

A320 Abnormal Procedures

Last Updated: **29th APR 2025**

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USING THE MEL

HOW TO USE THE MEL ENTRIES SECTION?

Applicable to: ALL

This section lists all the ECAM alerts. The ECAM monitors the condition of some systems. In the case of malfunction of one or more systems, the ECAM provides the flight crew with an associated ECAM alert. Refer to MI-00-08 ECAM and MAINTENANCE STATUS.

For each ECAM alert, this section indicates the associated MEL item (if any) to be applied for the dispatch.

AIRCRAFT STATUS COLUMN

An ECAM alert may cover one or several failure modes of the monitored system.

For each failure mode, the AIRCRAFT STATUS column may indicate the following status:

- **NIL** : When there is only one failure mode, the AIRCRAFT STATUS column indicates NIL.

<i>ECAM Alert: AIR PACK 1(2) OVHT</i>	
AIRCRAFT STATUS	CONDITION OF DISPATCH
<i>NIL</i>	<i>Refer to Item 21-52-01 Air Conditioning Pack</i>

When there are several failure modes, the AIRCRAFT STATUS column might give a short description of each failure mode and/or a simple way to identify each failure mode. If the MEL does not give this information, the column displays NIL.

<i>ECAM Alert: AIR PACK 1(2) REGUL FAULT</i>	
AIRCRAFT STATUS	CONDITION OF DISPATCH
If pack ram air inlet flap is affected	<i>Refer to Item 21-52-02 Air Conditioning Pack Ram Air Inlet Flap</i>
If pack controller, pack anti-ice valve or water exchanger temperature sensor are affected	<i>Refer to Item 21-61-02 Pack Controller Primary Channel</i>
If turbine bypass valve is affected	<i>Refer to Item 21-61-01 Pack Turbine Bypass Valve</i>

- Actual alert : This indicates that the monitored system is inoperative. The failure mode is the failure of the monitored system.
- False alert : This indicates that the monitoring system is inoperative. The failure mode is the failure of the monitoring system. The monitored system remains fully operative.

<i>ECAM Alert: CAB PR SAFETY VALVE OPEN</i>	
AIRCRAFT STATUS	CONDITION OF DISPATCH
Actual alert	<i>Refer to FCOM/PRO-SPO-20-FLIGHT WITHOUT CABIN PRESSURIZATION</i>
False alert	<i>Refer to Item 21-09-03 CAB PR SAFETY VALVE OPEN Alert</i>

The PIAC is responsible for identifying the failure mode.

CONDITION OF DISPATCH COLUMN

For each failure mode, the CONDITION OF DISPATCH column gives the applicable MEL item(s) for dispatch. **But the flight crew is responsible for checking that the condition of the aircraft systems/components complies with the MEL requirements. If not, the dispatch of the aircraft is not permitted.**

The CONDITION OF DISPATCH column may also give the following alternate possibilities:

- NO DISPATCH : It is not permitted to dispatch the aircraft when the ECAM displays this alert.
- Not related to MEL : The ECAM alert does not report a system failure but a reversible abnormal condition such as the state of a system or an aircraft configuration or an external condition. This condition is not a system failure and is not related to MEL. The MEL shall not be used. This is not a NO-GO situation. The corrective action to revert to normal condition is immediate, obvious or well known by flight crew and/or maintenance personnel.

ECAM Alert: ELEC BAT 1(2) OFF

AIRCRAFT STATUS	CONDITION OF DISPATCH
<i>NIL</i>	Not related to MEL

ECAM Alert: ENG 1(2) SHUT DOWN

AIRCRAFT STATUS	CONDITION OF DISPATCH
<i>NIL</i>	Not related to MEL

Example

A320 MINIMUM EQUIPMENT LIST	MEL ENTRIES FUEL
---------------------------------------	---------------------------------------

*ECAM Alert: **FUEL L(R) WING TK LO LVL***

AIRCRAFT STATUS	CONDITION OF DISPATCH
Actual alert	NO DISPATCH
False alert	<i>Refer to Item 28-46-04 Low Level Detection System in the Inner/Wing Tank</i>

After Checking the MEL Entry, you refer to MEL Item for dispatch if it is allowed e.g. in this case once it has been determined that the alert is not real only then you go to item 28-46-04, not otherwise.

A320 MINIMUM EQUIPMENT LIST	MEL ITEMS FUEL TANK LEVEL SENSING
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28-46-04	Low Level Detection System in the Inner Tank
-----------------	---

28-46-04A

Repair interval	Nbr installed	Nbr required	Placard
C	2	1	No

One may be inoperative.

Some items have operational and maintenance procedures like the one mentioned below:

32-42-01	Main Wheel Brake
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_____ Reference(s) _____

- (o)** Refer to OpsProc 32-42-01A Main Wheel Brake
- (m)** Refer to AMM Task 32-42-00-040-003

In this case after checking the MEL item you go to the operational procedures section:

A320 MINIMUM EQUIPMENT LIST	MEL OPERATIONAL PROCEDURES LANDING GEAR NORMAL BRAKING
---------------------------------------	--

32-42-01A	Main Wheel Brake
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FLIGHT PREPARATION/LIMITATIONS

Maximum landing capability is CAT 3 Single.

