuration.

Note: If in CONF 0 VLS were 1.23 VS (instead of 1.28 VS), the alpha protection strip would hit the VLS strip on the PFD.

Above 20 000 ft, VLS is corrected for Mach effect to maintain a buffet margin of 0.2 g.

In addition, VLS increases when the speedbrakes are extended.

F: Minimum speed at which the flaps may be retracted at takeoff.

In approach, used as a target speed when the aircraft is in CONF 2 or CONF 3.

Represented by “F” on the PFD speed scale. Equal to about 1.26 VS of CONF 1 + F.

S: Minimum speed at which the slats may be retracted at takeoff.

In approach, used as a target speed when the aircraft is in CONF 1.

Represented by “S” on the PFD airspeed scale.

Equal to about 1.23 VS of clean configuration.

O: Green dot speed.

Engine-out operating speed in clean configuration.

(Best lift-to-drag ratio speed).

Also corresponds to the final takeoff speed.

Represented by a green dot on the PFD scale.

Below 20 000 ft equal to $2 \times \text{weight (tons)} + 85$

Above 20 000 ft, add 1 kt per 1 000 ft

CHARACTERISTIC SPEEDS

Applicable to: A321

The characteristic speeds displayed on the PFD are computed by the Flight Augmentation Computer (FAC), according to aerodynamic data.

VLS (of normal landing configuration: CONF 3 or FULL), F, S and Green Dot speeds are also displayed on the MCDU TAKEOFF and/or APPR pages.

The speeds displayed by the MCDU are computed by the FMS, based on the aircraft gross weight (which is computed according to the entered ZFW and the FOB), or the predicted gross weight (for approach or go-around).

VS: Stalling speed.

Not displayed.

For a conventional aircraft, the reference stall speed, V_{Smin} , is based on a load factor that is less than 1 g. This gives a stall speed that is lower than the stall speed at 1 g. All operating speeds are expressed as functions of this speed (for example, $V_{REF} = 1.3 V_{Smin}$).

Because aircraft of the A320 family have a low-speed protection feature (alpha limit) that the flight crew cannot override, Airworthiness Authorities have reconsidered the definition of stall speed for these aircraft.

All the operating speeds must be referenced to a speed that can be demonstrated by flight tests. This speed is designated $VS1g$.

Airworthiness Authorities have agreed that a factor of 0.94 represents the relationship between $VS1g$ for aircraft of the A320 family and V_{Smin} for conventional aircraft types. As a result, Authorities allow aircraft of the A320 family to use the following factors :

$$V_2 = 1.2 \times 0.94 VS1g = 1.13 VS1g$$

$$V_{REF} = 1.3 \times 0.94 VS1g = 1.23 VS1g$$

These speeds are identical to those that the conventional 94 % rule would have defined for these aircraft. The A318, A319, A320 and A321 have exactly the same maneuver margin that a conventional aircraft would have at its reference speeds.

The FCOM uses VS for $VS1g$.

VLS: Lowest Selectable Speed.

Represented by the top of an amber strip along the airspeed scale on the PFD.

Computed by the FAC, based on aerodynamic data, and corresponds to 1.13 VS during takeoff, or following a touch and go.

Becomes 1.23 VS, after retraction of one step of flaps.

Becomes 1.28 VS, when in clean configuration.

Note: If in CONF 0 VLS were 1.23 VS (instead of 1.28 VS), the alpha protection strip would hit the VLS strip on the PFD.

Above 20 000 ft, VLS is corrected for Mach effect to maintain a buffet margin of 0.2 g.

In addition, VLS increases when the speedbrakes are extended.

F: Minimum speed at which the flaps may be retracted at takeoff.

In approach, used as a target speed when the aircraft is in CONF 2 or CONF 3.

Represented by “F” on the PFD speed scale. Equal to about 1.19 VS of CONF 1 + F.

S: Minimum speed at which the slats may be retracted at takeoff.

In approach, used as a target speed when the aircraft is in CONF 1.

Represented by “S” on the PFD airspeed scale.

Equal to about 1.25 VS of clean configuration.

O: Green dot speed.

Engine-out operating speed in clean configuration.

(Best lift-to-drag ratio speed).

Also corresponds to the final takeoff speed.

Represented by a green dot on the PFD scale.

Below 20 000 ft equal to $1.5 \times \text{weight (tons)} + 110$

Above 20 000 ft, add 1 kt per 1 000 ft

CHARACTERISTIC SPEEDS**Applicable to: A318**

The characteristic speeds displayed on the PFD are computed by the Flight Augmentation Computer (FAC), according to the FMS weight data (for PFD/MCDU display consistency and accuracy purposes), and aerodynamic data as a backup.

VLS (of normal landing configuration: CONF 3 or FULL), F, S and Green Dot speeds are also displayed on the MCDU TAKEOFF and/or APPR pages.

These values are computed by the FMS, based on the aircraft gross weight (which is computed according to the entered ZFW and the FOB), or the predicted gross weight (for approach or go-around).

VS: Stalling speed.

Not displayed.

For a conventional aircraft, the reference stall speed, VSmin, is based on a load factor that is less than 1 g. This gives a stall speed that is lower than the stall speed at 1 g. All operating speeds are expressed as functions of this speed (for example, VREF = 1.3 VSmin).

Because aircraft of the A320 family have a low-speed protection feature (alpha limit) that the flight crew cannot override, Airworthiness Authorities have reconsidered the definition of stall speed for these aircraft.

All the operating speeds must be referenced to a speed that can be demonstrated by flight tests. This speed is designated VS1g.

Airworthiness Authorities have agreed that a factor of 0.94 represents the relationship between VS1g for aircraft of the A320 family and VSmin for conventional aircraft types. As a result, Authorities allow aircraft of the A320 family to use the following factors :

$$V2 = 1.2 \times 0.94 \text{ VS1g} = 1.13 \text{ VS1g}$$

$$VREF = 1.3 \times 0.94 \text{ VS1g} = 1.23 \text{ VS1g}$$

These speeds are identical to those that the conventional 94 % rule would have defined for these aircraft. The A318, A319, A320 and A321 have exactly the same maneuver margin that a conventional aircraft would have at its reference speeds.

The FCOM uses VS for VS1g.

VLS: Lowest Selectable Speed.

Represented by the top of an amber strip along the airspeed scale on the PFD.

Computed by the FAC, based on FMS weight data, and on aerodynamic data as a backup, and corresponds to 1.13 VS during takeoff, or following a touch and go.

Becomes 1.23 VS, after retraction of one step of flaps.

Becomes 1.28 VS, when in clean configuration.

Note: *If in CONF 0 VLS were 1.23 VS (instead of 1.28 VS), the alpha protection strip would hit the VLS strip on the PFD.*

Above 20 000 ft, VLS is corrected for Mach effect to maintain a buffet margin of 0.3 g.

In addition, VLS is increased, when the speedbrakes are extended.

The VMC is taken into account for VLS computation, as follows:

- At takeoff, until retraction of one step of flaps, VLS is equal to, or greater than, the lowest of:
 - $V_2/1.05$
 - 1.05 VMCA maximum certified.
- In all the other phases, it is equal to, or greater than, VMCL.

F: Minimum speed at which the flaps may be retracted at takeoff.

In approach, used as a target speed when the aircraft is in CONF 2 or CONF 3.

Represented by “F” on the PFD speed scale. Equal to about 1.26 VS of CONF 1 + F.

S: Minimum speed at which the slats may be retracted at takeoff.

In approach, used as a target speed when the aircraft is in CONF 1.

Represented by “S” on the PFD airspeed scale.

Equal to about 1.23 VS of clean configuration.

O : Green dot speed.

Engine-out operating speed in clean configuration.

(Best lift-to-drag ratio speed).

Also corresponds to the final takeoff speed.

Represented by a green dot on the PFD scale.

Below 20 000 ft equal to $2 \times \text{weight (tons)} + 90$

Above 20 000 ft, add 1 kt per 1 000 ft

PROTECTION SPEEDS

Applicable to: ALL

V α PROT, V α MAX and VSW are computed by the FAC, based on aerodynamic data. They are only used for display on the PFD, and not for flight control protection (the activation of the protections is computed by the ELAC).

V α PROT: Angle of attack protection speed.

Corresponds to the angle of attack at which the angle of attack protection becomes active.

Represented by the top of a black and amber strip along the PFD speed scale, in normal law.

V α MAX: Maximum angle of attack speed.

Corresponds to the maximum angle of attack that may be reached in pitch normal law.

Represented by the top of a red strip along the PFD speed scale, in normal law.

VSW: Stall warning speed.

Represented by a red and black strip along the speed scale when the flight control normal law is inoperative.

VMAX: Represented by the bottom of a red and black strip along the speed scale.

Determined by the FAC according to the aircraft configuration.

Is equal to VMO (or speed corresponding to MMO), VLE or VFE.

LIMIT SPEEDS

Applicable to: ALL

VA:	Maximum design maneuvering speed. This corresponds to the maximum structural speed permitted for full control deflection, if alternate or direct law is active.
VMCG:	Minimum speed, on the ground during takeoff, at which the aircraft can be controlled by only using the primary flight controls, after a sudden failure of the critical engine, the other engine remaining at takeoff thrust.
VMCA:	Minimum control speed in flight at which the aircraft can be controlled with a maximum bank of 5 °, if one engine fails, the other engine remaining at takeoff thrust (takeoff flap setting, gear retracted).
VMCL:	Minimum control speed in flight, at which the aircraft can be controlled with a maximum bank of 5 °, if one engine fails, the other engine remaining at takeoff thrust (approach flap setting).
VFE:	Maximum speed for each flap configuration.
VLE:	Maximum speed with landing gear extended.
VLO:	Maximum speed for landing gear operation.
VMO:	Maximum speed.
VFE NEXT:	Maximum speed for the next (further extended) flap lever position.

OTHER SPEEDS

Applicable to: A320

- V1:** The highest speed, during takeoff, at which the flight crew has a choice between continuing the takeoff or stopping the aircraft.
- Represented by “1” on the airspeed scale (or the V1 value when it is off the airspeed scale).
- Inserted manually through the MCDU by the flight crew.
- Displayed on the MCDU TAKEOFF page.
- VR:** The speed at which the pilot rotates in order to reach V2 at an altitude of 35 ft at the latest after an engine failure.
- Inserted manually through the MCDU by the flight crew.
- Displayed on the MCDU TAKEOFF page.
- V2:** Takeoff safety speed that the aircraft attains at the latest at an altitude of 35 ft with one engine failed, and maintains during the second segment of the takeoff.
- Represented by the SPEED SELECT symbol on the speed scale.
- Minimum value equal to 1.13 VS for the corresponding configuration.
- Inserted manually through the MCDU by the flight crew.
- Displayed on the MCDU TAKEOFF page.
- VREF:** Reference speed used for normal final approach.
- Equal to $1.23 \times \text{VS of CONF FULL}$.
- Displayed on the MCDU APPR page, if landing is planned in CONF FULL (VLS CONF FULL).
- VAPP:** Final approach speed.
- Displayed on MCDU APPR page.
- Calculated by the FMGCs.
- Represents : $\text{VAPP} = \text{VLS} + \text{wind correction}$
- The wind correction is limited to a minimum of 5 kt and a maximum of 15 kt.
- The flight crew may modify VAPP through the MCDU.
- During autoland or when A/THR is on or in case of ice accretion or gusty crosswind greater than 20 kt, VAPP must not be lower than $\text{VLS} + 5 \text{ kt}$.

SPEED TARGET: Represented by a magenta triangle.

Calculated by the FMGCs

Gives efficient speed guidance in approach during various windy conditions.

Represents :

$\text{SPEED TARGET} = \text{GS mini} + \text{actual headwind (measured by ADIRS)}$

$\text{GS mini} = \text{VAPP} - \text{TOWER WIND (headwind component along runway axis calculated by FMGC from tower wind entered on MCDU)}$.

OTHER SPEEDS

Applicable to A318, A319 and A321

- V1:** The highest speed, during takeoff, at which the flight crew has a choice between continuing the takeoff or stopping the aircraft.
- Represented by “1” on the airspeed scale (or the V1 value when it is off the airspeed scale).
- Inserted manually through the MCDU by the flight crew.
- Displayed on the MCDU TAKEOFF page.
- VR:** The speed at which the pilot rotates in order to reach V2 at an altitude of 35 ft at the latest after an engine failure.
- Inserted manually through the MCDU by the flight crew.
- Displayed on the MCDU TAKEOFF page.
- V2:** Takeoff safety speed that the aircraft attains at the latest at an altitude of 35 ft with one engine failed, and maintains during the second segment of the takeoff.
- Represented by the SPEED SELECT symbol on the speed scale.
- Minimum value equal to 1.13 VS for the corresponding configuration.
- Inserted manually through the MCDU by the flight crew.
- Displayed on the MCDU TAKEOFF page.
- VREF:** Reference speed used for normal final approach.
- Equal to $1.23 \times \text{VS of CONF FULL}$.
- Displayed on the MCDU APPR page, if landing is planned in CONF FULL (VLS CONF FULL).

- VAPP:**
- Final approach speed.
 - Displayed on MCDU APPR page.
 - Calculated by the FMGCs.
 - Represents : $VAPP = VLS + \text{wind correction}$.
 - The wind correction is limited to a minimum of 5 kt and a maximum of 15 kt.
 - The flight crew may modify VAPP through the MCDU.
 - During autoland or when A/THR is on or in case of ice accretion or gusty crosswind greater than 20 kt, VAPP must not be lower than $VLS + 5 \text{ kt}$.
 - For landing in configuration 3 with ice accretion VAPP must not be lower than $VLS + 10 \text{ kt}$.
- SPEED TARGET:**
- Represented by a magenta triangle.
 - Calculated by the FMGCs
 - Gives efficient speed guidance in approach during various windy conditions.
 - Represents :
$$\text{SPEED TARGET} = \text{GS mini} + \text{actual headwind (measured by ADIRS)}$$
$$\text{GS mini} = \text{VAPP} - \text{TOWER WIND (headwind component along runway axis calculated by FMGC from tower wind entered on MCDU)}.$$

PRO-SUP-27 – Flight Controls (Flying Conditions)
General

GENERAL

Applicable to: ALL

The fly-by-wire system has been designed and certificated to make the new generation of aircraft more cost effective and safer and smoother to fly or ride in than a conventional aircraft.

Normal Operations

GENERAL

Applicable to: ALL

The pilot uses the sidestick to fly the aircraft in pitch and roll (and indirectly, through turn coordination, in yaw).

The computers interpret the pilot's inputs and move the control surfaces as necessary.

However, regardless of the pilot's inputs the computers will prevent :

- excessive load factor
- loss of control leading to excursions outside the safe flight envelope.

AIRCRAFT ON THE GROUND

Applicable to: ALL

At ground speeds below 70 kt, the sidesticks have full authority over the controls in pitch and roll to permit control checks.

At ground speeds above 70 kt, the authority in pitch is reduced from 30 ° up to 20 ° up.

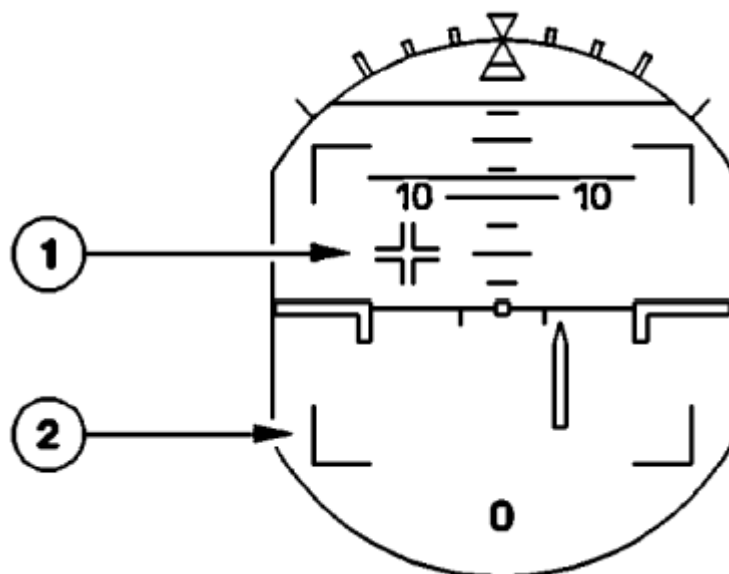
In this ground mode, movements of the control surfaces in pitch and roll correspond directly to the stick inputs.

With the aircraft in the normal configuration and engines running on the ground:

- when the wheel brakes are released, the aircraft usually rolls with no added thrust.
- nose wheel steering is “fly.by.wire”, with no mechanical connection between the nose wheel and the steering tiller. The control forces are light : the flight crew should be careful to move the tiller gently to avoid unnecessarily high-rate turns.

The aircraft can make very tight turns, but the flight crew should resist any tendency to overcontrol.

When making tight turns at low ground speed, the crew should hold the selected tiller position, even if the turn radius is shorter than intended, so as to maintain a smooth turn.



(1) The PFD includes this symbol that is the sum of sidestick positions given to the computers. It permits the PM to check that the PF is making an appropriate control input during takeoff roll.

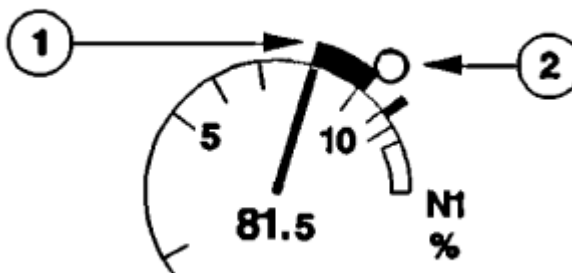
(2) Small limit marks indicate the limits of stick travel ($\pm 16^\circ$ in pitch, $\pm 20^\circ$ in roll).

They are only displayed with the aircraft on ground. The flight crew must not use this display for control checks, because it does not necessarily indicate the control position in failure cases. The flight crew must use the ECAM flight controls page for making that check.

IN FLIGHT

Applicable to: ALL

TAKEOFF MODE



Thrust management is very easy. The pilot selects a FLX thrust by stopping the thrust levers in the FLX/MCT detent, and by checking that the resulting N1 (or EPR) (1) is compatible with N1 (or EPR) target (2). For maximum takeoff thrust, the pilot moves the thrust levers fully forward and performs the same thrust check (N1 or EPR).

To counter the nose-up effect of setting engine takeoff thrust, the pilot should apply half forward stick, until the airspeed reaches 80 kt. Then, he should release the stick gradually to reach neutral at 100 kt (Refer to TAKEOFF for additional information).

Rotation is conventional. It takes about 1/3 to 1/2 back stick. The Pilot Flying (PF) continues the rotation in order to bring the all-engine attitude value towards approximately 15°. During rotation, the PF must not attempt to reach the FD pitch bar, because it does not provide a pitch rate order, and may lead to overreaction. As soon as the aircraft becomes airborne only, the PF must adjust the pitch attitude using the FD bar, which is then representative of the SRS order. As the attitude changes and stabilizes, the control laws change to those for the flight mode in pitch, allowing the sidestick to return to the neutral position to maintain 1 g at the chosen attitude. Pitch trim can begin to work at 50 ft.

For crosswind takeoffs, routine use of into wind aileron is not recommended. In strong crosswind conditions, some lateral control may be used, but care should be taken to avoid using large deflections, resulting in excessive spoiler deployment which increases the tendency to turn into wind, reduces lift and increases drag. Spoiler deflection starts to become significant with more than one third sidestick deflection. As the aircraft lifts off, any lateral control applied will result in a roll rate demand.

FLIGHT MODE

Normally the sidestick is in the neutral position, with the aircraft stable in pitch and roll at the chosen altitude in straight or turning flight within certain limits. As a result, even in turbulence, the aircraft is flown best with little or no stick input.

Hands off, the system maintains 1 g in pitch, corrected for pitch and roll attitude, and zero roll rate, within certain limits (+30°, -15° in pitch and ± 33° roll). Hands off, within these limits the aircraft resists disturbance from the atmosphere and rides well even in heavy turbulence.

The system compensates almost 100 % for changes of trim due to changes in speed and configuration. Changes of trim due to changes in thrust can be too large for the system to compensate, and the aircraft may respond to them in pitch in the conventional sense and then hold the new attitude at which it has stabilized after the trim change.

The pitch trim wheel moves as the control law compensates for these changes.

The control laws also make turning easier. They protect against overbanking, and at the chosen bank attitude (less than 33 ° of bank) the system maintains zero roll rate, stick free.

Steep turns can be made at up to 67 ° of bank. This is the steepest bank at which it is possible to maintain level flight at 2.5 g.

Beyond 33 ° of bank, the pitch trim stops working and a lateral stability term is introduced. This term becomes progressively stronger as bank angle increases, so that it equals a full sidestick demand at 67 ° of bank, hence forming the limiting system.

The lack of pitch trim makes it necessary for the pilot to hold the nose up in a steep turn. If he releases the stick, the nose drops and the aircraft eases its roll angle to less than 33 ° of bank and stabilizes at the pitch and bank angles it achieves at less than 33 ° of bank.

During a normal entry into a turn, the pilot must make an intentional initial change to the pitch attitude in order to maintain level flight. Once he has done this, he can release the stick. The system then maintains a level turn.

In climb, cruise, descent, and approach all these basic rules remain in effect.

LANDING MODE

The system's landing mode gives the aircraft a stabilized flight path and makes a conventional flare and touchdown. It carries out the initial approach as this manual described earlier. At 50 ft, the system memorizes the attitude, usually 3 ° or 4 ° nose up. From 30 ft down, this value washes out over eight seconds to -2 °. The result is that the pilot has to exert a progressive pull to increase pitch gently in the flare. He should pull the thrust levers back at or above 20 ft, and the landing should occur without a long flare. Touchdown quality is better and more repeatable at fairly flat attitudes. An audible "RETARD" callout reminds the pilot if he has not pulled back the thrust levers when the aircraft has reached 20 ft.

Crosswind landings are conventional. The preferred technique is to use the rudder to align the aircraft with the runway heading, during the flare, while using lateral control to maintain the aircraft on the runway centerline (Refer to LANDING). The lateral control mode does not change until the wheels are on the ground, so there is no discontinuity in the control laws. The aircraft tends to roll gently in the conventional sense as drift decreases, and the pilot may have to use some normal cross control to maintain roll attitude.

Even during an approach in considerable turbulence, the control system resists the disturbances quite well without pilot inputs. In fact, the pilot should try to limit his control inputs to those necessary to correct the flight path trajectory and leave the task of countering air disturbances to the flight control system.

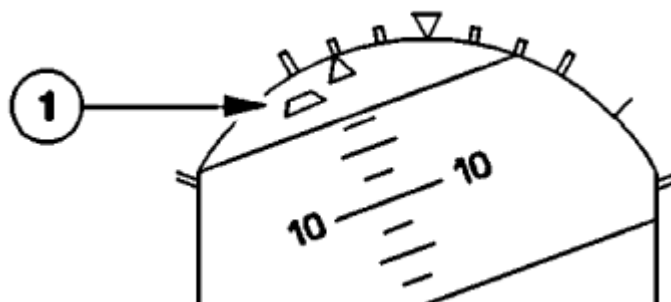
Derotation is conventional. The pilot releases the back pressure he was holding for the flare and the nose wheel comes down nicely.

Pitch trim then resets to zero.

Abnormal Operations

ENGINE FAILURE AT TAKEOFF

Applicable to: ALL



On the ground the aircraft is conventional. The pilot uses rudder to maintain direction. He should rotate to about 12.5 ° of pitch and adjust as required. The sideslip indication (1) changes to the engine-out mode (blue). When it is centered, the aircraft is close to the zero aileron position (best drag condition). It is therefore important to zero the slip indication accurately.

Trim the rudder conventionally.

When time permits, the pilot should check the ECAM's FLT CTL page, and refine the rudder trim to give neutral lateral control, and also trim the rudder toward the spoilers that are up or toward the aileron that is farthest up to bring the lateral controls back to neutral.

ENGINE-OUT LANDING

Applicable to: ALL

The engine-out landing is basically a conventional landing. The pilot should trim to maintain the slip indication centered. It is yellow, as long as N1 is less than 80 %. Between 100 and 50 ft, the pilot can reset rudder trim to make the landing run easier, and to recover full rudder travel in both directions.

BOUNCE AT LANDING

Applicable to: ALL

In case of a light bounce, maintain the current pitch attitude and complete the landing, while maintaining the thrust at idle. In case of a high bounce, initiate a go-around, initially maintaining the pitch attitude. Retract the flaps one step, and then the landing gear, once the aircraft is properly established on the go-around segment. In all cases, do not attempt to soften the (potential) second touchdown by increasing the pitch attitude.

TRAINING TOUCH-AND-GO

Applicable to: ALL

With the nosewheel on ground, pitch trim automatically resets to zero. The pilot should select CONF 2 and add thrust. He must always move the thrust levers to TOGA to bring up the speed reference system (SRS), and then reduce to a lower thrust (not less than CL), if he chooses. Takeoff may be a little out of trim, which may affect the rotation slightly, but once the aircraft is off the ground, the control law holds the "out of trim", then retracts at 50 ft.

PRO-SUP-30 – Ice and Rain Protection

ICING CONDITIONS

Applicable to: ALL

Icing conditions exist when the OAT (on ground and for takeoff), or when the TAT (in flight) is at or below 10 °C, and visible moisture in any form is present (such as clouds, fog with visibility of one mile or less, rain, snow, sleet or ice crystals).

Icing conditions also exist when the OAT on the ground and for takeoff is at or below 10 °C when operating on ramps, taxiways, or runways where surface snow, standing water or slush may be ingested by the engines or freeze on engines, nacelles or engine sensor probes.

WARNING

Pilots must turn on the engine anti-ice system, when temperature and visible moisture meet these criteria, and should not wait until they see ice building up.

OPERATIONS IN ICING CONDITIONS

Applicable to: ALL

FLIGHT IN ICING CONDITIONS

● **Engine anti-ice**

ENGINE ANTI ICE must be ON during all ground and flight operations, when icing conditions exist, or are anticipated, except during climb and cruise when the SAT is below -40 °C.

In climb or cruise, when the SAT decreases to lower than -40 °C, engine anti-ice should be turned off.

ENGINE ANTI ICE must be ON before and during a descent in icing conditions, even if the SAT is below -40 °C.

● **Wing anti-ice**

WING ANTI ICE may either be used to prevent ice formation, or to remove ice accumulation from the wing leading edges.

WING ANTI ICE should be selected ON, whenever there is an indication that airframe icing exists. This can be evidenced by ice accumulation on the visual ice indicator (located between the two cockpit windshields), or on the windshield wipers.

CAUTION

1. Extended flight, in icing conditions with the slats extended, should be avoided.
2. If there is evidence of ice accretion and to take into account ice formation on non-heated structure, the minimum speed should be:
 - In configuration full, VLS +5 kt.
 - In configuration lower than FULL, VLS +10 kt.
 For Landing Performance assessment, refer to QRH.
3. If there is evidence of ice accretion on de-iced parts (WING ANTI ICE inoperative) of the airframe, the minimum speeds should be:
 - VLS +10/G DOT,
 - For Landing Performance assessment, refer to QRH.

GROUND OPERATIONS IN HEAVY RAIN

Applicable to: ALL

When the aircraft is parked on the ground during heavy rain, it can take rainwater into the avionics ventilation system via the open skin air inlet valve.

To prevent this, the following procedure must be applied :

● **After landing:**

EXTRACT OVRD

This closes the avionics ventilation system, preventing rainwater from entering.

PACKS 1 and 2..... CHECK ON

This adds air from the air conditioning system to ventilation air. If bleed air is not available, the arrangement can function for a limited time, as follows :

- OAT ≤ 39 °C: no limit
- 39 °C ≤ OAT ≤ 45 °C: 3 h
- OAT ≥ 45 °C : 30 min

● **After takeoff:**

EXTRACT AUTO

PRO-SUP-70 – Power Plant

THRUST CONTROL

Applicable to: ALL

GENERAL

The flight crew uses console-mounted levers to control engine thrust. Each lever sends electrical signals to the FADEC of the engine it controls. The FADEC responds to the thrust lever position or an autothrust command by setting the engine thrust.

The thrust lever quadrant is the equivalent of a thrust rating panel. For each lever it has five detents. Moving the thrust lever to the forward stop of the quadrant always gives maximum takeoff or go-around thrust, as appropriate, and signals the AP/FD to go to takeoff or go-around, as appropriate. The FMA (Flight Mode Annunciator) in the left window of each PFD displays the status of the thrust system to the pilot.

The engine instrument display gives a read-out of the engine thrust mode (CL, MCT, etc.) and the appropriate engine limit. It displays the actual limit set, thrust lever position, FADEC command, and maximum engine rating limit continually.

MANUAL THRUST CONTROL

With A/THR disconnected, thrust control between full reverse (on the ground only) and maximum takeoff or go-around thrust is entirely conventional.

TLA (Thrust Lever Angle) determines the thrust demanded.

The rating limit selected by the pilot and the actual engine limit appear on the engine instrument display.

With the thrust lever short of the CL position on the quadrant, the engine instrument display shows CL continually. If one or both thrust levers are above CL, it shows MCT/FLEX. If one or both thrust levers are beyond the MCT detent, it shows TOGA. With the thrust levers positioned in a detent, the detent setting controls the engines to that limiting parameter.

AUTOTHRUST

When active A/THR controls either speed, thrust or retard as appropriate. The engine limit corresponds to the thrust lever position. If the thrust lever is below the CL detent then the TLA determines the engine power limit.

With the thrust lever above the CL detent, autothrust reverts to arm (A/THR blue on FMA) except if alpha-floor is active. CLB (or LVR CLB) flashes on the FMA.

If the thrust levers are not aligned, an asymmetric message (ASYM or LVR ASYM) appears on the FMA. If so, each engine is limited to its appropriate TLA.

This allows the use of autothrust to continue if one engine has to have its maximum RPM limited for some operational reasons such as excessive vibration.

AUTOTHRUST DISCONNECTION

Autothrust disconnection occurs when :

- The A/THR fails, or
- The FCU's A/THR pb is pressed, or
- The thrust lever(s)' instinctive disconnect button is pressed, or
- Both thrust levers are set to IDLE.

1. Disconnection, due to a failure or to the use of the FCU A/THR pb. If the thrust levers are in the CL detent (both engines operative), or one thrust lever in the MCT detent (one engine operative), the thrust is locked at its actual value. The FMA displays a “THR LK” pulsing memo. A single chime sounds, and an amber ECAM caution appears, as long as thrust is locked. (For more details: Refer to Autothrust section). Movement of the thrust lever(s) unlocks the thrust, and the engine(s) then respond(s) to TLA position.
2. Disconnection, due to the use of instinctive disconnect button.

When a pilot presses the instinctive disconnect button, the engines immediately develop thrust corresponding to the position of their thrust levers, whatever that might be.

INSTINCTIVE DISCONNECTION PROCEDURE

To avoid any confusion for those pilots flying the A318/A319/A320/A321 with different modifications (with, and without, energy management), 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 (or EPR) TLA white (blue with EIS2 screens) circle is adjacent to the N1 (or EPR) needle.
- Use the instinctive button to disconnect the A/THR.
- Check that “A/THR” memo is displayed on the ECAM, and that the autothrust mode on the first column of the FMA disappears.
- Set the thrust manually.

USE OF AUTOTHRUST IN APPROACH

The pilot should use autothrust for approaches. On final approach, it usually gives more accurate speed control, although in turbulent conditions the actual airspeed may vary from the target speed, by as much as five knots. Although the changeover between auto and manual thrust is easy to make with a little practice, the pilot should, when using autothrust for the final approach, keep it engaged until he retards the thrust levers to idle for touchdown. If the pilot is going to make the landing using manual thrust, he should disconnect the A/THR by the time he has reached 1 000 ft on the final approach.

If he makes a shallow flare, with A/THR engaged, it will increase thrust to maintain the approach speed until he pulls the thrust levers back to idle. Therefore he should avoid making a shallow flare, or should retard the thrust levers as soon as it is no longer necessary to carry thrust, and if necessary before he receives the “retard” reminder.

Although use of the autothrust is recommended for the entire approach, this does not absolve the pilot from his responsibility to monitor its performance, and to disconnect it if it fails to maintain speed at the selected value. Such monitoring should include checking on whether or not the managed speed, calculated by the FMGC, is reasonable.

ENGINE FAILURE

The pilot can continue to use autothrust after an engine failure, but some pilots feel that directional control is more difficult, when autothrust changes the thrust instead of the pilot making the thrust changes manually. The choice between using, or not using, autothrust after engine failure is a personal one. As far as speed control is concerned, autothrust is usually more accurate than a pilot.

MANUAL ENGINE START

Applicable to: A319, A320 and A321 except AEROSOFT

Pilots normally use automatic starting to start an engine.

However, manual starting is recommended in the following cases :

- **After aborting a start, because of:**
 - Engine stall, or Engine EGT overlimit, or LO START AIR PRESS, or No N1 rotation, or Hung start.
- **When expecting a start abort, because of:**
 - Degraded bleed performance, due to hot conditions, or at a high-altitude airfields.
 - An engine with a reduced EGT margin, in hot conditions, or at a high-altitude airfields.
 - Marginal performance of the external pneumatic power group.
 - Tailwind greater than 10 kt
Starting in tailwind may fail due to N1 counterrotation, hot gas back flow. Fuel should be set to ON at N2 max motoring speed, provided N1 has stopped, and turn clockwise. (confirmation by the ground crew).

Applicable to: A318 except AEROSOFT

Pilots normally use automatic starting to start an engine.

However, manual starting is recommended in the following cases:

- **After aborting a start, because of:**
 - Engine stall
 - Engine EGT overlimit
 - Low start air pressure
- **When expecting a start abort, because of:**
 - Degraded bleed performance, due to hot conditions, or at a high-altitude airfields.
 - An engine with a reduced EGT margin, in hot conditions, or at a high-altitude airfields.
 - Marginal performance of the external pneumatic power group.

MANUAL ENGINE START PROCEDURE

Note: *During a manual engine start, if the flight crew suspects an engine start malfunction, or if an engine-related ECAM alert is triggered, the PF must abort the start sequence:*

- *Before the PF sets the ENG MASTER lever to ON, the PF must set the ENG MAN START pb-sw to OFF*
- *After the PF sets the ENG MASTER lever to ON, the PF must set the ENG MASTER lever to OFF, and then the ENG MAN START pb-sw to OFF.
In that case, the flight crew should consider a dry crank cycle of the affected engine before they perform another start attempt (Refer to ENGINE VENTILATION (DRY CRANKING)).*

Then, in the case of an ECAM alert, the PF must announce "ECAM actions", in accordance with the ECAM management philosophy.

THR LEVERS IDLE

CAUTION

The engine will start, regardless of the thrust lever position, and will rapidly accelerate to generate the thrust demanded by the TLA, causing a hazardous situation, if the thrust levers are not at idle.

ENG MODE selector NORM THEN IGN

The lower ECAM displays the engine page.

ENG MAN START ON

- Do not set the MAN START pb-sw to ON, before all amber crosses have disappeared on engine parameters (upper ECAM display).
- On the ECAM lower display, check that the START VALVE is inline
- On the ECAM displays, check that the OIL PRESS increases, and N2 increases.
- **If N2 does not reach 20 % , check that the pack valves have correctly closed.**
During engine start, if the APU bleed is used and pack valves are closed, shed APU electrical loads to increase bleed air pressure, as follows:

GALY & CAB OFF

- **If needed, shed also:**

BLUE ELEC PUMP (ground only) OFF
FUEL X FEED ON
FUEL PUMPS except R TK PUMP 2 OFF
BLOWER OVRD
CAB FANS OFF

- **When N2 reaches 22 % or the maximum motoring speed (minimum 20 %):**
The maximum motoring speed is defined as the speed at which N2 acceleration is less than 1 % in approximately 5 s.

MASTER switch ON

The PM starts the timing for monitoring the light-up delay.

ECAM displays CHECK

If the electrical power supply is interrupted during the start sequence (indicated by loss of ECAM displays), abort the start by setting the MASTER switch to OFF. Then perform a 30 s dry crank.

- **When N2 reaches 50 %**
ECAM displays CHECK

Grey background on N2 indication disappears.

Note: CFM ENG. 56-5-B1/B2 engines accelerate slowly from 50 % N2 to idle. Start abort is not required as long as N2 is increasing.

MAN START OFF

ENG MODE selector NORM

Applicable to: A319, A320 and A321, except AEROSOFT

MANUAL ENGINE START PROCEDURE

Note: During a manual engine start, if the flight crew suspects an engine start malfunction, or if an engine-related ECAM alert is triggered, the PF must abort the start sequence:

- Before the PF sets the ENG MASTER lever to ON, the PF must set the ENG MAN START pb-sw to OFF
 - After the PF sets the ENG MASTER lever to ON, the PF must set the ENG MASTER lever to OFF, and then the ENG MAN START pb-sw to OFF.
- In that case, the flight crew should consider a dry crank cycle of the affected engine before they perform another start attempt (Refer to Engine Ventilation (Dry Cranking)).

Then, in the case of an ECAM alert, the PF must announce "ECAM actions", in accordance with the ECAM management philosophy.

THR LEVERS IDLE

CAUTION

The engine will start, regardless of the thrust lever position, and will rapidly accelerate to generate the thrust demanded by the TLA, causing a hazardous situation, if the thrust levers are not at idle.

ENG MODE selector NORM THEN IGN

The lower ECAM displays the engine page.

ENG MAN START pb..... ON

- Do not set the MAN START pb to ON, before all amber crosses except on N1 and N2, have disappeared on engine parameters (upper ECAM display).
- On the ECAM lower display, check that the START VALVE is inline
- On the ECAM displays, check that the OIL PRESS increases, and N2 increases.
- **If N2 does not reach 15 % , check that the pack valves have correctly closed.**
During engine start, if the APU bleed is used and pack valves are closed, shed APU electrical loads to increase bleed air pressure, as follows:

GALY & CAB OFF

● If needed, shed also :

BLUE ELEC PUMP (ground only)..... OFF
FUEL X FEED..... ON
FUEL PUMPS except R TK PUMP 2..... OFF
BLOWER..... OVRD
CAB FANS..... OFF

- **If additional shedding is required**, engine pump may be switched OFF (it should be ON for second engine start for PTU auto test).