MALFUNCTION PROTOCOL

1. Failure Confirmation.
2. Procedure Application.
 - OEB YES:
 - OEB Procedure > Step 3.
 - OEB NO:
 - ECAM YES
 - ECAM Procedure > Step 3.
 - ECAM NO
 - QRH / FCOM Procedure > Step 3.
3. Situation Assessment.
4. Decision Making.
5. Information Transfer:
 - ATC
 - Company
 - Cabin Crew
 - Passengers
6. Decision Execution.

APPLICATION OF OEBs


Operations Engineering Bulletins (OEBs) are given in the OEB section of QRH. The ECAM entry field of the OEB highlights the condition when ECAM must be disregarded. Instead of ECAM, OEB procedure is applied.

A318/A319/A320/A321 QUICK REFERENCE HANDBOOK	OPERATIONS ENGINEERING BULLETINS LIST OF EFFECTIVE OPERATIONS ENGINEERING BULLETIN	OEBPROC 1/2
		19 APR 17

Identification	Title
OEB47 Issue 2	HYD ENG PUMP LO PR followed by a HYD RSVR OVHT <u>ECAM Entry</u> HYD G ENG 1 PUMP LO PR followed by a <u>HYD Y RSVR OVHT</u>

HYD ENG PUMP LO PR FOLLOWED BY A HYD RSVR OVHT
<p><u>ECAM ENTRY</u></p> <p>HYD G ENG 1 PUMP LO PR followed by a <u>HYD Y RSVR OVHT</u></p> <p><u>PROCEDURE</u></p> <ul style="list-style-type: none"> • If a <u>HYD G ENG 1 PUMP LO PR ECAM</u> caution is followed by a <u>HYD Y RSVR OVHT ECAM</u> caution, disregard the <u>HYD Y RSVR OVHT ECAM</u> procedure, and apply the following procedure to stop the <u>overheat situation</u>:
<u>HYD Y RSVR OVHT</u>
<p>PTU.....OFF</p> <p>YELLOW ENG 2 PUMP.....KEEP ON</p>

ECAM TASKSHARING

PF	PM
First pilot who notices MASTER WARNING/CAUTIONRESET	
For each ECAM procedure:	
<p>OEB..... CONSIDER</p> <p>'ECAM ACTIONS'.....ORDER</p> <p style="text-align: center;">Apply the Tasksharing Rules and Communication for Abnormal Operations <i>Refer to AOP-20 General</i></p> <p>ECAM ACTIONS PERFORMED.....CHECK "CLEAR (name of the system)"..... CONFIRM</p>	<p>"Title of failure"..... ANNOUNCE ECAM.....CONFIRM</p> <p><i>The PM should check/inspect the overhead panel and/or associated SD, in order to analyze and confirm the failure, before they take any action. The flight crew should keep in mind that the sensors on the overhead panel and/or SD may be different from the sensors that trigger the failure.</i></p> <p>ECAM/OEB ACTIONS.....PERFORM "CLEAR (name of the system)?"..... REQUEST</p> <p>CLR pb..... PRESS <i>Before the PM presses the CLR pb, the flight crew should carefully check that all actions have been performed.</i></p>
For each System Display (SD) page:	
<p>SD page..... ANALYZE</p> <p>"CLEAR (name of the system)"..... CONFIRM</p>	<p>"CLEAR (name of the system)?"..... REQUEST</p> <p>CLR pb..... PRESS</p>
When STATUS page appears:	
<p>"STOP ECAM".....ORDER</p> <p>Consider any normal C/L, system reset¹, or any additional procedure, as applicable</p> <div style="text-align: center;">  <p>Checklist Procedure Reset</p> </div> <p>"CONTINUE ECAM".....ORDER "REMOVE STATUS"..... CONFIRM</p>	<p>"STATUS"..... ANNOUNCE</p> <p>ECAM ACTIONS..... STOP</p> <p>STATUS.....READ <i>The procedures associated with the STATUS should be previewed to evaluate the associated workload. They should be performed at the appropriate flight phase.</i></p> <p>"REMOVE STATUS?".....REQUEST</p> <p>STS pb..... PRESS "ECAM ACTIONS COMPLETED".....ANNOUNCE</p>

1. For a system reset refer to "QRH Abnormal & Emergency procedures – System Resets". CPR is just to remember the items to consider, the sequence remains checklist > reset > additional procedure.

* Announcing LAND ASAP color on ECAM while reviewing inoperative systems e.g., LAND ASAP "AMBER" or LAND ASAP "RED" will give a hint to change the MAYDAY to PANPAN or vice versa if required.

NO ECAM FAILURES



Some failures or conditions have no ECAM warnings and procedures e.g., a “Display Unit Failure.” In the scenario depicted above, the captain’s DU failure has shifted his PFD automatically on his ND. There will be no ECAM in this case. Apparently, the situation looks easily manageable as all required information is available for the flight. However, you will have to check the QRH as “Display Unit Failure” is covered under Abnormal and Emergency Procedures > EIS. Same would be the case for many other conditions which have no ECAM procedures. Be conversant with your QRH & FCOM and consult them after malfunctions.

SITUATION ASSESSMENT

After reviewing the status page for failures and their consequences, carry out an assessment for:


1. Continuing to Destination:

- Cruise:
 - Equipment Required: RVSM, PBN, ETOPS (FCOM Special Operations).
 - Weather – Enroute.
 - Fuel – Trip.
- Arrival:
 - Equipment Required: PBN (FCOM Special Operations).
 - Weather – Vicinity.
 - Fuel – Reserves.
- Landing:
 - Equipment Required: Narrow Runways (FCOM Special Operations).
 - Weather – Aerodrome Operating Minima & Runway Surface.
 - Performance – Landing Distance Calculations & Limitations.