- **When N2 reaches the maximum motoring speed (minimum 15 %) and 30 s after selection of the MAN START pushbutton:**

Maximum motoring speed is reached when a significant decrease in N2 acceleration is observed. Do not attempt start unless N2 is at least 15 % and EGT has dropped below 100 °C. If EGT is still high, continue dry motoring until below the 100 °C limit. The starter motoring time must remain within limitations.

MASTER switch ON

The PM starts the timing for monitoring the light-up delay.

ECAM displays CHECK

If the electrical power supply is interrupted during the start sequence (indicated by loss of ECAM displays), abort the start by setting the MASTER switch to OFF. Then perform a 30 s dry crank.

- **When N2 reaches 43 %**

ECAM displays CHECK

Grey background on N2 indication disappears.

MAN START OFF

ENG MODE selector NORM

ENGINE START WITH EXTERNAL PNEUMATIC POWER

Applicable to: A318

- **Before connecting external pneumatic power:**
PACKS 1 and 2 OFF

(To prevent pack contamination).

- **Before start:**
APU BLEED OFF
ENG BLEED (both engines) OFF
X BLEED OPEN

- **Cleared to start:**
Start Engine 2 first.

Note: As necessary, Engine 1 can also be started by using the external pneumatic power. If Engine 1 is started first, check the brake ACCU pressure prior to engine start.

Use the normal engine start procedure.

The minimum recommended starter air supply pressure is 30 PSI, when the start valve is open.

Two external pneumatic power units may be used in parallel, if the pressure/flow relation is expected to be marginal.

- **After Engine 2 is started:**
 - **If external pneumatic power is used to start Engine 1 :**
Start Engine 1
Request the removal of external pneumatic power unit.

X BLEED AUTO
ENG BLEED (Both engines) ON
PACKS 1 and 2 ON
 - **If the crossbleed engine start procedure is used for Engine 1:**
Request the removal of external pneumatic power unit

PACKS 1 and 2 ON
ENG 2 BLEED ON
CROSSBLEED ENGINE START PROC for Engine 1 APPLY

ENGINE START WITH EXTERNAL PNEUMATIC POWER

Applicable to: A319, A320 and A321

- **Before connecting external pneumatic power:**
PACKS 1 and 2 OFF

(To prevent pack contamination).

- **Before start:**
APU BLEED OFF
ENG BLEED (both engines) OFF
X BLEED OPEN

- **Cleared to start:**
Start Engine 2 first.

Note: As necessary, Engine 1 can also be started by using the external pneumatic power. If Engine 1 is started first, check the brake ACCU pressure prior to engine start.

Use the normal engine start procedure.

The minimum recommended starter air supply pressure is 25 PSI, when the start valve is open.

Two external pneumatic power units may be used in parallel, if the pressure/flow relation is expected to be marginal.

- **After Engine 2 is started:**
 - **If external pneumatic power is used to start Engine 1 :**
Start Engine 1
Request the removal of external pneumatic power unit.

X BLEED AUTO
ENG BLEED (Both engines) ON
PACKS 1 and 2 ON
 - **If the crossbleed engine start procedure is used for Engine 1:**
Request the removal of external pneumatic power unit

PACKS 1 and 2 ON
ENG 2 BLEED ON
CROSSBLEED ENGINE START PROC for Engine 1 APPLY

CROSSBLEED ENGINE START

Applicable to: A319, A320 and A321

CAUTION

The use of engine bleed supply and external pneumatic power supply simultaneously is prohibited.

- **Before start:**

APU BLEED..... OFF

The BLEED valve of the running engine reopens and the cross bleed valve closes.

ENG BLEED (running engine) check ON

ENG BLEED (receiving engine)..... OFF

The bleed valve of engine to be started is closed to eliminate reverse flow leakage.

X BLEED..... OPEN

- **Cleared to start:**

Confirm area is clear of obstacles.

Ensure increased power jet wake does not constitute any hazard to people or installation behind the aircraft.

Adjust thrust of supplying engine to obtain an engine bleed pressure of 30 PSI before start initiation, and of at least 25 PSI during the start sequence.

If the thrust required to obtain the appropriate engine bleed pressure exceeds 40 % N1, pay particular attention to the surrounding area.

Apply the normal engine start procedure.

- **After start:**

THRUST LEVER (supplying engine) IDLE

X BLEED..... AUTO

ENG BLEED (receiving engine)..... ON

PACKS..... Check ON

CROSSBLEED ENGINE START

Applicable to: A318

CAUTION

The use of engine bleed supply and external pneumatic power supply simultaneously is prohibited.

● Before start:

APU BLEED..... OFF

The BLEED valve of the running engine reopens and the cross bleed valve closes.

ENG BLEED (running engine)..... check ON

ENG BLEED (receiving engine)..... OFF

The bleed valve of engine to be started is closed to eliminate reverse flow leakage.

X BLEED..... OPEN

● Cleared to start:

Confirm area is clear of obstacles.

Ensure increased power jet wake does not constitute any hazard to people or installation behind the aircraft.

Adjust thrust of supplying engine to obtain an engine bleed pressure of 30 PSI before start initiation, and of at least 25 PSI during the start sequence.

If the thrust required to obtain the appropriate engine bleed pressure exceeds 40 % N1, pay particular attention to the surrounding area.

Apply the normal engine start procedure.

● After start:

THRUST LEVER (supplying engine)..... IDLE

X BLEED..... AUTO

ENG BLEED (receiving engine)..... ON

PACKS..... Check ON

ENGINE VENTILATION (DRY CRANKING)

Applicable to: ALL except AEROSOFT

On ground, after a manual engine start that is not successful, the flight crew can perform a dry crank cycle on the affected engine to remove the fuel vapors.

MANUAL DRY CRANK CYCLE

ENG MODE selector CRANK

ENG MAN START pb-sw ON

Note: The corresponding ENG MASTER lever should remain on OFF

Note: A manual start sequence can be initiated following a dry crank cycle (Refer to MANUAL ENGINE START). The flight crew should consider the starter limitations.

Note: To clear fuel vapors, the flight crew can stop the dry crank after 30 seconds.

- **To stop the dry crank:**

ENG MAN START pb-sw OFF

ENG MODE selector NORM

PRO-SUP-91 – Adverse Weather
Severe Turbulence

GENERAL

Applicable to: ALL

Whenever possible, avoid areas with known or forecasted severe turbulence. If turbulence is unavoidable, aim to keep the speed in the region of the target speed given in this section, so as to provide the best protection against the effect of gust on the structural limits, whilst maintaining an adequate margin above VLS.

Sufficient buffet margin exists at optimum altitude. In order to further increase the margin to buffet onset, consider descending to a lower altitude.

Severe turbulence is defined as turbulence that causes large, abrupt changes in altitude and/or attitude. It usually causes large variations in airspeed. Occupants are forced violently against their seat belts and loose objects will move around the aircraft.

If severe turbulence occurs during a flight, the flight crew must make a logbook entry in order to initiate maintenance action.

Note: Recommendations for severe turbulence are also applicable to extreme turbulence.

SIGNS

Applicable to: ALL

Before entering an area of known turbulence, the flight crew and the cabin crew must secure all loose equipment and switch the cabin SIGNS to ON.

AUTOPILOT/AUTOTHURST

Applicable to: ALL

Keep the autopilot ON.

When thrust changes become excessive : Disconnect Autothrust.

For approach : Use A/THR for managed speed.

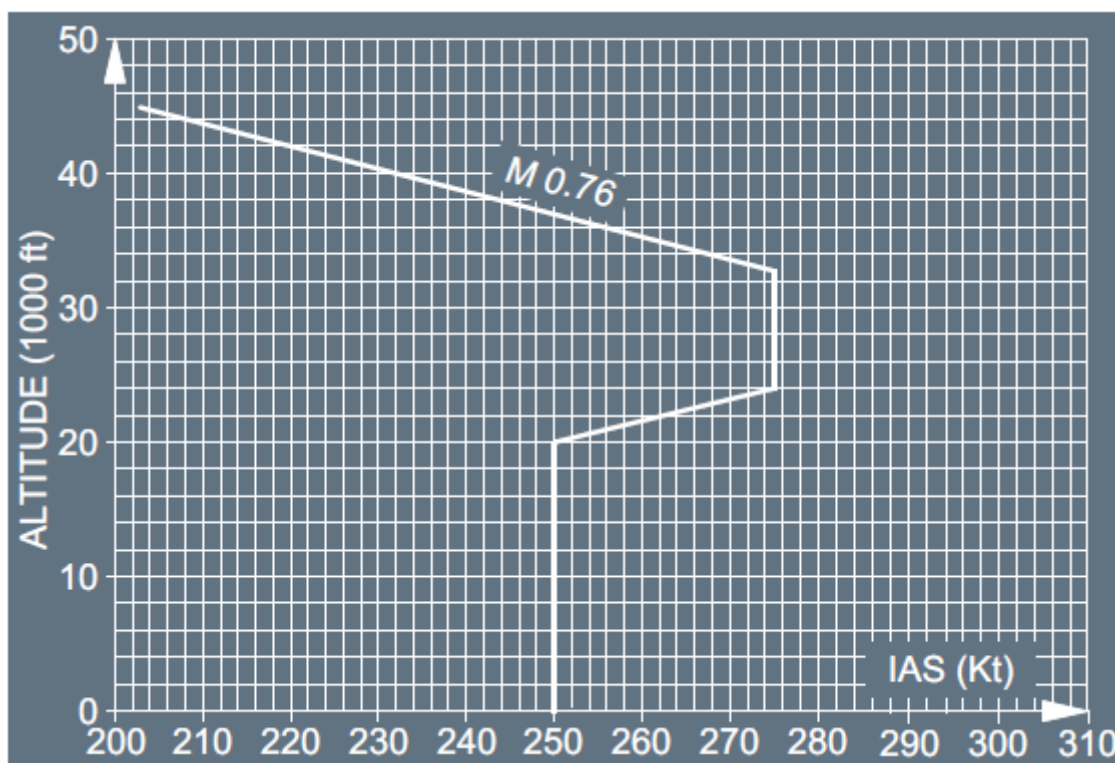
THRUST AND AIRSPEED

Applicable to: A318

Set the thrust to give the recommended speed (Refer to THRUST SETTING (N1) FOR RECOMMENDED SPEED). This thrust setting attempts to obtain, in stabilized conditions, the speed for turbulence penetration given in the graph below.

Only change thrust in case of an extreme variation in airspeed, and do not chase your Mach or airspeed.

A transient increase is preferable to a loss of speed that decreases buffet margins and is difficult to recover.



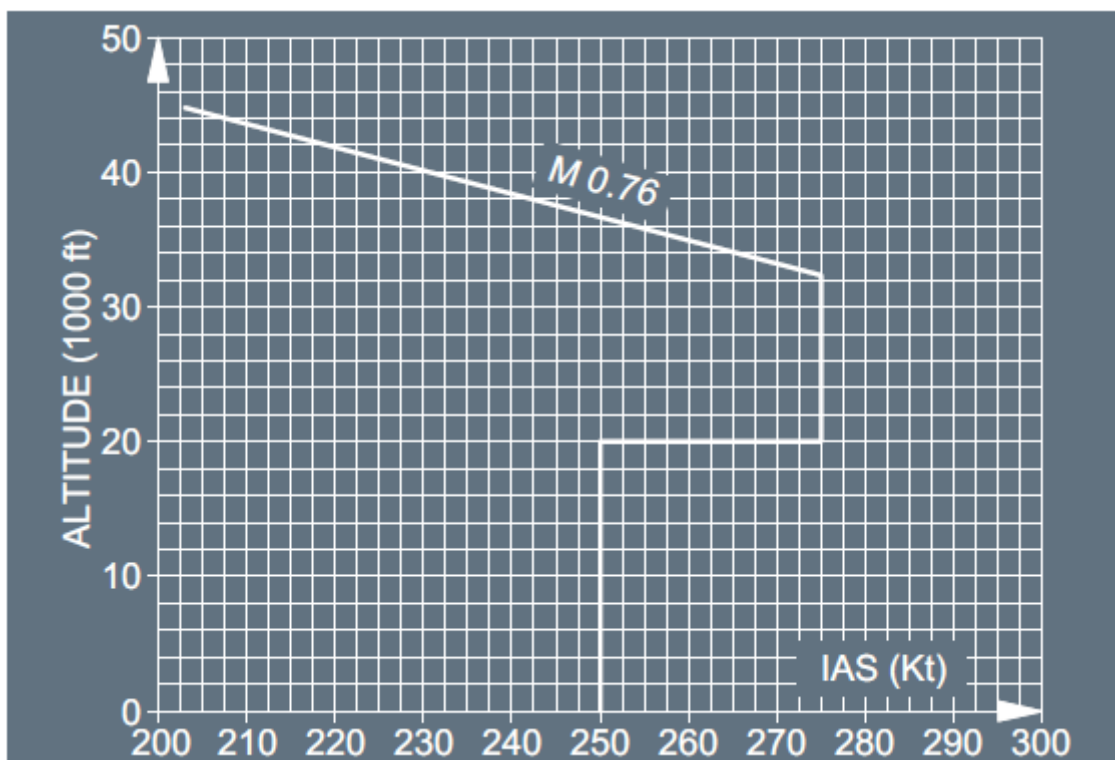
THRUST AND AIRSPEED

Applicable to: A319

Set the thrust to give the recommended speed (Refer to THRUST SETTING (N1) FOR RECOMMENDED SPEED). This thrust setting attempts to obtain, in stabilized conditions, the speed for turbulence penetration given in the graph below.

Only change thrust in case of an extreme variation in airspeed, and do not chase your Mach or airspeed.

A transient increase is preferable to a loss of speed that decreases buffet margins and is difficult to recover.



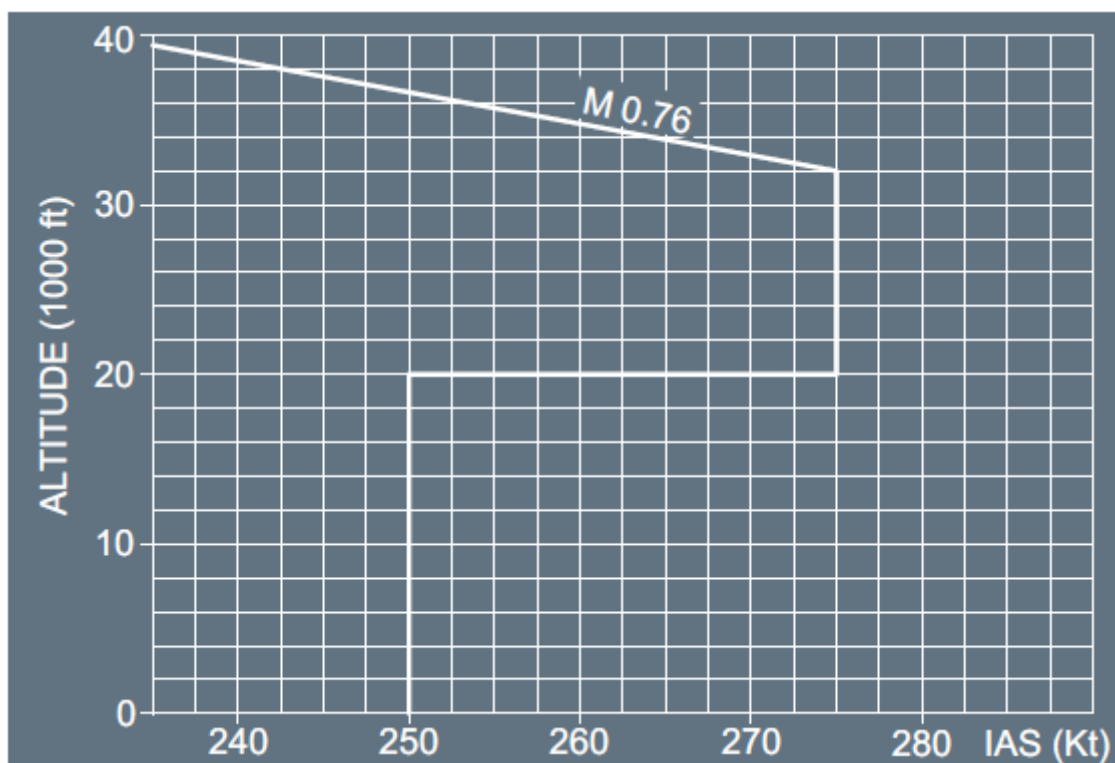
THRUST AND AIRSPEED

Applicable to: A320

Set the thrust to give the recommended speed (Refer to THRUST SETTING (N1) FOR RECOMMENDED SPEED). This thrust setting attempts to obtain, in stabilized conditions, the speed for turbulence penetration given in the graph below.

Only change thrust in case of an extreme variation in airspeed, and do not chase your Mach or airspeed.

A transient increase is preferable to a loss of speed that decreases buffet margins and is difficult to recover.



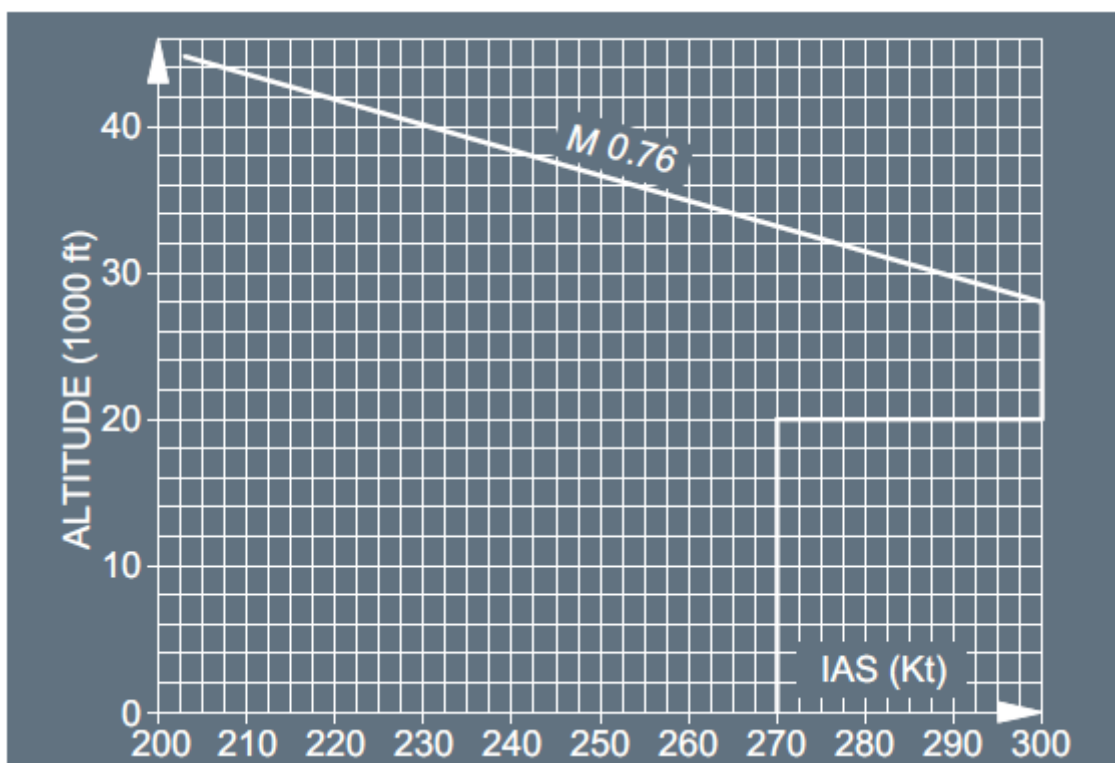
THRUST AND AIRSPEED

Applicable to: A321

Set the thrust to give the recommended speed (Refer to THRUST SETTING (N1) FOR RECOMMENDED SPEED). This thrust setting attempts to obtain, in stabilized conditions, the speed for turbulence penetration given in the graph below.

Only change thrust in case of an extreme variation in airspeed, and do not chase your Mach or airspeed.

A transient increase is preferable to a loss of speed that decreases buffet margins and is difficult to recover.



THRUST SETTING (N1) FOR RECOMMENDED SPEED

Applicable to: A319

SEVERE TURBULENCE											
SPEED AND THRUST SETTING FOR RECOMMENDED TURBULENCE SPEED											
FL	SPD or Mach	GROSS WEIGHT (1000 kg)									
		40	44	48	52	56	60	64	68	72	76
		N1 %									
410	0.76	75.7	76.8	78.0	79.6	—	—	—	—	—	—
390	0.76	74.7	75.6	76.5	77.6	79.0	—	—	—	—	—
370	0.76	74.0	74.6	75.4	76.2	77.1	78.3	79.6	—	—	—
350	0.76	73.9	74.2	74.8	75.5	76.2	77.1	78.0	79.2	80.4	—
330	0.76	74.2	74.4	74.7	75.2	75.9	76.6	77.3	78.1	79.1	80.2
310	275	73.8	74.0	74.3	74.6	75.1	75.7	76.3	77.0	77.8	78.7
290	275	72.6	72.8	73.1	73.4	73.9	74.4	75.0	75.7	76.4	77.2
270	275	71.3	71.5	71.8	72.2	72.6	73.2	73.8	74.5	75.1	75.9
250	275	70.1	70.3	70.6	70.9	71.3	71.9	72.5	73.1	73.8	74.6
200	275	66.4	66.6	66.9	67.3	67.7	68.2	68.9	69.7	70.3	70.9
150	250	60.3	60.6	60.9	61.4	62.0	62.7	63.4	64.3	65.2	66.2
100	250	56.9	57.2	57.6	58.0	58.6	59.2	59.9	60.7	61.6	62.6
50	250	54.0	54.3	54.7	55.2	55.8	56.4	57.1	57.9	58.7	59.6

Applicable to: A320

SPEED AND THRUST SETTING FOR RECOMMENDED TURBULENCE SPEED										
FL	SPD or Mach	GROSS WEIGHT (1000 kg)								
		44	48	52	56	60	64	68	72	76
		N1 %								
390	0.76	75.7	76.6	77.7	79.0	-	-	-	-	-
370	0.76	74.7	75.5	76.3	77.2	78.4	79.7	-	-	-
350	0.76	74.3	74.8	75.6	76.3	77.1	78.1	79.3	80.5	-
330	0.76	74.5	74.8	75.3	76.0	76.6	77.4	78.2	79.2	80.2
310	275	74.1	74.3	74.7	75.2	75.8	76.4	77.1	77.9	78.8
290	275	72.9	73.2	73.5	73.9	74.5	75.1	75.8	76.5	77.3
270	275	71.7	71.9	72.3	72.7	73.3	73.9	74.5	75.2	76.0
250	275	70.4	70.7	71.0	71.4	71.9	72.6	73.2	73.9	74.7
200	275	66.8	67.1	67.4	67.9	68.4	69.0	69.8	70.4	71.1
150	250	59.9	60.4	61.0	61.7	62.5	63.5	64.5	65.5	66.5
100	250	56.3	56.7	57.2	57.8	58.5	59.3	60.3	61.4	62.5
50	250	52.7	53.4	53.8	54.4	54.9	55.7	56.5	57.4	58.4

Applicable to: A321

SEVERE TURBULENCE												
SPEED AND THRUST SETTING FOR RECOMMENDED TURBULENCE SPEED												
FL	SPD or Mach	GROSS WEIGHT (1000 kg)										
		54	58	62	66	70	74	78	82	86	90	94
		N1 %										
390	0.76	79.4	80.6	—	—	—	—	—	—	—	—	—
370	0.76	77.9	78.9	80.0	81.2	—	—	—	—	—	—	—
350	0.76	77.2	77.9	78.8	79.7	80.7	—	—	—	—	—	—
330	0.76	76.9	77.6	78.2	79.0	79.8	80.7	81.6	—	—	—	—
310	0.76	76.7	77.3	77.9	78.5	79.2	79.9	80.6	81.5	82.4	—	—
290	0.76	76.7	77.2	77.7	78.2	78.8	79.4	80.0	80.6	81.4	82.1	83.0
270	300	76.2	76.6	77.0	77.5	78.0	78.5	79.7	79.6	80.3	80.9	81.6
250	300	75.0	75.4	75.8	76.2	76.7	77.1	77.7	78.2	78.9	79.5	80.2
200	300	72.2	72.5	72.9	73.3	73.7	74.2	74.7	75.2	75.8	76.4	77.0
150	270	65.5	65.9	66.5	67.0	67.7	68.4	69.2	70.3	71.0	71.8	72.6
100	270	62.5	62.9	63.5	64.0	64.6	65.3	66.0	66.8	67.6	68.4	69.2
50	270	59.1	59.5	60.0	60.5	61.1	61.8	62.6	63.4	64.2	65.0	65.7

Applicable to: A318

SEVERE TURBULENCE									
SPEED AND THRUST SETTING FOR RECOMMENDED TURBULENCE SPEED									
FLIGHT LEVEL	Speed or Mach	GROSS WEIGHT (1000 kg)							
		40	44	48	52	56	60	64	68
		N1 %							
390	0.76	78.8	79.5	80.5	81.6	82.7	83.9	—	—
370	0.76	78	78.6	79.3	80.2	81.1	82.2	83.2	—
350	0.76	77.5	78.2	78.8	79.5	80.2	81	82	82.9
330	0.76	77.6	78.1	78.7	79.3	79.9	80.5	81.2	82.1
310	275	76.9	77.4	77.9	78.5	79.1	79.8	80.4	81.1
290	275	75.4	75.9	76.4	76.9	77.5	78.2	78.9	79.8
270	275	73.8	74.3	74.9	75.4	76	76.7	77.3	78.1
250	275	72.4	72.8	73.3	73.8	74.5	75.1	75.9	76.6
240	275	71.6	72	72.5	73	73.6	74.3	75	75.8
200	250	65.1	65.7	66.4	67.2	67.8	68.6	69.4	70.3
150	250	61.3	61.8	62.4	63	63.8	64.6	65.6	66.6
100	250	57.8	58.3	58.9	59.5	60.1	60.8	61.6	62.4
50	250	53.9	54.4	54.9	55.5	56.2	57	57.8	58.8

ALTITUDE

Applicable to: ALL

If the flight crew flies the aircraft manually:

- The flight crew may expect large variations in altitude, but should not chase altitude.
- The flight crew should consider descending to or below OPT FL, in order to increase the margin to buffet.

LANDING

Applicable to: A318, A320 and A321

Configuration FULL, or 3, can be used.

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

Operations in Windshear or Downburst

PRECAUTIONS FOR SUSPECTED WINDSHEAR

Applicable to: ALL

BEFORE TAKEOFF

Delay takeoff until conditions improve.

Evaluate takeoff conditions :

- Using observations and experience.
- Checking weather conditions.

Select the most favorable runway (considering location of the likely windshear).

Use the weather radar or the predictive windshear system before commencing takeoff to ensure that the flight path clears any potential problem areas.

Select TOGA thrust.

Monitor closely airspeed and airspeed trend during the takeoff run for early signs of windshear.

BAV alleviation:

- If severe windshear is reported or forecast - DO NOT TAKE-OFF.
- TOGA thrust must be used if the nature or severity of the windshear cannot be determined.
- Reduced thrust may be used if any windshear expected during or after take-off is caused by strong winds not associated with CBs or frontal activity.

DURING APPROACH

Delay landing or divert to another airport until conditions are more favorable.

Evaluate condition for a safe landing by:

- Using observations and experience,
- Checking weather conditions.

Use the weather radar.

Select the most favorable runway, considering also which has the most appropriate approach aid.

Select FLAPS 3.

Use managed speed in the approach phase.

Check both FDs engaged in ILS, MLS, FPA or V/S.

Engage the autopilot, for a more accurate approach and earlier recognition of deviation from the beam, when ILS or MLS is available.

Note: When using the GS mini-function, associated with managed speed, the system will carry extra speed in strong wind conditions.

RECOVERY TECHNIQUE AT TAKEOFF

Applicable to: ALL

BEFORE V1

The takeoff should only be rejected if unacceptable airspeed variations occur below the indicated V1, and the pilot decides that there is sufficient runway remaining to stop the aircraft.

AFTER V1

Set thrust levers to TOGA

Rotate normally.

Follow SRS orders.

DURING INITIAL CLIMB

Set or maintain TOGA.

If the autopilot is engaged, use it ; but, be aware that automatic disengagement may occur, if $\alpha > \alpha_{prot}$.

Follow SRS orders (including use of full backstick, if demanded).

Note: If FD bars are unavailable, use an initial pitch attitude up to 17.5 ° with full backstick, if necessary. If needed, to minimize the loss of height, increase this pitch attitude.

Do not change configuration (gear, flaps), until out of shear.

Closely monitor the flight path and speed.

Recover smoothly to a normal climb, when out of shear.

RECOVERY TECHNIQUE AT LANDING

Applicable to: ALL

Set thrust levers to TOGA.

If the autopilot is engaged, use it ; but, be aware that automatic disengagement may occur, if $\alpha > \alpha_{prot}$.

Follow SRS orders.

Note: If FD bars are unavailable, use an initial pitch attitude up to 17.5 ° with full backstick, if necessary. If needed, to minimize the loss of height, increase this pitch attitude.

Do not change configuration.

Closely monitor the flight path and speed.

Recover smoothly to a normal climb, when out of shear.

Cold Weather

GENERAL

Applicable to: ALL

For flight operations in icing conditions, Refer to OPERATIONS IN ICING CONDITIONS.

The preparation and ground operation of the aircraft, after it has been sitting idle in very low temperatures, may present particular problems. In such cases, the flight crew should use the following procedures, which complement the normal operating procedures.

Ice accumulates on the aircraft when the air temperature approaches, or falls below, freezing (0 °C) and there is precipitation or condensation. Ice may also build up when the aircraft is exposed to any form of moisture, after the surfaces have been cold-soaked during previous cruise flight at high altitudes, after the aircraft has been refueled with cold fuel, or after it has been exposed to low overnight air temperatures.

EXTERIOR INSPECTION

Applicable to: ALL

PRELIMINARY COCKPIT PREPARATION (normal procedures) COMPLETED

APU is started and air conditioning is on.

ICE/SNOW REMOVE FROM WINDSHIELD/UPPER COCKPIT FUSELAGE

CAUTION

With ice or snow accumulated on the windshield/upper cockpit fuselage, and if the PROBE/WINDOW HEAT pb is turned on, melted snow running down from the cockpit windows could re-freeze on the fuselage area below, when the temperature is very low. This could create ice build up on the forward fuselage that could possibly disturb the airflow around the static/pitot/angle-of-attack probes.

PROBE/WINDOW HEAT ON

Note: Ensure that the probe covers are removed in order to prevent the probe covers from melting.

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 for takeoff.

Thin hoarfrost is acceptable on the upper surface of the fuselage.

On the underside of the wing tank area, a maximum layer of 3 mm (1/8 in) of frost will not penalize takeoff performance.

FOLLOWING EQUIPMENT CHECKED FREE OF FROST, ICE AND SNOW

- Landing gear assemblies (lever locks) and tires, landing gear doors.
- Engine inlets, inlet lips, fans (check for rotation), spinners, fan exhaust ducts, reverser assemblies.
- Drains, bleeds, probes (pitots, static ports, TAT sensors, angle of attack sensors).
- Fuel tank ventilation.
- Radome.

- Verify that the commercial water supplies are not frozen and have been refilled (these should have been emptied prior to the cold soak).

● **After first engine start**

PROBE/WINDOW HEAT AUTO

Heating will continue to operate but under automatic control.

DEICING/ANTI-ICING PROCEDURE ON GROUND

Applicable to: ALL

GENERAL

In all situations, it is the Captain's responsibility to decide if the ground crew must deice/anti-ice the aircraft, and/or if additional deicing/anti-icing treatment is required.

Before starting the deicing/anti-icing procedure, the flight crew must establish communication with the ground crew (GSX/AES) that will be applying the procedure.

CAUTION

- Make sure that the low or high-pressure ground connectors do not supply any external air to the aircraft.
- If it is necessary for the ground crew to repeatedly anti-ice the aircraft, they must deice the surfaces with a hot fluid mixture before applying a new layer of anti-icing fluid.

The aircraft can be deiced or anti-iced when the APU and engines are either stopped or running.

However, do not start the engines when the ground crew is spraying fluid on the aircraft.

CAUTION

- The ground crew should take care when spraying deicing fluid, and make sure that the engine and APU do not ingest any fluid.
- Do not move flaps, slats, ailerons, spoilers, or elevators, if they are not free of ice.
- Always ensure that both the left and right sides of the aircraft receive the same, complete, and symmetrical deicing/anti-icing treatment.

BEFORE SPRAYING FLUID

CAB PRESS MODE SEL CHECK AUTO
ENG BLEED 1 + 2 OFF
APU BLEED OFF
DITCHING pb ON

Outflow valve, pack valves, and avionic ventilation inlet and extract valves close.

This prevents deicing/anti-icing fluid from entering the aircraft. Avionic ventilation is in a closed circuit with both fans running. In view of the low OAT, there is no time limit for this configuration.

However, in order not to affect passengers comfort, it is recommended to avoid packs inoperative for longer than 20 min.

Note: If the "VENT AVNCS SYS FAULT" warning appears, reset the AEVC circuit breaker at the end of the aircraft deicing/anti-icing procedure.

AIR COND/AVNCS VENT/CTL D06 on 49VU.

AIR COND/AVNCS/VENT/MONG Y17 on 122 VU.

THRUST LEVERS CHECK IDLE
“AIRCRAFT PREPARED FOR SPRAYING” INFORM GROUND CREW

UPON COMPLETION OF THE SPRAYING OPERATION

DITCHING pb..... OFF
OUTFLOW VALVE.....CHECK OPEN

On the ECAM PRESS page, confirm that the outflow valve indication reaches the open green position to avoid any unexpected aircraft pressurization.

ENG BLEED 1 + 2 ON
PITOTS and STATICS (ground crew) CHECK
DEICING/ANTI-ICING REPORT RECEIVED

The information from ground personnel, who performed the deicing/anti-icing and post-application check, must include (ANTI-ICING CODE):

- Type of fluid used
- The mix ratio of fluid to water (for example 75/25)
- When the holdover time began.

● **At least 5 minutes after completion of spraying operation:**

APU BLEED.....AS RQRD

Note: *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. Therefore:*

- Keep the APU running with the APU BLEED OFF for about 5 min after spraying completion before setting the APU BLEED to ON,
- Consider APU BLEED OFF for takeoff.

NORMAL PROCEDURE.....RESUME

Apply appropriate normal procedures. Pay special attention to the flight control check. In freezing precipitation, perform the appropriate checks to evaluate aircraft icing. Base the decision on whether to takeoff, or to re-protect the aircraft, on the amount of ice that has built up on the critical surfaces since the last deicing/anti-icing, as revealed by a personal inspection from the inside and outside of the aircraft. Make this inspection before the holdover time expires, or just before takeoff.

SECURING THE AIRCRAFT FOR COLD SOAK

Applicable to: ALL

● **After switching off all bleeds, and before switching off AC power:**

DITCHING pb ON

This closes the outflow valve, the pack valves, and the avionics ventilation inlet and extract valves.

PARKING BRAKE OFF

Check chocks in place, and release the parking brake to prevent brakes from freezing.

- **After switching off the AC power and the batteries:**

DITCHING pb OFF
PROTECTIVE COVERS.....INSTALL

Install protective covers and plugs to protect the aircraft and engines from snow and ice.

PRO-SUP-93 – Green Operating Procedures
Flight Phases

GENERAL

Applicable to: ALL

INTRODUCTION TO GREEN OPERATING PROCEDURES

This section describes the available fuel-reduction procedures during the different flight phases.

Operators can evaluate these procedures to define their own fuel-reduction policy as part of a general cost-reduction policy.

Each operator is responsible for the decision of which costs to reduce, for example (non-exhaustive list):

- Maintenance costs
- Fuel consumption
- Operating costs
- Passengers comfort.

For example, Cost Index (CI) and Flexible Takeoff aim at reducing general costs not fuel consumption.

The information in this chapter is not applicable to all operators to the same extent, and depends on their specific operations (geographical location, airport conditions, local regulations, etc).

The flight crew decides the procedures to apply, in accordance with operator guidelines and current flight conditions.

PRELIMINARY COCKPIT PREPARATION

Applicable to: ALL

APU

APU START DELAY

Use the ground electrical unit and ground pneumatic unit when available.

AIR CONDITIONING

- If one PACK is sufficient to supply air during preliminary cockpit preparation:

One PACK OFF

Change between the packs on each flight, in order to prevent excessive wear of one pack.

COCKPIT PREPARATION

Applicable to: ALL

AIR CONDITIONING

- If one PACK is sufficient to supply air during cockpit preparation:

One PACK OFF

Change between the packs on each flight, in order to prevent excessive wear of one pack.

FMGS INITIALIZATION

INIT PAGE

COST INDEX (CI)

Cost Index.....Check consistency with CFP

The CI is the ratio of time costs versus fuel costs. The CI does not aim to reduce fuel consumption.

TROPOPAUSE

Tropopause value AS RQRD

Check that the tropopause value is correct, in order to ensure the accuracy of FMS predictions.

ATC CLEARANCE

- **If conditions and performance permit:**

TAKEOFF RUNWAY..... OPTIMIZE

At airport with reduced traffic, request takeoff from the runway which reduces taxi time and/or flight time.

BEFORE PUSHBACK OR START

Applicable to: ALL

APU

APU START DELAY

Delay APU start as long as possible.

PUSHBACK/START-UP CLEARANCE

ENGINES START DELAY

Ask for a start clearance as late as possible.

AFTER START

Applicable to: ALL

APU

- **During or after taxi, if APU necessary for performance purpose:**

APU BLEED..... KEEP ON

When the engines are running, exhaust gas ingestion may occur during use of the APU bleed.

AIR CONDITIONING

- **If one PACK is sufficient to supply air during taxi:**

ONE PACK OFF

Change between the packs on each flight, in order to prevent excessive wear of one pack.

PACK FLOW SELECTION

PACK FLOW LO (ECON)

The SOP provide the pack flow settings.

When passenger numbers permit, LO (ECON) mode saves up to 0.5 % of fuel.

When the APU bleed supplies air, the pack flow-setting has no effect on fuel consumption.

ANTI-ICE

The selection of anti-ice increases engine thrust and fuel consumption.

Therefore, the flight crew should only select the anti-ice when necessary.

TAXI

Applicable to: ALL

THRUST MANAGEMENT

THRUST AS LOW AS POSSIBLE

Avoid excessive thrust application

BEFORE TAKEOFF

Applicable to: A320NEO and A321NEO

AIR CONDITIONING

PACK 1+2 OFF

Before takeoff, the flight crew can select both packs to OFF, in order to reduce fuel consumption.