2. Unable to Continue to Destination:

- Based on above assessment the choices are:
 - A. Destination Alternate (as per flight plan).
 - B. Enroute Alternate (select after considering following factors):
 - i. Aircraft: Fuel & Maintenance.
 - ii. Passengers: Medical Support & Logistics.
 - iii. Crew: FDTL & Crew Availability.
 - C. Holding (if possible, for the best aerodrome selection).

DECISION, INFORMATION AND EXECUTION

<p>DECISION MAKING</p>		<ul style="list-style-type: none"> • Settle a consensus before deciding. • Decision to be endorsed by the captain. 												
<p>INFORMATION TRANSFER</p>														
	<p>ATC</p>	<ul style="list-style-type: none"> • Use DISTRESS (MAYDAY) or URGENCY (PAN) call as required. • Request shorter vectors / holding etc. • Request for ground assistance e.g., fire tender etc. 												
	<p>COMPANY</p>	<ul style="list-style-type: none"> • Inform company about the situation and intentions. 												
	<p>CABIN CREW</p>	<p>Captain will say over the PA “LCC (Lead Cabin Crew) TO THE FLIGHT DECK IMMEDIATELY”. Then tell him: “THIS IS A NITS DRILL PLEASE LISTEN CAREFULLY”</p> <table border="1" data-bbox="518 1153 1449 1473"> <tr> <td>NATURE</td> <td>→</td> <td>Nature of the Emergency, i.e. engine fire, decompression, technical problem</td> </tr> <tr> <td>INTENTION</td> <td>→</td> <td>Intention of the Captain, i.e. whether to make an emergency landing or ditching, whether to divert, continue or return to base</td> </tr> <tr> <td>TIME</td> <td>→</td> <td>Time remaining airborne, i.e. Time available or Time – Short Notice</td> </tr> <tr> <td>SPECIAL INSTRUCTIONS</td> <td>→</td> <td>Special instructions given by the Captain, i.e. any know factors affecting evacuation and exits to be used.</td> </tr> </table> <ul style="list-style-type: none"> • Captain’s briefing will be acknowledged by repeating back the NITS. • Watches must be synchronized. 	N ATURE	→	Nature of the Emergency, i.e. engine fire, decompression, technical problem	I NTENTION	→	Intention of the Captain, i.e. whether to make an emergency landing or ditching, whether to divert, continue or return to base	T IME	→	Time remaining airborne, i.e. Time available or Time – Short Notice	S PECIAL INSTRUCTIONS	→	Special instructions given by the Captain, i.e. any know factors affecting evacuation and exits to be used.
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<p>PASSENGERS</p>	<p>Inform them about what is going on and reassure them.</p>													
<p>DECISION EXECUTION</p>		<p>Plan the flight and fly the plan.</p>												

HANDLING ADVISORIES

- The flight crewmember that first notices an advisory announces “ADVISORY on XYZ system”.
- Then, PF requests PM to monitor the drifting parameter.
- If time permits, PM may refer to the QRH – Abnormal & Emergency Procedures – ECAM Advisory:
 - To check advisory triggering conditions.
 - To find the recommended actions.

ABNORMAL AND EMERGENCY PROCEDURES		01.01A
A318/A319/A320/A321 QUICK REFERENCE HANDBOOK		05 SEP 17
ECAM ADVISORY CONDITIONS		
SYSTEM	CONDITIONS	RECOMMENDED ACTION
CAB PR	CAB VERTICAL SPEED V/S > 1 800 ft/min	CPC changeover is recommended: MODE SEL: MAN Wait 10 s then: MODE SEL: AUTO
	CAB ALTITUDE altitude ≥ 8 800 ft	PACK FLOW: HI MODE SEL: MAN Manual pressure control
	ΔP ≥ 1.5 PSI in phase 7	LDG ELEV : ADJUST If unsuccessful: MODE SEL: MAN Manual pressure control

RED AND AMBER LAND ASAP

Red **LAND ASAP** information is applicable to a time-critical situation. If it is part of the procedure, land as soon as possible at the nearest airport at which a safe landing can be made. If amber **LAND ASAP** is part of the procedure, consider landing at the nearest suitable airport. The suitability criteria should be defined in accordance with the Operator's policy.

ADEQUATE AND SUITABLE AIRPORT

An airport is considered “**Adequate**” by Operator and agreed with the national authority based on the aeroplane performance requirements applicable at the expected landing weight. Following consideration should be met at the expected time of use:

- a. Availability of airport.
- b. Adequate runways length
- c. Over flying and landing authorizations.
- d. Capability of ground operational assistance.
- e. ATC, MET, AIS offices, lighting, rescue and fire-fighting category.
- f. At least one let-down NAVAID must be available for instrument approach (ILS, VOR, NDB).
- g. No provision is made for the meteorological conditions that may prevail at adequate airports, however, good airmanship demands that the forecasts for any adequate intermediate airfields be checked at the planning stage and monitored during flight if marginal.