During flexible takeoff, the selection of packs to OFF reduces takeoff EGT and therefore maintenance costs.

Applicable to: A319, A320CEO and A321CEO

AIR CONDITIONING

Before takeoff, the flight crew can set both packs to OFF for performance requirements only. Packs should not be set to OFF purely for fuel saving reasons due to excessive Bleed Valve wear.

TAKEOFF

Applicable to: ALL

AIR CONDITIONING

- If PACKS have been set to OFF for takeoff:
 - At thrust reduction altitude:
 - ONE PACK ON

The selection of one pack to ON before the thrust levers are in the CLB detent results in an EGT increase.

- **At least 10 s after selection of the first pack to ON:**
SECOND PACK.....ON

CLIMB

Applicable to: ALL

ECON SPEED

SPEED MANAGED

Unless restricted by the ATC, use managed speed during climb, in order to fly at the optimum ECON speed.

ACCELERATION BELOW 10 000 FT

By default, the FMS flight plan takes into account the 250 kt speed limitation below 10 000 ft.

If the ATC permits, remove this limitation, in order to accelerate and save fuel.

CRUISE

Applicable to: ALL

OPTIMUM FLIGHT LEVEL (OPTI FL)

TARGET FL OPTI FL

During cruise, the OPTI FL increases while the aircraft weight decreases.

Monitor the OPTI FL, and fly at the most appropriate flight level for optimum aircraft performance and fuel consumption.

Applicable to: FSLABS

WIND UPDATE

WIND INFO CHECK

Accurate and up-to-date wind information enables the FMS to optimize:

- Fuel predictions
- Determination of OPTI FL.

Update wind information when the change is more than:

- 30 ° in direction, or
- 30 kt in speed.

Applicable to: ALL

MANAGED SPEED

SPEED MANAGED

Fly in managed speed mode, in order to:

- *Fly at ECON speed*
- *Optimize speed in accordance with the CI and current flight conditions.*

The flight crew should not modify the CI in flight.

DESCENT PREPARATION

Applicable to: ALL

LANDING PREPARATION

When landing performance permits, the best combination to reduce fuel costs and brake wear is:

CONF 3 + REV IDLE + Autobrake LO.

If the flight crew needs to reduce the landing distance, they should use the deceleration devices in the following order :

1. Consider flaps full
2. Consider REV MAX
3. Consider Autobrake MED.

The use of Autobrake MED in combination with CONF 3 and REV IDLE increases the brake oxidation, which may be severe.

When the flight crew rides the brakes (and overrides the Autobrake) at landing, the same oxidation phenomenon may occur.

DESCENT

Applicable to: ALL

MANAGED SPEED

SPEED..... MANAGED

Fly in managed speed mode, in order to:

- *Fly at ECON speed*
- *Optimize speed in accordance with the CI and weather conditions.*

ANTI-ICE

The selection of anti-ice increases engine thrust and fuel consumption. Therefore, the flight crew should only select anti-ice when necessary.

HOLDING

Applicable to: ALL

FLAPS CONFIGURATION

FLAPS.....AS QRDR

Clean configuration is the optimum configuration for a holding circuit.

When required (holding pattern or speed limitation), the flight crew may consider the selection of CONF 1.

OPTIMUM SPEED

- **In CONF CLEAN:**
OPTIMUM SPEED.....Green Dot

In clean configuration, fly at Green Dot speed, in order to optimize the lift-to-drag ratio. A higher speed may be required in turbulent conditions.

APPROACH

Applicable to: ALL

DECELERATION

- **When conditions and ATC permit:**

APPROACH.....DECELERATED

A decelerated approach reduces the fuel consumption.

When the approach type does not enable to fly a decelerated approach, the flight crew should fly an early stabilized approach.

FLAPS CONFIGURATION

FLAPS.....AS QRDR

When landing performance permits, the selection of CONF 3 reduces both the approach time and fuel consumption.

AFTER LANDING

Applicable to: ALL

APU

- **If both engines are running:**

APU START.....DELAY

Delay the start of the APU as long as possible after landing.

AIR CONDITIONING

- **If one PACK is sufficient to supply air after the landing:**

ONE PACK OFF

Change between the packs on each flight, in order to prevent excessive wear of one pack.

One Engine Taxi

GENERAL

Applicable to: ALL

It is recommended to apply the One Engine Taxi Out procedure except in some circumstances as listed below. Benefits of One Engine taxi include greater situational awareness during taxi, reduced fuel consumption, emissions and engine wear, as well as reduced brake wear and heating, and a quicker stand departure.

Before applying this procedure, the flight crew should be aware of the following:

- Taxi with one engine shut down may require higher thrust than usual. Caution must therefore be exercised to avoid excessive jet-blast and the risk of Foreign Object Damage (FOD)
- Slow or tight turns in the direction of the operating engine may not be possible at high gross weights
- When one engine taxi is planned, pay particular attention to the fuel imbalance limitation for take-off.

One Engine Taxi is prohibited in the following circumstances:

- LVOs in force.
- There are steep uphill slopes.
- Freezing precipitation.
- The taxiway is slippery or contaminated (i.e. braking action less than GOOD) or covered with sand/dust.
- ENG 2 is inadvertently started instead of ENG 1.
- GEN 1 or IDG1 or APU or APU BLEED or APU GEN inoperative.
- Y ELEC Pump inoperative.
- Any problem requiring a manual or X BLEED Engine start.

DEPARTURE

Applicable to: A320NEO and A321NEO

BRAKE ACCU PRESS.....CHECK

If necessary, use the Y ELEC PUMP to pressurize the brake accumulator.

ENGINE 1 START

Use Engine 1 for taxiing because it pressurizes the green hydraulic system, providing normal braking.

APPLY THE "AFTER START" NORMAL PROCEDURE, BUT:

- The APU can be kept running. In that case, switch the APU BLEED to OFF.
The APU generator provides power to prevent electrical transients and enable galley and IFE operation.
Closing the APU BLEED prevents engine exhaust gases ingestion in the air conditioning system.
- Delay the wing anti-ice setting until all engines are started.

Note: CAT3 DUAL INOP will be displayed on the STS page with only ENG 1 running.

Note: With the exception of the above items, the normal "AFTER START" procedure is followed including the selection of takeoff flap.

Applicable to: A318, A319, A320, A321

BRAKE ACCU PRESS.....CHECK

If necessary, use the Y ELEC PUMP to pressurize the brake accumulator.

ENGINE 1 START

Use Engine 1 for taxiing because it pressurizes the green hydraulic system, providing normal braking.

AFTER START

Apply the normal “AFTER START” procedures, but:

- Keep the APU running and switch the APU BLEED to OFF.
The APU generator provides power to the engine fire extinguisher, prevents electrical transients and enables galley operation. Closing the APU BLEED prevents engine exhaust gases ingestion in the air conditioning system.
- Do not open the X-BLEED to prevent inhibition of BLEED LEAK ECAM cautions
- Delay the wing anti-ice setting until all engines are started.

Note: CAT 3 DUAL INOP will be displayed on the STS PAGE with only ENG 1 running.

Note: With the exception of the above items, the full normal “AFTER START” procedure is followed including the selection of takeoff flap.

Applicable to: ALL

BEFORE RELEASING THE PARKING BRAKE

Y ELEC PUMP ON

This pressurizes the yellow hydraulic system.

Apply the normal “TAXI” procedures, but:

- Perform the Flight Controls checks after both engines have been started.
- Do not arm the Auto Brake system before the Flight Controls checks have been completed.

Applicable to: ALL

BEFORE TAKEOFF

Do not start ENG 2 crossing or back tracking an active RWY.

In the event of an abnormal start or other technical malfunction it is recommended to stop the aircraft (if moving and circumstances permit), set the park brake and action ECAM.

ENGINE WARM-UP TIME BEFORE TAKEOFF (remaining engine) CONSIDER

The second engine must be started soon enough before takeoff, in order to take in to account the engine start time and ensure the applicable engine warm-up time.

- **For ENG 2 start and when taxiing in a straight line:**

Note: During the engine start, a slight jerk forward may occur if the brakes are applied while the aircraft is moving.

Note: Maintain taxi in a straight line from after the selection of the Y ELEC pump to OFF until 5 s after ENG 2 master lever to ON

Note: In the event of a PTU fault N/W STRG is lost. Use differential braking to turn and stop.

Y ELEC PUMP OFF

The yellow electric pump must be set to OFF to enable PTU automatic test during engine 2 start.

APU BLEED ON
ENG 2 START

AFTER ENG 2 START

ENG MODE SEL NORM
APU BLEED AS RQRD
ENG ANTI ICE AS RQRD
APU MASTER Switch AS RQRD
ECAM STATUS CHECK and ANNOUNCE

TAXI

FLIGHT CONTROL CHECK
AUTO BRK MAX

ARRIVAL

Applicable to: A320NEO and A321NEO and G-DBCA

APU AS RQRD

If necessary, the APU can be started while taxiing and before shutting down one engine, in order to avoid additional electrical transients and enable galley and IFE operation.

Applicable to: A318, A319, A320CEO and A321CEO except G-DBCA

APU START

Start the APU before shutting down the engine, in order to supply the engine fire extinguishing and avoid additional electrical transients.

Applicable to: ALL

- **After high-thrust operations:**

ENGINE MINIMUM COOLING TIME CONSIDER

- **When taxiing in a straight line:**

ENG 2 SHUT DOWN
Y ELEC PUMP ON

This avoids running the PTU.

Note: A slight jerk forward of the aircraft may occur, if the flight crew applies brakes during engine shutdown.

● **At parking:**

Y ELEC PUMP OFF
ENG 1 SHUT DOWN

PRO-TRG – TRAINING NOTES
PRO-TRG-10 – Flow Patterns

GENERAL

Applicable to: ALL

Normal procedures are accomplished from memory and scan flow. The diagrams below may aid in remembering the patterns in which normal procedures are carried out.

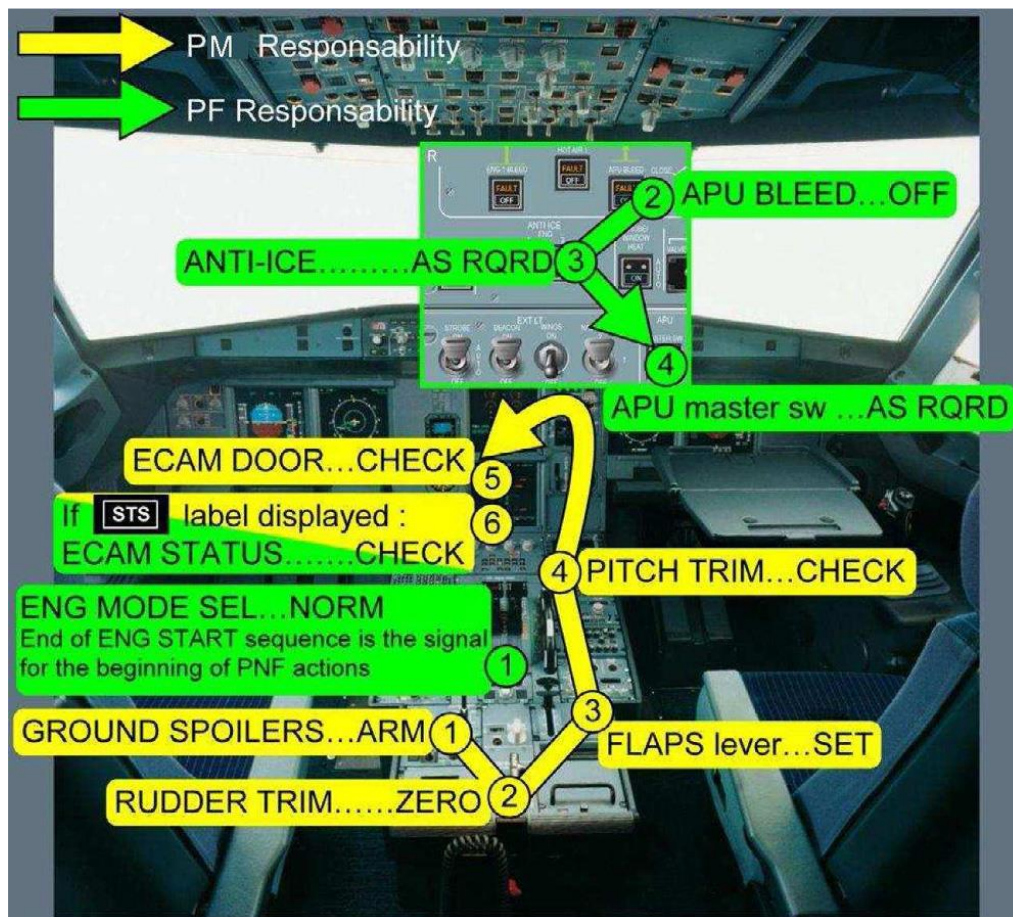
MCDU SETUP

Navigation	Status Init A F-PLN (SEC F-PLN) RAD NAV	
Performance	Init B PERF	

AFTER START FLOW PATTERN

Applicable to: ALL

When the engines have started, the PF sets the ENG MODE selector to NORM to permit normal pack operation. At this time, the After Start Flow Pattern begins.

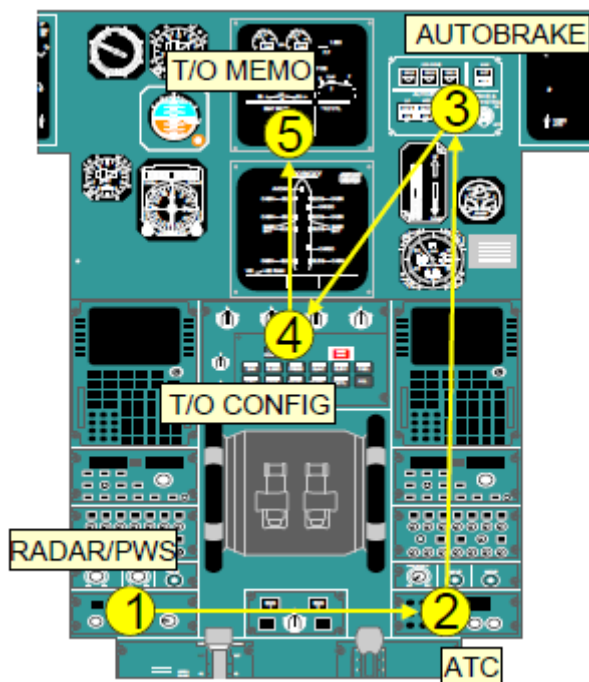


BA Note:

- Item 6 (ECAM STATUS) must not be checked until during the After Start checklist to minimise the threat to ground crew following distraction.

- Y ELEC PUMP is added to PM scan flow to facilitate One Engine Taxi.

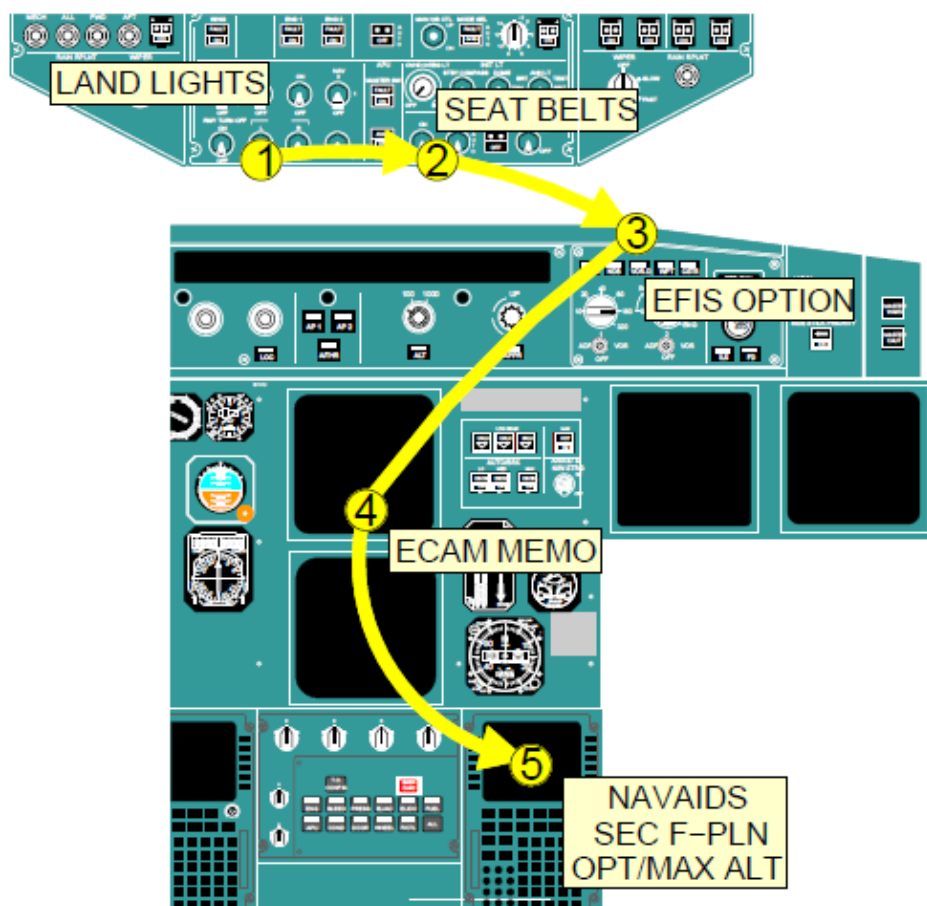
TAXI FLOW PATTERN



BA Note:

- Item 3 is delayed until Flight Controls have been checked once both Engines are running.
- Items 4 and 5 are delayed until reached in the before take-off checklist to act as a reminder of whether this checklist has been completed.

FL100 (CLIMB) FLOW PATTERN



EFIS Option:

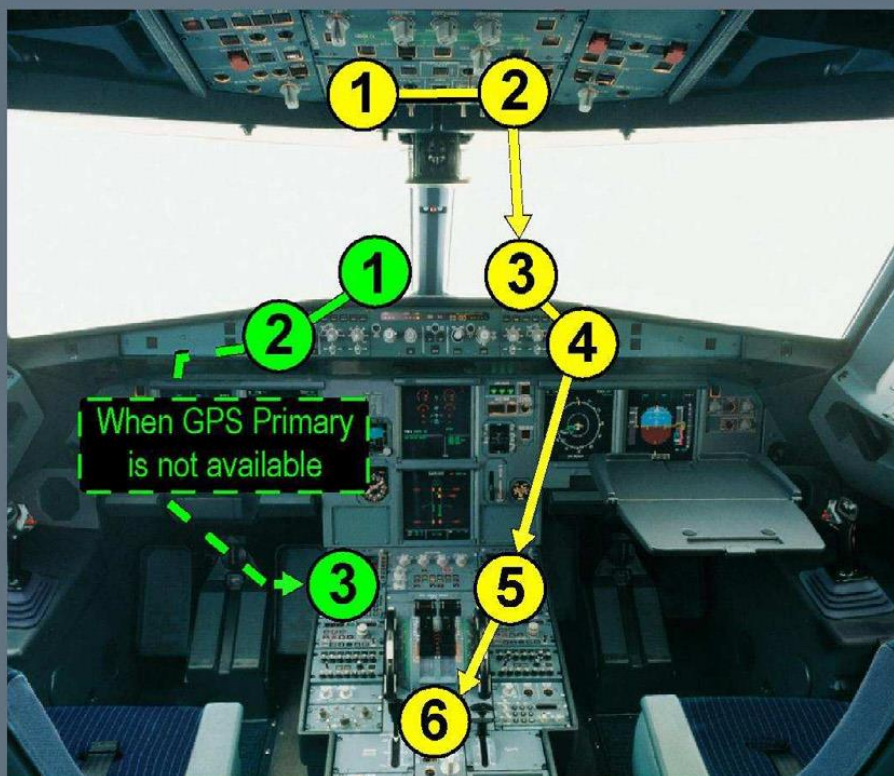
The PF will select CSTR for grid MORA

The PM will select ARPT

FL100 (DESCENT)

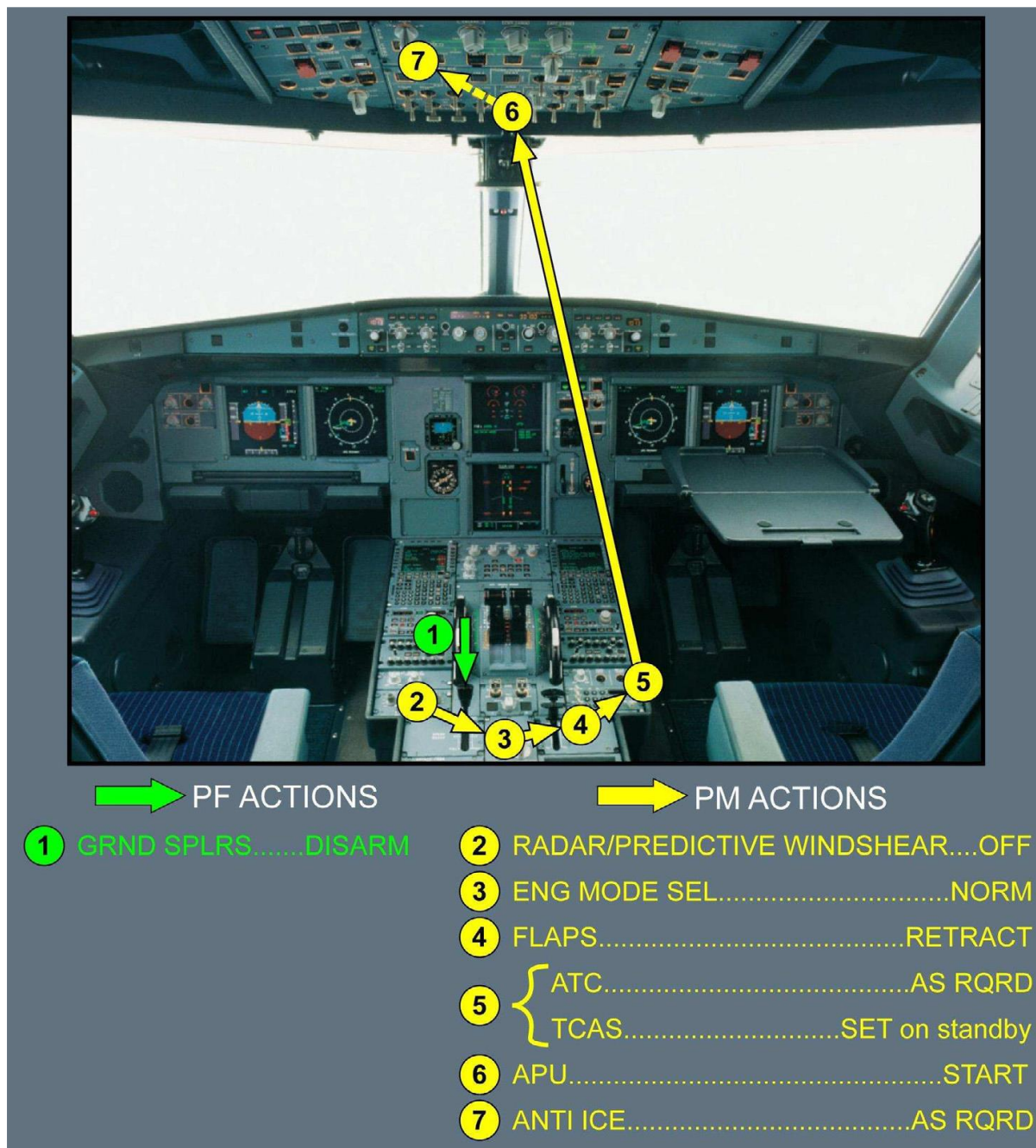
→ PF ACTIONS

→ PM ACTIONS



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

AFTER LANDING



Note: PF disarms ground spoilers: trigger for PM to carry out remaining actions.

PRO-TRG-20 -- Briefings

TAKE OFF BRIEFING

Applicable to: ALL

The purpose of the takeoff briefing is for the flight crew to identify and agree practical solutions to relevant threats whilst also ensuring a shared understanding of both normal and abnormal procedures and factors during takeoff and departure. In addition to this, the brief should ensure that the aircraft preparation and particularly the programming of the FMS reflects this shared crew understanding of the takeoff and departure. The takeoff brief should be performed at the gate, when the flight crew workload permits, cockpit preparation complete and before the engines are started. The brief should be appropriate to the circumstances on the day. It should be concise and interactive. Pilots may use the term "Standard Briefing" to cover the emergency brief but a full emergency briefing should be practised at regular intervals and at least once at the beginning of a flight duty tour.

The Situational Awareness section of the BAV Pilot Competencies table gives guidance as to what constitutes an effective brief. When a main parameter is referred to, then both flight crew members should cross-check that the parameters are set or programmed correctly. The relevant MCDU pages should be displayed as appropriate.

The takeoff brief should consider but not necessarily include all the following factors:

1. THREATS – Highlight any identified threats for the sector and identify how they will be avoided.
2. MEL – Review MEL deficiencies, ADDs and autopilot status to assess their effect on the handling or performance of the flight.
3. VARIANT – Identify whether the aircraft is an A318/A319/A320/A321 and any relevant sub systems, e.g. PWS, RAAS, etc. Awareness of the aircraft model may help to prevent tailstrike.
4. OEBs – Review applicable OEBs in FCOM and QRH to ensure compliance with their requirements.
5. AIS – Review AIS to assess the effect of promulgated airfield and nav-aid deficiencies.
6. Sig. Wx – Review the wind direction and strength, temperature, visibility, precipitation, need for de or anti-ice, expected turbulence, windshear, inversions, etc.
7. Departure Alternate – Review the alternate situation, bearing in mind any requirements for an overweight landing.
8. Runway – Mention the departure runway and any pertinent details including lighting, length, etc. Include the expected taxi routing to the departure runway.
9. Flap – Setting to be used.
10. Acc Alt – State.
11. Trans Alt – State.
12. Terrain – Discuss proximate and en route terrain problems as appropriate.
13. Performance Restrictions – Discuss the likely performance of the aircraft including any emergency
14. turns, non-standard climb-outs, noise considerations, reduced thrust capabilities, etc.
15. MSA – Review versus SID clearance/ETP.
16. SID – Review expected clearance including profile, heights and speeds.
17. Radio Aids – Selected if required for the departure and correctly tuned and identified.
18. FMGC – Review FMGC set up and use.
19. HDG – V/S. Check that the FCU is in HDG–V/S mode.
20. Emergencies – Review SOPs for rejected and continued take-off cases including the effect of wind direction, likely aircraft performance, available extra engine power and any other relevant factors.
21. Review – Review SOPs for normal operation, airfield delays and slot times, special considerations, etc. Invite questions and Queries and check full understanding of the brief.

DEPARTURE BRIEF

Applicable to: ALL

PF may update the Departure Brief once ATC Clearance is known (and all other items in the “ATC clearance obtained” taxi procedure box are completed). Maximum use should be made of PFD, ND and E/WD to check that the FMGS has been set up for the cleared departure.

Departure Brief Scan



APPROACH BRIEFING

Applicable to: ALL

The purpose of the approach briefing is for the flight crew to identify and agree practical solutions to relevant threats whilst also ensuring a shared understanding of both normal and abnormal procedures and factors during approach, landing and taxi-in. The flight crew should perform the approach briefing when the workload is low. The briefing should be appropriate to the circumstances on the day, concise and interactive. The Situational Awareness section of the BAV Pilot Competencies table gives guidance as to what constitutes an effective brief. When a main parameter is referred to, then both flight crew members should cross-check that the parameters are set or programmed correctly. The relevant MCDU pages should be displayed as appropriate.

The approach brief should consider, but not necessarily include all the following factors:

1. THREATS – Highlight any identified threats for the descent and approach. Identify how they will be avoided.
2. ECAM STS – Review the status of the a/c, including any problems which have arisen during the flight. Discuss anything which is unusual and has a bearing on the operation.
3. VARIANT – Identify whether the aircraft is an A318/A319/A320/A321 and any relevant sub-systems, e.g. PWS, RAAS, etc. Awareness of the aircraft model may help to prevent tailstrike.
4. OEBs – Review applicable OEBs in FCOM and QRH to ensure compliance with their requirements.
5. AIS – Review and discuss any pertinent factors.
6. Weather – Review and discuss the arrival weather, with reference to forecasts, Volmet and ATIS for the intended arrival and any alternate. Also mention any likely turbulence and icing.
7. QNH – Review the QNH, set on the STBY ALT and pre-set behind the BARO REF display on the FCU panel.
8. Transition Level – State.
9. Req'd Nav Accy – Crew should consider the expected descent and approach clearance and the anticipated Navigation Accuracy requirements. The navigation accuracy check determines which autopilot mode the flight crew should use for the approach, the type of displays to be shown on the ND as well as the use of EGPWS.
10. MSA – Review and brief relevant MSA's
11. STAR – Discuss and review the anticipated procedure, including any speed/height restrictions.
12. Approach – Discuss the type and detail of the approach to be flown, including autopilot usage, mentioning check heights.
13. MINIMA – Agree the minima for the intended approach and ensure it is appropriately set. Discuss any visual reference requirements at minima if the approach is to be conducted in limiting conditions.
14. Flap – Review Flap setting for landing.
15. Airfield Elevation – State.
16. Go-around – Review and discuss profile and procedure including SOPs clean up schedule and holding facility. Consider MACG weight limitation.
17. Runway – Discuss the intended runway, including length, elevation, slope, width, contamination or braking action, lighting, inset threshold and any other factors. Include the expected taxi routing to the apron/stand.
18. Landing Performance – Agree the Factored Landing Distance (FLD) in the prevailing or expected conditions and consider the Available Landing Distance (LDA). Discuss the use of Reverse Thrust, Autobrake, etc.
19. Airfield – Review taxiing and stand allocation including ground facilities.
20. Radio Aids – Ensure required Nav-aids are selected, correctly tuned and Identified.
21. Alternate – Discuss the alternate(s) including distance, time, direction, commercial preference and Company advice.
22. Fuel Capability – Discuss and review the options for Holding/Diversion.
23. Review – Review SOPs for normal operation, airfield delays and slot times, special considerations, etc. Invite questions and queries and check full understanding of the brief.

Additional briefing items that should be considered are:

1. Descent point.
2. Allocation of duties.

Additional approach briefing will be required in the event of:

1. Cat 2/3 operations (refer to the QRH LVO section).
2. Change from the expected approach procedure.
3. Change in configuration.
4. Change of runway in use.

The full use of the briefing aide memoire on the checklist and in the QRH is recommended to assist in this process.

PRO-TRG-30 – Crew Resource Management

GENERAL

Applicable to: ALL

If you have an interest in aviation – even if you are not a real pilot – you may be aware of the term “CRM”. However, until now there has been no practical application within the Flight Simulator environment.

CRM stands for **Crew Resource Management**. Whilst an in-depth discussion of CRM is beyond the scope of this document, it is worthwhile familiarising oneself with the general concepts as it forms the foundation of multi-crew operations.

CRM may be defined as:

The effective use of all available resources for flight crew personnel to ensure a safe and efficient operation, reducing error, avoiding stress and increasing efficiency.

CRM is not concerned so much with the technical knowledge and skills required to fly and operate an aircraft, but rather with the cognitive and interpersonal skills needed to manage the flight. In practical terms, it can be considered to be the need to communicate clearly with your fellow flight crew member about:

- Your intentions (for example, your plan for flying an approach or handling an emergency)
- Your actions (for example, selecting a different mode on the FCU or making an adjustment to a system)
- Your expectations (of either the aircraft or your colleague(s)).

You should make every effort to ensure that you develop between you a ‘shared mental model’ of how the flight is to proceed. In other words – you should never let the jet go anywhere – or point the jet anywhere, if you are PF -- that *both* of you aren’t already thinking about.

In some ways this communication is even more vital in FS, as we do not have the benefit of the visual communication that comes from sitting next to each other. Also, there is always the risk of synchronisation errors resulting in FMA disagreements and mis-matched switch positions. Making use of the standard callouts detailed below should ensure that any errors are identified and trapped before they become problematic, but it should be stressed that the standard callouts are the bare minimum and additional communication should be used where necessary to enhance situational awareness.

The careful use of the standard words and phrases detailed is also important to ensure unambiguous communication. Take the example – from an actual CFD flight -- of a command to “ARM THE APPROACH”.

The response from the PM was to select the APPR pushbutton on the FCU. However, what the PF was expecting was for the Approach Phase to be activated in the MCDU! There are many other similar traps for the unwary: the moral of the story is to use the standard calls and phrases at all times!

COMMUNICATION

Applicable to: ALL

EMERGENCY CALL

Some abnormal/emergency procedures require flight and cabin crews to use specific phraseology when communicating with each other. To ensure effective communication between the flight and cabin crews, the standard phraseology may be discussed at the preflight phase.

CROSS-COCKPIT COMMUNICATION

The term "cross-cockpit communication" refers to communication between the PF and the PM. This communication is vital for any flight crew. Each time one flight crewmember adjusts or changes information and/or equipment on the flight deck, the other flight crewmember must be notified, and an acknowledgement must be obtained.

Such adjustments and changes include:

- FMGS alterations
- Changes in speed or Mach
- Tuning navigation aids
- Flight path modifications
- System selections (e.g. anti-ice system).

When using cross-cockpit communication, standard phraseology is essential to ensure effective flight crew communication. This phraseology should be concise and exact, and is defined (Refer to COMMUNICATIONS AND STANDARD TERMS).

The flight crew must use the headset:

- From the ENGINE START phase until the TOP OF CLIMB phase
- From The TOP OF DESCENT phase until the aircraft is parked.

PRO-TRG-40 – NORMAL PROCEDURES
STANDARD OPERATING PROCEDURES

USE OF NORMAL CHECKLIST

Applicable to: ALL

Airbus' NORMAL CHECKLIST takes into account ECAM information, and includes only those items that can directly impact flight safety and efficiency, if actions are not correctly performed. These checklists are of a "non-action" type (i.e. all actions should be completed from memory before the flight crew performs the checklist).

The NORMAL CHECKLIST includes 9 flight phases. The BEFORE START, BEFORE TAKEOFF, AFTER TAKEOFF and APPROACH checklists are divided in two sections: The "Down to the Line" section, and the "Below the Line" section. This format is designed to help flight crew manage the workload.

The Pilot Flying (PF) requests the NORMAL CHECKLIST, and the Pilot Monitoring (PM) reads it. The checklist actions are referred to as "challenge/response"-type actions. The PF "responds" to the "challenge" only after checking the current status of the aircraft in a considered and deliberate manner.

Level 2 information is provided to detail the intent of the checklist item and/or which cockpit display/panel to check.

If the configuration does not correspond to the checklist response, the PF must:

- Stop the checklist;
- Take corrective action before "responding" to the "challenge";
- Continue the checklist.

If it becomes apparent that an entire procedure was not done:

- Stop the checklist;
- Complete the entire procedure;
- Do the checklist from the start.

The PF may request that action is performed by the PM depending on the situation. If corrective action is not possible, then the PF must modify the response to reflect the real situation (with a specific answer). When necessary, the other flight crewmember must crosscheck the validity of the response. The challenger (PM) waits for a response before proceeding with the checklist.

For the checklist items that are identified with (___), the response should correspond to the real condition or configuration of the system.

Normal Checklists should be initiated in a timely manner during low-workload periods to prevent unconscious completion, rushing or interruption that could defeat the safety purpose of the Normal Checklists.

Note: The QRH Normal Procedures defines the latest point by which each Normal Checklist must be initiated.

Critical items require response by the PF. These are indicated by an solid line:

CHALLENGE _____ RESPONSE

Some less critical items may be both challenged and responded to by the PM alone. These are indicated by a dotted line:

CHALLENGE RESPONSE

The PM must announce "XXX CHECKLIST COMPLETED", after reading and completing the checklist.

BEFORE START

Applicable to: ALL

COCKPIT PREP _____ COMPLETED (BOTH)
Confirms PRELIMINARY COCKPIT PREP, EXT WALKROUND and COCKPIT PREP procedures have been completed.

BARO REF _____ (____) SET (BOTH)
Confirm that the correct QNH is set (both PFDs and the Standby Altimeter – PF/PM States Value), and altitude is in limits w.r.t airfield/apron elevation (PFD/STBY ALT).

ACARS _____ INITIALISED
Confirms that Merlin ACARS has been initialised and armed to start recording the flight.

PARK BRAKE _____ ON
Check yellow pressure applied to the left and right brakes and ACCU PR is in green band (BRAKES Indicator).

FOB _____ (____)kg
Confirms the FOB Procedure has been completed and the Fuel On Board is sufficient for the intended flight (E/WD – PF states FOB Value).

[A318 only] FUEL X FEED _____ CHECKED
Confirm the fuel cross-feed valve has been tested and is now closed (OVERHEAD PANEL).

INIT B _____ LOADED
Confirms that the FMGS CRITICAL DATA ENTRY PROCEDURE has been complete and that ZFW, ZFWCG and FOB have been entered (PF INIT B).

FLEX TEMP _____ (____)
Confirm that a valid FLEX temperature (if required) has been entered (PERF TO - PF States Value). State "TOGA" if FLEX Takeoff not possible.

SPEEDS _____ (____)
Confirms that the FMGS CRITICAL DATA ENTRY PROCEDURE has been complete and VALID SPEEDS have been entered (PERF TO). PF States V1/VR/V2 and Gm Dot.

START CLEARANCE

SIGNS _____ ON & AUTO
Confirm that SEAT BELT and NO SMOKING signs are ON and AUTO (Sw ' s and EWD MEMO)

BEACON _____ ON
Confirm that BEACON is ON (Overhead Panel)

ATC _____ AUTO or XPDR
Confirm that ATC is in AUTO (or XPDR) (TCAS/ATC panel)

N WHEEL STEER DISC _____ AS RQRD
Confirm that NW STRG DISC is displayed, if required for push back (EWD MEMO)
(PF States DISCONNECTED or NOT RQRD)

WINDOWS and DOORS _____ CLOSED (BOTH)
Confirm that both sliding windows are closed and locked (WINDOW CONTROL HANDLE) and all aircraft external doors are closed (DOOR/OXY SD).

FLT DECK DOOR _____ LOCKED
Confirm FLT DECK Door is locked and No FAULT LT (PEDESTAL)

AFTER START

Applicable to: ALL

GROUND CREW CLEARANCE _____ SEEN
Confirm all personnel and ground equipment are clear and hand signal received.