“**Suitable**” airport is an adequate airport with weather reports or forecast or any combination thereof indicating that the weather conditions are at or above operating minima as specified in the operations specification and the field condition report indicates that a safe landing can be accomplished at the time of the intended operations e.g. an adequate airport which satisfies ETOPS/EDTO weather minima requirements in terms of ceiling and visibility within a validity period (1 hour before earliest ETA and 1 hour after latest ETA) becomes a suitable airport.

ENGINE START MALFUNCTIONS

1) Engine Start Fault (Hot or Hung Start)

- In auto mode FADEC handles it.
- In hot start you can see EGT going up and down and fuel flow going to zero during auto restart attempts.
- In hung start N1, N2 is hung below idle parameters.
- No action is required until the ECAM advises to switch off the affected engine's master switch.
- In some simulators, a hung start results in an ECAM fault after 2 minutes, whereas in others, it does not.
- Call for any OEBs > ECAM Actions > Review STATUS page > Complete ECAM > Check MEL Entries:

ECAM Alert: ENG 1(2) START FAULT	
Ident.: ME-70-00008379.0001001 / 03 MAY 17	
Applicable to: ALL	
AIRCRAFT STATUS	CONDITION OF DISPATCH
If the associated THR LEVER NOT AT IDLE subtitle is displayed	Apply ECAM procedure.
NIL	Refer to FCOM/PRO-NOR-SUP-ENG Manual Engine Start - General

- Then FCOM > Normal Procedures > Supplementary Procedures > ENG > Manual Engine Start.

For Supplementary Procedures, if the procedure is related to engine start, it is recommended to read the entire procedure first, and then: The PM reads the actions, and The PF acts on the controls. For all other supplementary procedures, the procedures should be applied in accordance with the READ & DO principle, i.e., the PM reads the procedure and the PF or the PM acts on the controls, depending on the context.

2) Start Valve Failure During Second Engine Start

- Engine 2 started successfully.
- Engine 1 start attempt during pushback.
- Start valve does not open.
- Carry out ECAM Actions > Review STATUS page > Complete ECAM.
- Inform ground and ATC (since you will be holding position for some time to carry out a procedure).
- Check MEL Entries:

ECAM Alert: ENG 1(2) START VALVE FAULT	
Ident.: ME-70-00008381.0001001 / 18 JUL 12	
Applicable to: ALL	
AIRCRAFT STATUS	CONDITION OF DISPATCH
NIL	Refer to Item 80-11-01 Start Valve

- Do the procedure once pushback is completed and aircraft is stationary.
- As guided by MEL, carry out FCOM > Normal Procedures > Supplementary Procedures > ENG > Engine Start Valve Manual Operation
- The procedure has the following warning in it:

WARNING To ensure safety of the ground crew when starting an engine with manual operation of the start valve, the flight crew should start the affected engine first.

- Since No 1 engine is the affected engine, it has to be started first, so shut down engine no 2 first.
- Then start engine no 1 as directed by the procedure.
- After starting engine 1, start engine 2 again.

3) APU Shutdown during Engine Starting

- After EGT rise the tendency is to monitor EGT and N1 only as other parameters like start pressure, start valve, N2, ignition and fuel flow have already been monitored, assuming them to be functioning normally. However, at this stage if one engine is already running and APU shuts down, electrical supply will be normal but start pressure will begin dropping giving the appearance of a hung start like condition. For trouble shooting, always start from bottom upwards and you will find that there is no start pressure due to APU malfunction.

REJECTED TAKEOFF

Before 100 knots (Less serious. Abort is at Captain's discretion depending on the circumstances)
Any ECAM Warning / Caution.
Between 100 knots & V1 (More Serious. Be go minded except for a few situations, as mentioned below)
Any ECAM is triggered
Fire warning
Sudden loss of engine thrust
Severe damage
Malfunctions / Conditions indicating that aircraft will not fly safely
Windshear
Note:
Exceeding EGT red line or nose gear vibration: Should not result in an abort above 100 knots ¹ . Below 80 knots, EGT over limit will trigger an ECAM & takeoff can be aborted but above 80 it is inhibited. EGT can exceed red line above 80 knots but do not reject takeoff above 100 knots. ECAM procedure should be applied after lift-off when appropriate flight path is established and aircraft is at least 400 ft AGL. Read more on why you can continue even if EGT exceeds the red line .
Tire failure within 20 knots of V1: Unless debris from tire causes noticeable engine parameter fluctuation, takeoff, reduce fuel load & land with full RWY length available.

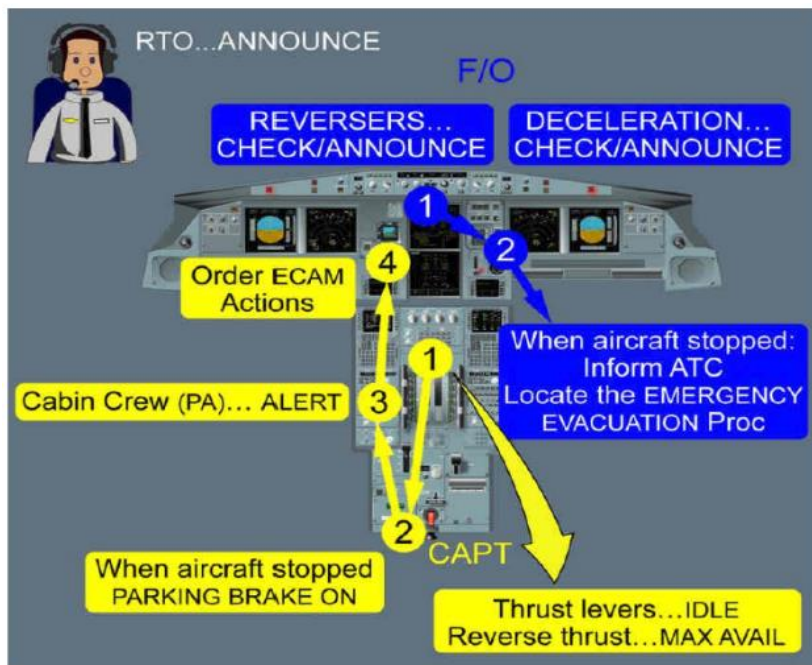
1. FCTM > Abnormal and Emergency Procedures > MISC > Rejected Takeoff.