ANTI ICE _____ (____)
Confirm required Engine(s) (OVERHEAD PNL) and/or Wing anti ice is selected (if required)
(EWD MEMO)

FLAPS _____ CONF (____) (BOTH)
Confirm that the FLAPS position (EWD - PF states with colour) corresponds to the intended position
(PERF TO - PM states with colour).

APU _____ (____)
Confirm APU MASTER Sw is in the required position (OVERHEAD Panel)

Y ELEC PUMP _____ (____)
Confirm Y ELEC Pump Pb in in the correct position (OVERHEAD Panel)

ECAM STATUS _____ CHECKED
If STS reminder is displayed (EWD), PM depresses STS Pb (ECAM CTL PNL) and PF reviews the
ECAM STATUS page.

BEFORE TAKEOFF

Applicable to: ALL

FLIGHT CONTROLS _____ CHECKED (BOTH)
Confirms FLT CTL check procedure has been completed

TCAS _____ TA/RA or TFC
PM Confirms TA/RA or TFC (ATC/TCAS Panel). (PF reviews TA ONLY displayed on ND).

LOADSHEET _____ ACK'D
Confirms the LATE CLOSEOUT PROCEDURE has been completed and that the GW Cx (SD Vs Final Loadsheet) has been completed AFTER any REVISIONS have been entered.

TRIMS _____ (____)% & ZERO
PM confirms Takeoff CG is set (PITCH TRIM wheel - PM States value) and in green band, and Rudder Trim is zero (PEDESTAL - PM States).

DEPARTURE BRIEF _____ CONFIRMED
Confirm Departure Brief has been verbalised or, if any changes, restated.

TO DATA _____ (____) (BOTH)
*PM states the RWY and SHIFT (PERF TO).
PF verifies that this is valid and appropriate for the cleared takeoff point and responds with the Runway and the Intersection observed outside the aircraft.
PF states the Speeds & FMAs (PFD) and the FLX/TOGA with Value (EWD).*

FLAPS _____ CONF (____) (BOTH)
Confirm that the FLAPS position (EWD - PF states with colour) corresponds to the intended position (PERF TO - PM states with colour).

CABIN REPORT _____ (BLACK)
Confirm cabin report is received for Takeoff (CDSS) (Not RQRD for CSF aircraft)

ECAM MEMO _____ T.O NO BLUE
PM depresses the TO Pb (ECAM CTL PNL), PF Reviews the TO MEMO and assures no blue

ENTERING RUNWAY

TAKEOFF RWY _____ (____) (BOTH)
Confirm the aircraft is entering the correct RWY (Signage, RWY markings)

CABIN CREW SIGNAL _____ GIVEN
Confirm CABIN CREW signal was given

PACKS _____ (____)
Check Packs are ON or OFF as required (OVERHEAD Panel)

AFTER TAKEOFF/CLIMB

Applicable to: ALL

L/G _____ UP
Confirm that the landing gear is retracted (lights extinguished on LDG GEAR Indicator panel).

ECAM _____ CHECKED
Check the ECAM Memos are as desired (E/WD)

STD SET

BARO REF _____ (____) (BOTH)
Confirm that STD is set (both PFDs - PF/PM State Value).

APPROACH

Applicable to: ALL

ECAM STATUS _____ CHECKED

If there is a status reminder, check the aircraft STATUS.
Take particular note of any degradation in landing capability, or any other aspect affecting the approach and landing.

APPROACH BRIEF _____ (APPR/RWY) CONFIRMED
Confirm the ATC cleared approach and runway is correct (ND - PF States APPR and RWY).

MINIMA _____ (____) BARO/RADIO SET (BOTH)
Confirm applicable minima (PFD - PF/PM State value).

APPROACH PHASE _____ ACTIVE
Confirm that approach phase has been activated (PERF APPR).

QNH SET

BARO REF _____ (____) (BOTH)
Confirm that the correct QNH is set (both PFDs and the Standby Altimeter - PF/PM State value).

LANDING

Applicable to: ALL

CABIN REPORT _____ (WHITE)
Confirm cabin report is received for Landing (CDSS) (Not RQRD for CSF aircraft)

AUTOBRAKE _____ (____)
Check selected Autobrake mode is ON (WHEEL SD page - PF States Selection or NOT RQRD).

ECAM MEMO _____ LDG NO BLUE
Review the LDG MEMO and assure no blue (EWD)

AFTER LANDING

Applicable to: ALL

EXTERIOR LIGHTS..... SET
Check STROBE Sw, LDG LT Sw are OFF and TAXI LT Sw and RWY TURN OFF LT Sw are ON or AS RQRD

FLAPS..... ZERO
Confirm Flaps at Zero (EWD).

GROUND SPOILERS..... DISARM
Confirm Spoilers retracted (ECAM MEMO - EWD)

APU..... START/AS RQRD
Confirm APU MASTER Sw ON and APU START ON (OVERHEAD Panel). With SETWA capability consider delaying APU start.

RADAR/PWS OFF
Check Radar OFF (ND - No Wx Radar Indications) and PWS OFF (EWD MEMO - PRED W/S OFF Amber)

TCAS STBY
Confirm TCAS is STANDBY (EWD Memo)

Consider ONE ENGINE TAXI ARRIVAL

PARKING

Applicable to: ALL

PARK BRK.....ON
Confirm yellow pressure applied to the left and right brakes and ACCU PR is in green band (BRAKES Indicator).

ENGINES.....OFF
Check fuel flow zero (EWD).

SLIDES.....DISARMED
Confirm slides disarmed (DOORS SD)

BEACON.....OFF
Confirm that BEACON is OFF (OVERHEAD Panel)

SEAT BELTS.....OFF
Confirm SEAT BELTS OFF (EWD)

FUEL PUMPS.....OFF
Confirm all FUEL PUMP Pbs are OFF (OVERHEAD Panel)

ATC.....x000/STBY
Confirm ATC Code Display is X000 and Mode Sel STBY (TCAS/ATC Panel)

Consider HEAVY RAIN

SECURE

Applicable to: ALL

ADIRS..... OFF
Confirm IR Mode rotary Sel for IR 1, 2, 3 are OFF (OVERHEAD Panel)

EXTERNAL POWER ON
Confirm EXT PWR Pb is selected to ON (OVERHEAD Panel)

SIGNS..... OFF
Confirm SEAT BELTS and NO SMOKING Sign are OFF (OVERHEAD Panel)

EMER EXIT LT OFF
Confirm EMER EXIT LT Selector is OFF (OVERHEAD Panel)

OXYGEN..... OFF
Confirm CREW SUPPLY Pb is OFF (OVERHEAD Panel)

BATTERIES..... OFF
Confirm both BATTERY Pbs are OFF (OVERHEAD Panel)

Consider COLD WEATHER

APPROACH USING FLS FUNCTION

Applicable to: G-TTNV – G-TTSA, G-TNEA – G-TNEE

GENERAL

This chapter explains some of the specific details required to fly an approach using the FLS function. However, general recommendations mentioned in the aircraft configuration management and aircraft guidance management section apply.

Approaches based on both radio nav aids and RNAV(GNSS) with LNAV or LNAV/VNAV minima can be flown with the FMS Landing System (FLS) function.

For LOC G/S OUT, LOC ONLY and LOC B/C approaches, the lateral guidance remains based on the radio beam whilst the FLS function can guide the aircraft on the vertical path.

The FLS function may be used if:

- The FLS function is available
- The required FLS capability for the approach is available

FLS PRINCIPLE

GENERAL

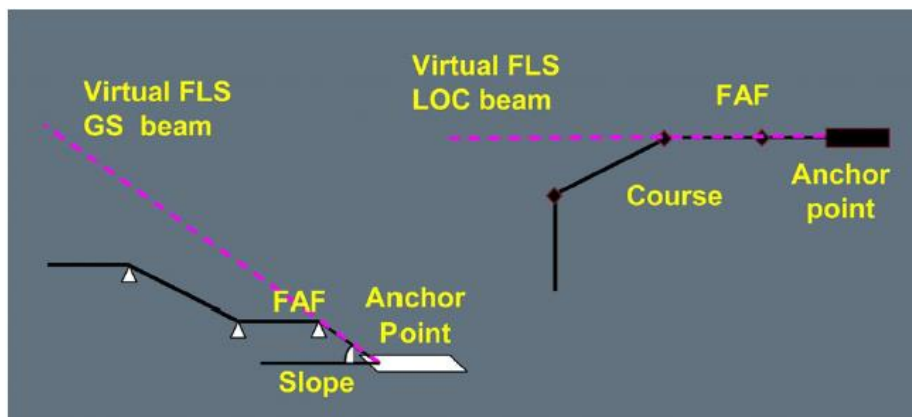
The FLS function allows flying a NPA “ILS alike”.

The FMS uses information from the Navigation Database to compute a virtual FLS beam. The FMS sends this FLS beam and the FM position to the Multi Mode Receiver (MMR).

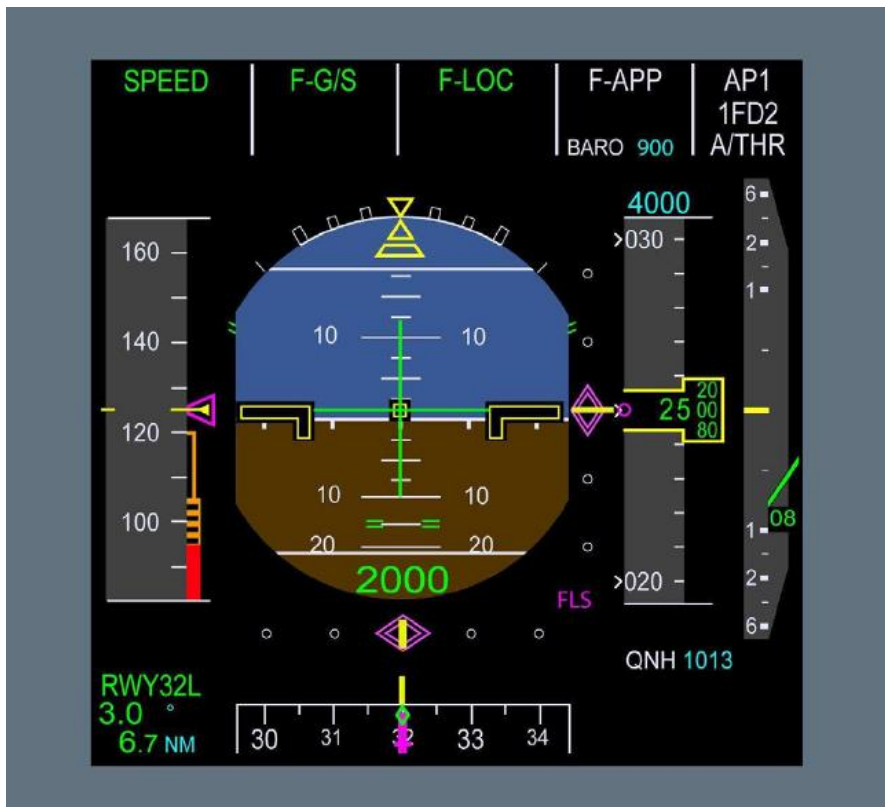
The virtual FLS beam is characterized by:

- An anchor point (the anchor point ident is RWY if it is located on the runway threshold, or EP in other cases)
- A slope
- An approach course (shown as a double dagger on the PFD heading scale)

The final approach leg from the Navigation Database defines the course and slope of the FLS beam. On the ND, the FLS lateral beam is displayed as a magenta dotted line.



The MMR computes and displays the lateral and vertical angular deviations from this FLS virtual beam in the same way as for an ILS approach. These deviations are presented as double diamonds both on the PFD and ND. The FLS virtual beam may be flown with F-LOC and/or F-G/S AP/FD modes.



APPROACH CAPABILITY

The approach capability is displayed on the FMA when the LS pb is pressed. This approach capability helps the flight crew to determine their strategy.

- F-APP: FLS deviations and F-G/S, F-LOC guidance are reliable.
- F-APP + RAW: The flight crew can refer to FLS deviations but must cross check with navaid raw data, i.e. VOR, NDB and/or DME
- RAW ONLY: The flight crew must not use the FLS and must refer exclusively to navaid raw data, i.e. VOR, NDB and/or DME to perform the approach.

Note:

1. Any approach capability degradation on the FMA is accompanied by a triple click (as for ILS)
2. The term RAW in F-APP + RAW and RAW ONLY refers to navaid raw data. It does not refer to an approach in FLS raw data (AP/FD OFF)
3. In F-APP + RAW, the distance to be considered for the altitude/distance cross-check is the radio-computed distance on the ND and not the FMS computed distance (to anchor point) on the PFD.
4. The flight crew must not fly RNAV approaches when the FLS capability is F-APP + RAW or RAW ONLY since no navaid raw data is available for these types of approach.

F-G/S DEVIATIONS REFERENCE

Unlike the ILS G/S, the F-G/S deviations are baro-referenced, i.e. at sea level a 1 hPa altimeter setting error moves the F-G/S vertical profile about 30 ft up or down. The crew should therefore pay particular attention to the altimeter setting and any altimeter setting change on the approach must be reflected both on the FCU and the MCDU PERF APPR page.

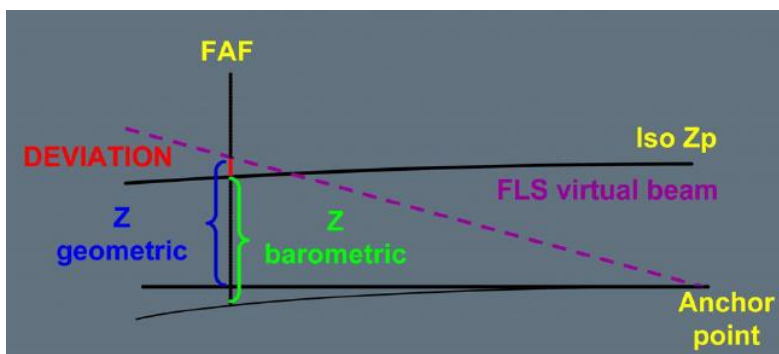
Whatever the altimeter reference used prior to or during the approach, i.e. STD, QNH or QFE (if installed), the virtual FLS G/S beam is always based on QNH. The QNH value used for the FLS beam is either:

- The QNH value entered on the PERF APPR page (whilst STD is used for baro ref)
- The QNH value entered on FCU (when QNH is used for baro ref)
- Computed from the QFE (if installed) set on the FCU and the runway elevation from the FM database (when QFE is used for baro ref)

When temperature is below ISA, the F-G/S deviations are temperature-corrected.

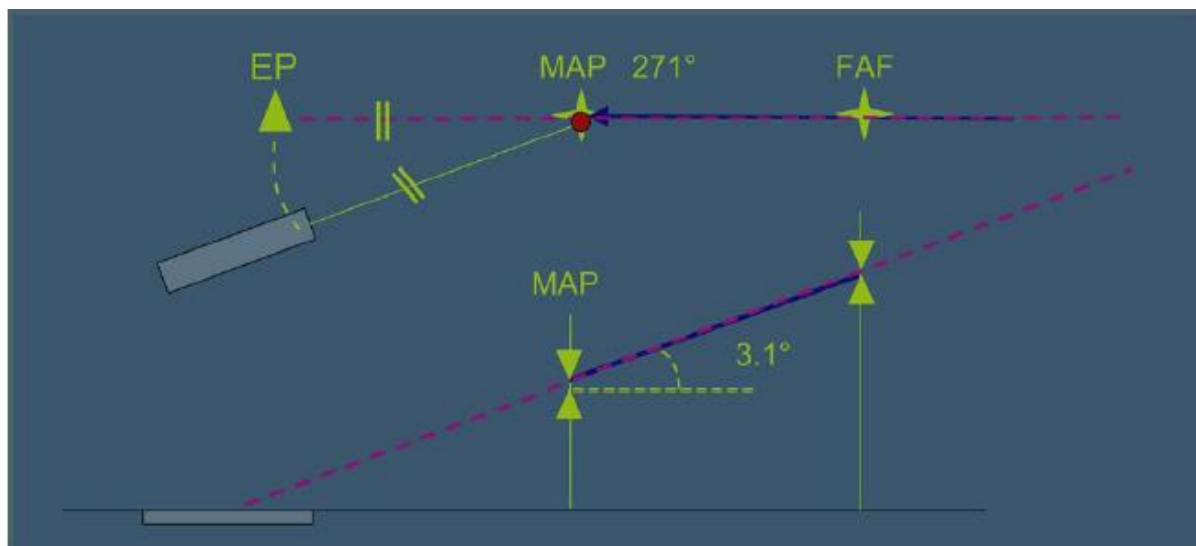
EARTH CURVATURE

For NPAs flown with the FLS function, the final path crossing altitudes are geometric altitudes referenced to the anchor point. When intercepting the final approach path, a slight altitude deviation between the altimeter and the published approach chart may be noticed due to the curvature of the Earth. Typically, at the FAF, the F-G/S virtual beam is about 50 ft higher than the chart.



OFFSET APPROACH

Depending on the approach procedure, the anchor point may be different from the runway threshold and may be located abeam this threshold. The anchor point ident is then EPXXX (e.g. EP33L).



- Down to minimum, the distance and slope information on the PFD are representative of distance and slope to the runway threshold.
- When flying the visual part of the approach, i.e. below the minimum:
 - The distance displayed on PFD is no longer representative of distance to the threshold (indeed, distance may increase as the aircraft is converging toward the runway threshold)
 - As the aircraft is leaving the F-LOC beam and turning toward the runway threshold, the F-G/S deviation becomes meaningless and must be disregarded. Therefore, the LS pb should be selected OFF at minimum.

FLS USE

All published NPA coded in the FM database may be flown using the FLS function provided:

- The offset between the final approach course and the runway course does not exceed 50°
- The approach capability is at least F-APP or F-APP + RAW

If the FLS function is not available due to the approach construction, a white MCDU message “NO FLS FOR THIS APPR” is displayed on the scratchpad when selecting the NPA. If a system failure affects the FLS capability, the ECAM STATUS page displays the FLS capability even before the LS pb is pressed.

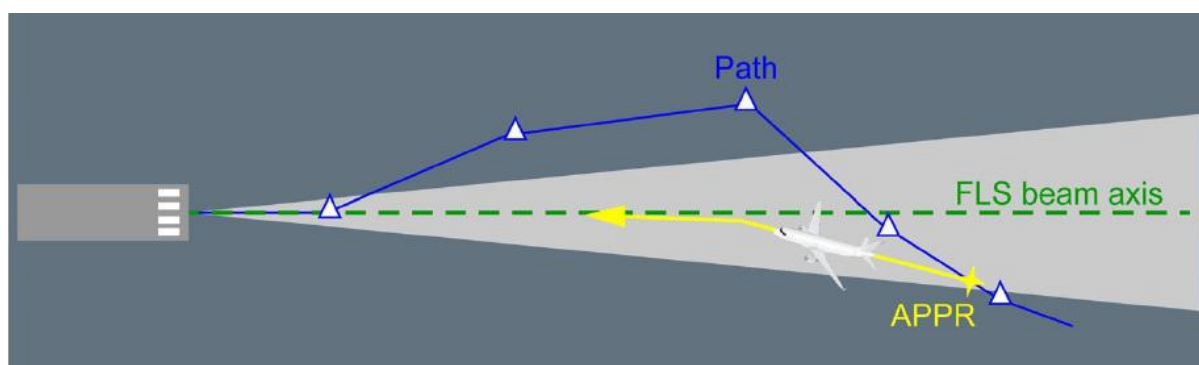
INTERCEPTION OF THE FINAL APPROACH COURSE

The FLS virtual beam is displayed in magenta and is 80 NM long. It can be intercepted at any point along the magenta line.