PROCEDURE DURING A REJECTED TAKEOFF

CAPT	F/O
"STOP" ANNOUNCE	
Simultaneously:	
THRUST LEVERS..... IDLE	
REVERSE THRUST..... MAX AVAIL.	REVERSERS..... CHECK/ANNOUNCE
	DECELERATION.....CHECK/ANNOUNCE
	ANY AUDIO..... CANCEL
Aircraft stopped	
Consider positioning the aircraft to keep any possible fire away from the fuselage.	
REVERSERS..... STOWED	ATC..... NOTIFY
PARKING BRAKE..... ON	EMER EVAC Procedure (QRH)..... LOCATE
CABIN CREW..... ALERT	
ECAM ACTIONS..... ORDER	ECAM ACTIONS..... PERFORM
The aircraft should remain stationary while the crew evaluates the situation.	

Note:

- Standard call for alerting the Cabin Crew is "ATTENTION CREW AT STATIONS." It lets cabin crew know the flight crew is not incapacitated and that they are performing actions to determine if evacuation is required.
- While locating the EMER EVAC procedure (QRH) make sure the dome light is ON.



EMERGENCY EVACUATION

The decision to evacuate is irreversible and can have severe consequences. The main factors that result in the crew initiating an emergency evacuation are uncontrollable fire, thick smoke, and severe structural damage.

1. Read and do by F/O.
2. Captain's Call - ATTENTION CREW AT STATIONS
Done at the time when parking brake is set.
3. F/O does not need any confirmation from Captain.
4. If EVACUATION REQUIRED (Captain's Items):

- **ASSESS** – Use any possible means to get a clear and comprehensive overview of the situation e.g. direct communication with any relevant person like cabin crew, ATC, ground personnel, Rescue and Fire Fighting Services etc.

- **CALL** – CREW & PASSENGERS EVACUATE, EVACUATE, EVACUATE

- **ACTIVATE** – The EVAC command

Even if cabin crew can initiate evacuation, they must try to contact flight crew first to avoid any unnecessary evacuation.

- **ATC** – Advise.

- **BRIEFING TO F/O** – On battery power, seats can only be operated mechanically. Help the cabin crew and guide passengers away. Keep them gathered in front of the aircraft nose at a safe distance, upwind and clear of danger. I will check the cabin so that no is left behind and will be the last one to leave.

5. If EVACUATION NOT REQUIRED (Captain's Items):

- **ASSESS** – Use any possible means to get a clear and comprehensive overview of the situation e.g. direct communication with any relevant person like cabin crew, ATC, ground personnel, RFF Services etc.

- **CALL** – CREW and PASSENGERS REMAIN SEATED.

- **ATC** – Advise.