When cleared for interception of the final approach course and on an intercept trajectory for the final approach course, the flight crew press the APPR pb on the FCU. Check F-G/S and F-LOC become armed on the FMA.

WARNING	Obstacle clearance is not guaranteed if FLS guidance is used outside the published approach.

Example of APPR pb selection that leads the aircraft to fly outside the published approach:



INTERCEPTION OF THE FINAL VERTICAL LEG

When the aircraft reaches the FDP, the crew must check that **F-G/S** is engaged.

As with an ILS, when passing the FDP the crew must check the altitude and location of the FDP via an altitude/distance check.

When the FLS capability is F-APP + RAW, the crew must monitor the final approach using FLS deviations and cross-check with navaid raw data, i.e. VOR, NDB and/or DME (needles, distance and altitude).

GLIDE SLOPE INTERCEPTION FROM ABOVE

The following procedure must only be applied when established on the localiser (F-LOC). There are a number of factors which might lead to a glide slope interception from above. In such a case, the crew must react without delay to meet the stabilization criteria.

In order to get the best rate of descent, when cleared by ATC and below the limiting speeds the landing gear should be lowered and at least CONF 2 selected to ensure that the aircraft speed will not increase. Speedbrakes may also be used.

When cleared to intercept the glideslope, the flight crew should:

- Press the APPR pb on FCU and confirm **F-G/S** is armed and **F-LOC (LOC) (LOC B/C)** engaged
- Select the FCU altitude above aircraft altitude to avoid unwanted **ALT*** engagement
- Select V/S 1 500 ft/min initially. V/S in excess of 2 000 ft/min will result in the speed increasing toward VFE.

The use of **V/S** mode ensures that the A/THR is in **SPEED** mode.

The flight crew must carefully monitor the rate of descent to avoid exceeding VFE. When approaching the F-G/S path, **F-G/S*** will engage. The flight crew should monitor the F-G/S capture with raw data (pitch and F-G/S deviation). The go-around altitude should be set on the FCU at **F-G/S***.

REACHING MINIMA

The applicable minima are those associated with the approach chart.

When the aircraft reaches the minima, the PF either monitors or announces "MINIMUM".

The current altitude value becomes amber.

■ **If the appropriate visual conditions are met at minima:**

The flight crew can continue the approach visually.

- **Below minima:**

When the FLS is used for approach, the FDs provide lateral and vertical managed guidance down to the anchor point. The flight crew can keep the AP/FD engaged below minima.

Keeping the AP/FD below minima when visual references are acquired is highly valuable in the following conditions:

- High minima above ground level
- Marginal weather conditions

However, the guidance may not be relevant especially in the following circumstances:

- Missed Approach Point not at the RWY threshold and final segment not aligned with the runway track
- Large offset between final segment and runway track.

In such cases the AP/FD should be switched off and TRK/FPA (bird) flying reference may be used.

- **At the minimum use height of the AP:**

The AP must be disconnected now later than the Minimum Use Height of AP (Refer to [LIM-AFS-Autopilot Function](#)). Switching off FDs and use of TRK/FPA (bird) is at pilot discretion.

CAUTION

- Below minima, the visual references must be the primary references until landing
- From minima the FD provides additional guidance. The FD must be switched off if the guidance is not relevant or not followed.

■ **If the appropriate visual conditions are not met at minima:**

A missed approach must be initiated.

LOC ONLY, ILS G/S OUT, LOC B/C APPROACH

LOC ONLY, LOC B/C and LOC G/S OUT approaches may be flown using the LOC radio beam signal for lateral navigation and FMS computed F-G/S for vertical guidance.

APPROACH PREPARATION

LOC ONLY APPROACH

The flight crew selects the LOC approach as required in the FMS during the approach preparation.

LOC B/C APPROACH

Back course localizer (LOC B/C) approach must be flown using TRK FPA mode.

LOC GS OUT APPROACH

The flight crew selects the ILS approach in the FMS during the approach preparation. As the G/S deviations and guidance modes are not available, the vertical FLS deviation (double diamond) and mode (F-G/S) may be made available by deselecting the G/S. To deselect the G/S, the flight crew should press the "DESELECT*" prompt on the MCDU RAD NAV page.

DESCENT (CROSSING FL100)

When the flight crew presses the ILS/LS pb they should check:

- FLS approach capability (addresses only the vertical mode)
- The LOC (or LOC B/C) deviation is displayed as single diamond (radio data)
- The F-G/S deviation is displayed as a double diamond (FM computed data)
- The LOC IDENT, frequency and DME distance.



INTERMEDIATE APPROACH

The flight crew presses the APPR pb on the FCU when cleared for approach, and on the intercept trajectory for the final approach course. The flight crew monitors that the LOC (or LOC B/C) and F-G/S mode arm.

FINAL APPROACH

- **If the approach capability reverts to F-APP+ RAW:**
The lateral navigation (LOC or LOC B/C deviations) remains reliable
The vertical navigation (F-G/S deviations) must be crosschecked with navaid raw data (distance/altitude).
- **If the approach capability reverts to RAW ONLY:**
The F-G/S vertical deviation remains but must be disregarded.
The flight crew will select the bird and select a Flight Path Angle. This will disengage the F-G/S mode.

COLD WEATHER OPERATIONS

The virtual FLS beam is corrected for temperature below ISA thanks to the airport temperature entered in the MCDU PERF APPR page. The F-G/S deviations and the managed vertical mode F-G/S can therefore be used whatever the outside temperature.

The altitude corrections for cold weather operation should still be applied:

- During approach, before being established on the F-G/S beam
- When the FLS capability is F-APP+RAW or RAW ONLY, for the altitude/distance check
- On the value of the minima entered in the MCDU.

Refer to OM A for further Cold Weather Operations guidance.

PRO-TRG-50 – ABNORMAL AND EMERGENCY PROCEDURES
MISC

REJECTED TAKEOFF

Applicable to: ALL

FACTORS AFFECTING THE REJECTED TAKEOFF (RTO)

Experience has shown that rejected takeoffs, particularly at high speed, can be hazardous even if the correct procedures are followed.

Some factors which can detract from a successful rejected takeoff include:

- Tyre damage
- Worn or malfunctioning brakes
- Brakes not fully applied
- Error in gross weight determination
- Incorrect performance calculations
- Incorrect runway line-up technique
- Initial brake temperature
- Delay in initiating the stopping procedure
- Runway friction coefficient lower than expected

Thorough pre-flight preparation and exterior inspection can eliminate the effect of some of these factors.

During the taxi out, the takeoff briefing should be confirmed. Any change to the planned conditions requires the takeoff data to be re-calculated. In this instance, the crew should resist pressure to accept a takeoff clearance before being fully ready. Similarly, the crew should not accept an intersection takeoff until the takeoff performance has been checked.

The line-up technique is very important. The pilot should use the over-steer technique to minimise field length loss and consequently to maximise the acceleration-stop distance available.

DECISION MAKING

The decision to reject the takeoff is made by the Captain, although F/O's may call STOP in certain circumstances. The stop action is performed by PF.

A rejected takeoff is a potentially hazardous manoeuvre and the time for decision making is limited. It is not possible to list all the factors that could lead to a decision to reject the takeoff. However, in order to help the Captain make a decision, the ECAM inhibits warnings that are not essential from 80 kt to 1 500 ft or 2 min after lift-off, whichever occurs first. Therefore, any warning received during this period must be regarded as significant.

SPEED CONSIDERATIONS

To assist in the decision making process, the takeoff is divided into low and high speed regimes, with 100 kt being chosen as the dividing line. The speed of 100 kt is not in itself critical, but was chosen in order to help the Captain make the decision and to avoid unnecessary stops from high speed.

- **Below 100 kt:**
The decision to reject the takeoff may be taken at the Captain's discretion
The Captain should seriously consider discontinuing the takeoff if any ECAM warning/caution is activated.

- **Above 100 kt, and below V1:**

Rejecting the takeoff at these speeds is a more serious matter, particularly if braking action is degraded. It could lead to a hazardous situation if the speed is approaching V1. At these speeds, the Captain should be 'go minded' and very few situations should lead to the decision to reject the takeoff:

1. Fire warning or severe damage
2. Sudden loss of engine thrust
3. Malfunctions or conditions that give unambiguous indications that the aircraft will not fly safely
4. If any ECAM alert is triggered.

Exceeding the EGT red line or nose gear vibration should not result in the decision to reject the takeoff above 100 kt. In the event of tyre failure between V1 – 20 kt and V1, unless debris from the tyres has caused serious engine anomalies it is far better to get airborne, reduce fuel load and land with a full runway length available.

The V1 call takes precedence over any other call.

- **Above V1:**

The takeoff must be continued, since it may not be possible to stop the aircraft on the remaining runway.

DECISION CALLOUTS

If a malfunction occurs before V1 for which the Captain does not intend to reject the takeoff, the Captain will announce their intention by calling "CONTINUE".

If a decision is made to reject the takeoff, the Captain calls "STOP".

The First Officer should also call "STOP" at any speed in the following circumstances:

- Fire warning or severe damage
- Sudden loss of engine thrust

When the First Officer is handling the take-off, they may also call "STOP" for a significant handling difficulty or a blocked runway.

Above 100 kt the First Officer may also call "STOP":

- If an ECAM alert is triggered.

RTO TECHNIQUE

If an RTO procedure is initiated, the following task sharing shall be applied:

PF	PM
"STOP"	ANNOUNCE
Simultaneously: THRUST LEVERS IDLE REVERSE THRUST MAX AVAIL ⁽¹⁾	REVERSERS CHECK/ANNOUNCE DECELERATION CHECK/ANNOUNCE ⁽²⁾ AUTOBRAKE MONITOR ANY AUDIO CANCEL
<u>Aircraft stopped</u> Consider positioning the aircraft to keep any possible fire away from the fuselage. REVERSERS STOWED PARKING BRAKE ON Set parking brake ON after aircraft stops.	
CAPT	F/O
"Attention Crew, At Stations" ANNOUNCE ECAM ACTIONS ORDER The aircraft should remain stationary while the crew evaluates the situation. ATC NOTIFY	ECAM ACTIONS PERFORM EMER EVAC PROCEDURE LOCATE
<u>EVACUATION PHASE</u> • If required: EMER EVAC Procedure ORDER ATC NOTIFY <i>Inform ATC of the intention and the required assistance</i>	EMER EVAC Procedure APPLY

(1): Full reverse may be used until the aircraft is fully stopped. However, if there is enough runway available at the end of the deceleration, reverse thrust should be reduced when passing 70 kt.

(2): Annunciation of the deceleration means that the flight crew feels the deceleration and confirms it by the speed trend indicator on the PFD. If the autobrake is on, the DECEL light may illuminate when the actual deceleration is 80% of the selected rate. However, the DECEL light is not an indicator of proper autobrake operation and is not a criteria to confirm the deceleration. For example, the DECEL light may not appear on a contaminated runway with the autobrake working properly due to the effect of the antiskid.

- If a rejected takeoff is initiated and A/BRK MAX decelerates the aircraft, PF must avoid pressing the pedals (which may be a reflex action).
- If the autobrake is inoperative of the takeoff is rejected prior to 72 kt (autobrake not active and no spoiler deployment) PF simultaneously reduces thrust and applies maximum pressure on both pedals. The aircraft will only stop in the minimum distance if the brake pedals are maintained fully pressed until the aircraft comes to a stop.
- If the brake response does not seem appropriate for the runway condition, full manual braking should be applied and maintained. If the flight crew has any doubt, they must take over manually.
- If normal braking is inoperative, the flight crew should immediately apply the [MEM] **LOSS OF BRAKING** memory items.

After a rejected takeoff, if the aircraft stops using A/BRK MAX the flight crew must disarm the ground spoilers in order to release the brakes before taxiing.

Do not attempt to vacate the runway until it is absolutely clear that an evacuation is not necessary and it is safe to do so.

TAKEOFF FOLLOWING RTO

Depending on the technical condition of the aircraft and the reason for the RTO (e.g. ATC instruction) the flight crew may consider a new takeoff attempt subsequent to the RTO.

In this case the flight crew should:

- Reset both FDs and set FCU
- Restart Standard Operating Procedures from the AFTER START checklist.

PRO-CFD – CONNECTED FLIGHT DECK PROCEDURES
PRO-CFD-10 – Connected Flight Deck Recommendations

GENERAL

Applicable to: AEROSOFT

Whilst the Aerosoft Connected Flight Deck feature is extremely powerful and, for the most part, works extremely smoothly, there are some limitations – some related to the programming of the CFD feature itself and some related simply to the vagaries of transmitting and receiving data in real time over the Internet. For this reason, experience has shown that there are some best practices that will minimise any problems.

NAVDATA

Applicable to: AEROSOFT

It should be borne in mind that it is button presses that are synchronised between the MCDUs, rather than data itself. Therefore, the most seamless experience will be had if both parties use the same Navigation Database (AIRAC) cycle from the same data provider (e.g. Aerosoft or Navigraph). Whilst having different AIRAC cycles or data providers does not preclude a successful connection or even a successful flight, one may encounter problems with route loading and SID/STAR selection, particularly if different data providers are used. A recent poll of BAVirtual Airbus pilots suggested that **over 90%** use Navigraph as their provider for FMS data.

Recommendation

- It is recommended that all pilots utilise FMS data from **Navigraph** to maximise compatibility
- Data provider and AIRAC cycle in use by each pilot should be confirmed during crew assembly and any potential issues discussed

SYNC SETTINGS

Applicable to: AEROSOFT

In the Connected Flight Deck menu found in MCDU2 (where the CFD connection is established), two options are available: Sync Displays and Sync Overlays.

Sync Displays controls whether ND range and EFIS option settings are synchronised.

Sync Overlays controls whether the Terrain or WX Radar controls are synchronised between pilots: i.e. if **Sync Overlays** is turned on then one pilot selecting the **TERRAIN** switch to **on** will switch the Terrain display on for **both** pilots. With Sync Overlays turned off, each pilot will have individual control over terrain and WXR display settings. **Note: no display data is synchronised. Even with Sync Overlays ON, it is possible that each pilot will see e.g. slightly different WXR pictures.**

Recommendation

- It is recommended that both options are turned **off** as this gives each pilot independent control over their own navigation display range and EFIS options, as in the real aircraft.

PUSHBUTTON/TOGGLE SWITCH USAGE

Applicable to: AEROSOFT

It should be remembered that the Connected Flight Deck function requires data to be sent across the Internet, possibly over hundreds or even thousands of miles between pilots. This process, whilst highly efficient for the most part, is by its very nature prone to occasional latency and packet loss issues.

For this reason, just as in the real aircraft all actions on pushbuttons and toggle switches should be carried out methodically and deliberately. In particular, one should take care over MCDU inputs to ensure that characters are transmitted correctly as errors can cause a loss of route or performance data synchronisation and, in the worst case, cause the other party's FS to crash.

Recommendation

- It is recommended that all MCDU button presses should be carried out with the mouse, rather than with the Keyboard Input function
- Perform all MCDU key inputs and button presses slowly and deliberately, and communicate with the other pilot to ensure that button presses are being received correctly
- Avoid rapid selections across multiple switches or pushbuttons; work slowly and deliberately

VATSIM/IVAO NETWORK CONNECTION

Applicable to: AEROSOFT, VATSIM, IVAO

Currently, the shared cockpit implementation on VATSIM requires one party to connect to the network as an "Observer".

The "Observer" (who has ticked "Connect in Shared Cockpit Mode" in the vPilot connection window) will have full access to both transmit and receive voice, and may transmit and receive private text messages. However, they will be unable to transmit text messages on the open ATC frequency. Nor will they be able (or need) to file an ATC flight plan.

The other pilot who is logged in normally will have full access to all communication facilities and should file the ATC flight plan.

Recommendation

- The Pilot Flying for the sector should log in as Observer and append an "A" to their callsign
- The Pilot Monitoring for the sector should log in as normal and file the ATC flight plan

COMPANY ROUTE USAGE

Applicable to: ALL

To ensure synchronisation of route data, it is highly recommended that a Company Route file should be generated as part of the flight planning process and shared between the pilots. The pilot performing the MCDU setup should enter the Company Route identifier on the INIT A page and allow this to autofill the departure and destination fields.

This is because it is button presses, and not data that is synchronised between the MCDUs. Therefore, if one pilot has multiple Company Routes installed for a particular sector and another has only one, entering the departure and destination ICAO on INIT A will present an option to select a Company Route on the left hand LSKs. If the two pilots do not have exactly the same Company Routes installed and displayed in exactly the same order, selecting LSK1 (for example) on one MCDU may result in a different route, or no route at all, being loaded in to the other pilot's MCDU. Entering the Company Route identifier directly in to the INIT A page avoids this.

Recommendation

- The pilot responsible for flight planning should generate an Airbus Company Route (e.g. using Simbrief or PFPX) and share this with the other pilot prior to loading FS
- Company Routes should always be loaded by entering the Company Route identifier directly in to the MCDU, rather than by entering the departure and destination ICAO identifiers and selecting the Company Route via the left-hand LSKs

CONNECTED FLIGHT DECK CONNECTION CHECKLIST

Applicable to: AEROSOFT

INITIAL CONFIGURATION

Verify ports 6881 and 6882 (TCP and UDP) are forwarded to your Flight Simulator PC using [Simple Port Tester](#).

FLIGHT PLANNING

CIRRUS GENERATE (e.g. Simbrief/PFPX)
Email/Dropbox CIRRUS to other pilot

AIRBUS COROUTE FILE GENERATE (e.g. Simbrief/PFPX)
E-mail/Dropbox to other pilot
Coroute files (*.flp) are normally installed in to Documents\Aerosoft\Airbus\FlightPlans folder.

VPILOT/FSINN FLIGHT PLAN FILE GENERATE (e.g. Simbrief/PFPX)
E-mail/Dropbox to other pilot

SCENERY DISCUSS
Best results will be obtained if both pilots have the same scenery for dep/arr airfields.

CREW ASSEMBLY

Aim to meet on Teamspeak around STD -40 to STD -60.

DO NOT START FS YET

IP ADDRESSES EXCHANGE
Both pilots must enter the other pilot's IP address in to the Aerosoft Airbus Configurator programme prior to starting FS.

AIRCRAFT TYPE CONFIRM
Both pilots must be using the same type (i.e. A318/A319/A320/A321) and livery/registration

STAND NUMBER CONFIRM

NAVDATA DISCUSS
Identify the Navdata provider & AIRAC cycle each pilot is using & discuss potential conflicts.

START STATE CONFIRM
Recommend using the Turnaround state.

FS LOAD
Start FS and load appropriate model at the agreed departure stand.

AIRCRAFT STATE SELECT
Select previously agreed aircraft state from MCDU2 menu. Allow a few moments for the aircraft to settle down and properly initialize before attempting a connection.

Do not adjust any switches or values in the cockpit prior to connection.

CONNECTION INITIATE
PF SELECT MASTER, then ON in CFD MCDU2 menu
When confirmed on:
PM SELECT SLAVE, then ON in CFD MCDU2 menu

Verify CONN OK displayed in green.

INTENTIONALLY BLANK