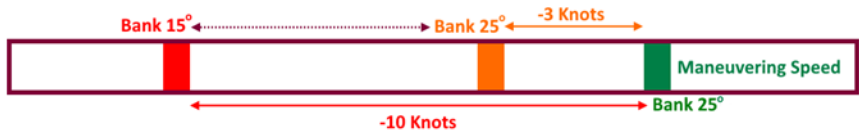
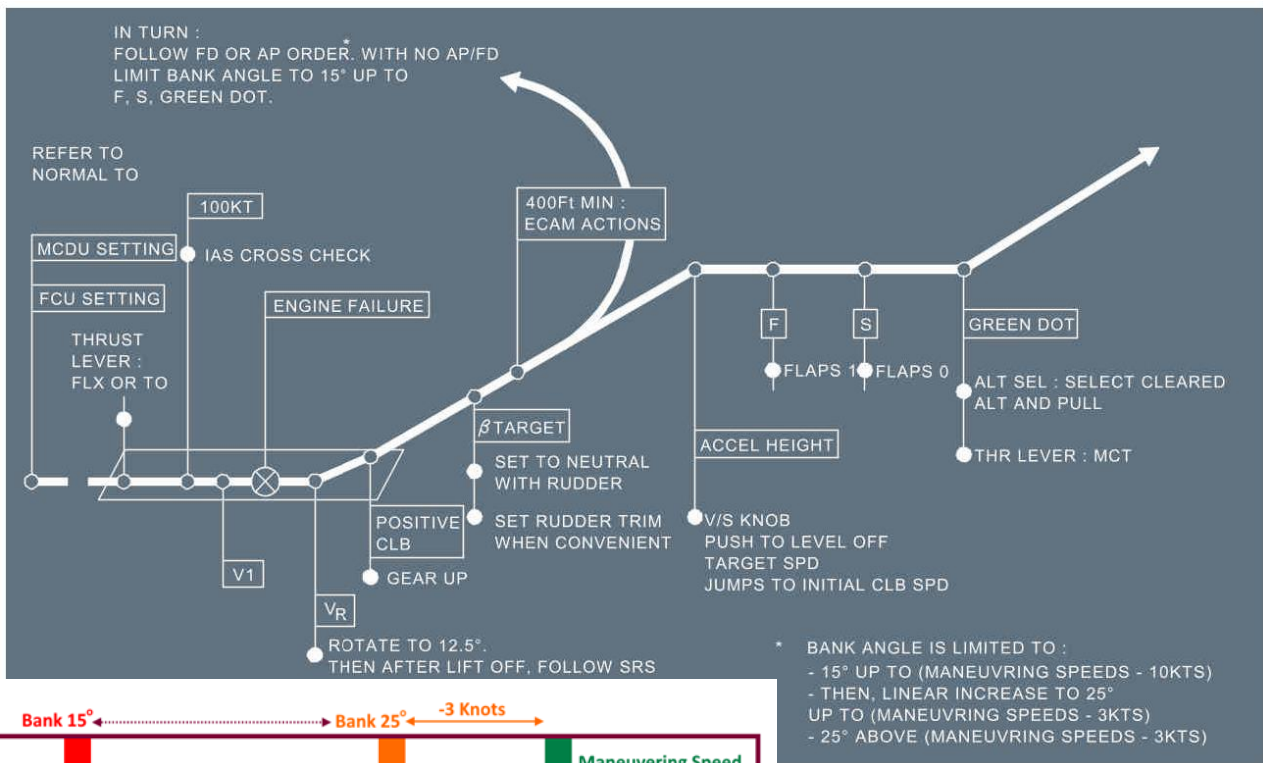
1 EMER EVAC	
AIRCRAFT / PARKING BRK.....	STOP / ON
ATC (VHF 1).....	NOTIFY
2 CABIN CREW (PA).....	ALERT
ΔP (only if MAN CAB PR has been used).....	CHECK ZERO
• If ΔP not at zero:	
CAB PR MODE SEL.....	MAN
V/S CTL.....	FULL UP
3 ALL ENG MASTERS.....	OFF
3 ALL FIRE pb (ENGs & APU).....	PUSH
ALL AGENTS (ENGs & APU).....	AS RQRD
4 ■ If evacuation required:	
EVACUATION.....	INITIATE
5 ■ If evacuation not required:	
CABIN CREW AND PASSENGERS (PA).....	NOTIFY



ENGINE FAILURE AFTER V1

	PF	PM
FLY THE A/C	FROM V1 TO 400 FT	
VR	Rotate to 12.5° pitch ¹	Call – ROTATE
Positive Climb	Call – GEARS UP	Call – POSITIVE CLIMB
	β Target – Zero Rudder – Trim ² Auto Pilot – ON Thrust – Consider TOGA ³	
SECURE THE ENG	FROM 400 FT TO ENG OUT ACC ALT ⁴	
400 Feet	Call – ECAM ACTIONS	Read – ECAM Title
		Do – ECAM Actions Call – ENGINE SECURED ⁵
Engine Secured	Call: <ul style="list-style-type: none"> PM – STOP ECAM ATC – PANPAN / MAYDAY 	
CLEAN UP	FROM ENG OUT ACC ALT TO GREEN DOT SPEED	
ENG Out ACC ALT	Push to Level OFF	
F Speed	Call – CONF 1	Call – F SPEED
S Speed	Call – FLAPS 0	Call – S SPEED
Green Dot Speed	Select: <ul style="list-style-type: none"> OP CLIMB ⁶ MCT ⁷ 	
FINISH ECAM	AFTER GREEN DOT SPEED	
	<ul style="list-style-type: none"> Continue ECAM At STATUS, stop ECAM and carryout/review <u>Checklists</u>, <u>Resets</u>, <u>Procedures</u>. ⁸ Then continue with STATUS review and complete the ECAM Actions Carry out the assessment, decision & information protocol and execute the plan. In case of land back check the latest weather and type of approaches. Prepare accordingly. 	

1. When safely airborne, follow SRS orders.
2. Reset rudder trim in later phase of approach, before thrust reduction. With zero trim, anticipate increased rudder force. With zero trim, neutral rudder pedal position corresponds to zero rudder & zero nose wheel deflection.
3. For a derated takeoff, do not apply asymmetric TOGA thrust if the speed is below F, due to VMCA considerations.
4. Min 1500 ft AGL if engine is secured. Between 1500 ft and Max EO ACC ALT subject to securing the engine.
5. Delay acceleration for securing engine. Engine is considered secured when ECAM actions are performed until: "ENG MASTER OFF" for an engine failure without damage, "AGENT 1 DISCH" for an engine failure with damage, Fire extinguished or "AGENT 2 DISH" for an engine fire. However, do not exceed the engine out maximum acceleration altitude (which corresponds to maximum altitude that can be achieved with one engine out and the other engine operating at takeoff thrust for a maximum of 10 mins).
6. When speed trend arrow reaches Green Dot. Climb at green dot speed and request for altitude change if required.
7. If already in FLX/MCT gate, move to CL and then back to MCT.
8. Since there is no after TO checklist, a glance at ECAM memo after takeoff helps to verify if something was forgotten. There is no system reset but engine can be relighted (as mentioned on status page) if not damaged. Related procedures can be "One Engine Inoperative Straight-In or Circling Approach" in QRH (Abnormal & Emergency Procedures – ENG) OR "Overweight Landing" in QRH (Abnormal & Emergency Procedures – MISC) to be done at the appropriate stage.

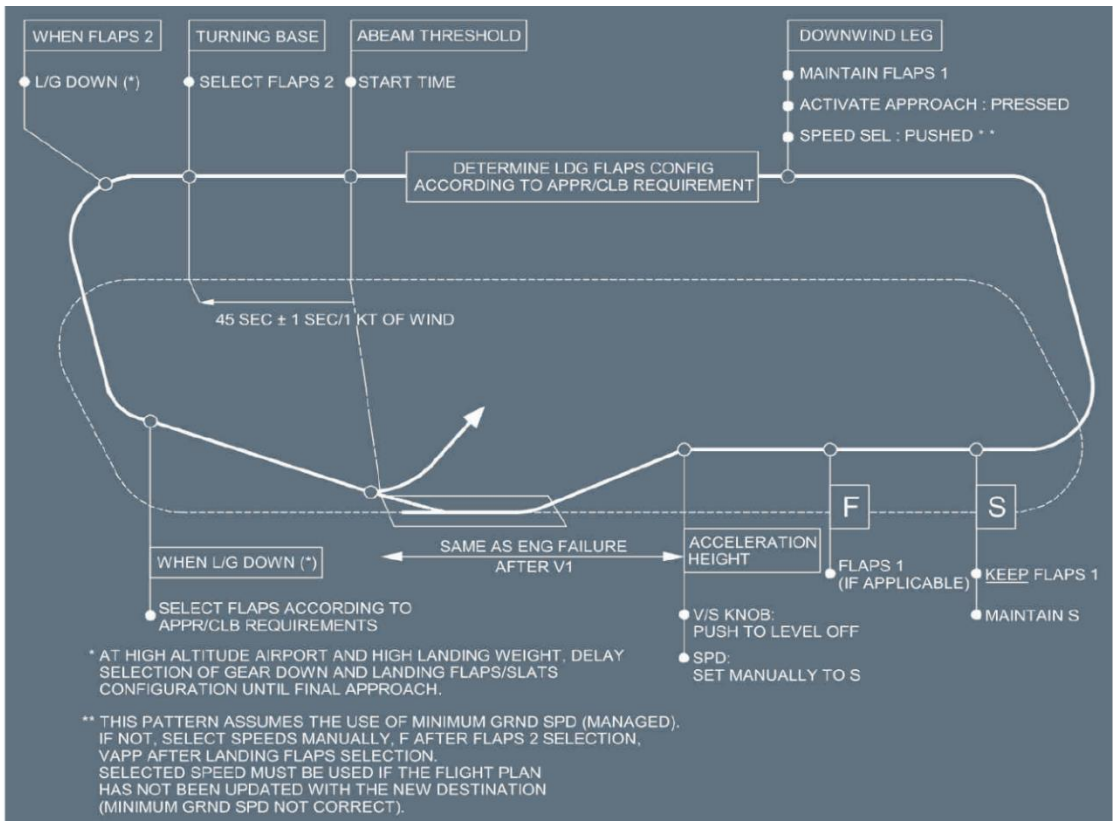


Engine Flameout without Damage: It can be detected by observing rapid decrease of N1, N2, EGT and FF.

Engine Flameout with Damage: Suspect engine damage if two or more of the following symptoms are observed:

- Aircraft vibrations and/or buffeting.
- Repeated, or not controllable engine stalls.
- Rapid increase of the EGT above the red line.
- Absence of rotation or mismatch of rotor speeds.
- Hydraulic system loss.

Immediate Visual Circuit to Land Following an Engine Failure on Takeoff



ENGINE FAILURE DURING CRUISE

Initial Actions

As soon as the engine failure is recognized, the PF simultaneously:

- Sets all thrust levers to MCT
- Disconnects A/THR ¹
- Sets a HDG as appropriate and pulls (towards an alternate or to keep clear of an airway etc.)
- Determines the engine out recovery altitude.
- When ready for descent:
 - SPEED – SET & PULL (According to Strategy ²).
 - ALTITUDE – SET & PULL (OPEN DES to Engine Out Recovery Altitude).
- ECAM/OEB actions.

1. THR is disconnected to avoid any engine thrust reduction when selecting speed according to strategy or when pulling for OPEN DES to initiate the descent. With A/THR disconnected, the target speed is controlled by the elevator when in OPEN DES.

2. Standard, Obstacle or Fixed Speed Strategy.



Standard Strategy

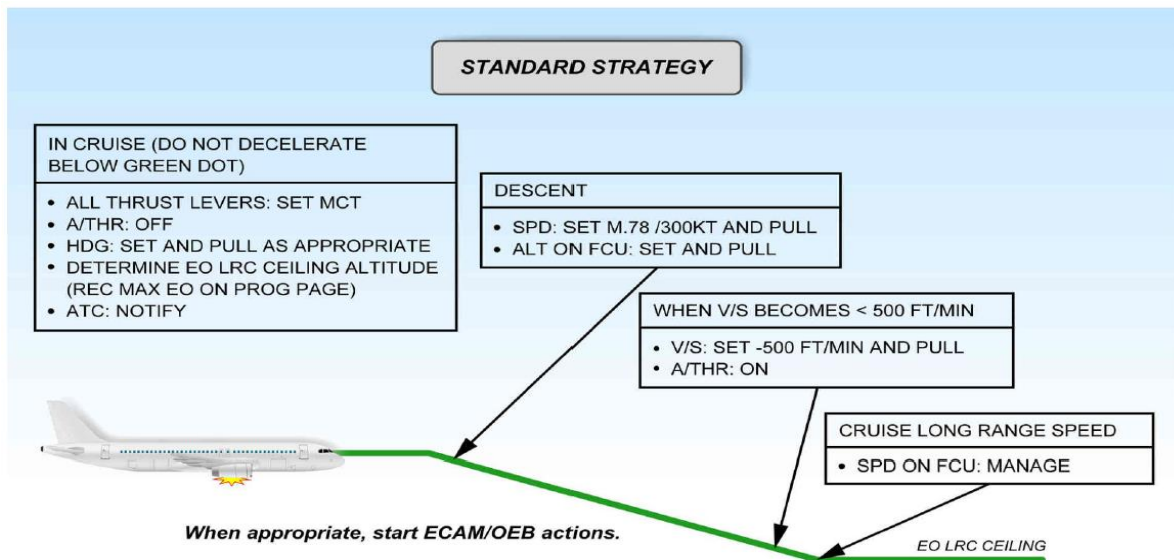
This is generally used unless a special procedure before dispatch has been established (e.g. ETOPS / Mountains etc.)

- Speed – 0.78 / 300 (stabilized windmill engine relight in-flight envelope)
- Descend – To REC MAX EO cruise altitude ¹
- V/S – Select V/S -500 if ROD < 500 ²
- A/THR – ON
- Level Off Altitude – LRC with 1 Engine Out ³

1. This equates to LRC with anti-icing OFF and should be set on FCU. Displayed on PROG page.

2. Likely to occur while approaching level off altitude.

3. Alternate source: Airbus Fly Smart Application.



Note: Pressing the EO CLR key on the MCDU restores the all-engine operative predictions and performance. Reverting to one engine-out performance again is not possible.

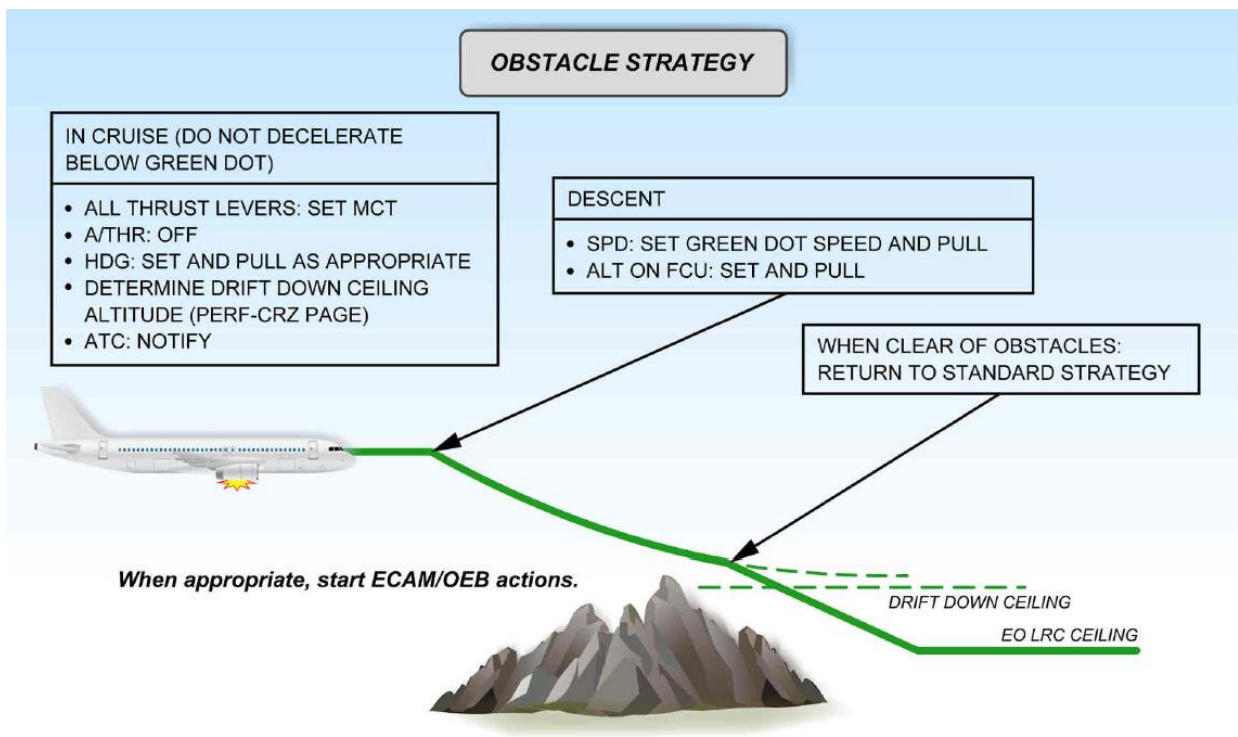
Obstacle Strategy

- Speed – Green Dot
- Descend – To Drift Down Ceiling ¹
- At Drift Down Ceiling – Check Obstacles
 - Not Clear of Obstacles
 - Maintain Drift Down Procedure ²
 - Clear of Obstacles (revert to standard strategy)
 - Ceiling – Set LRC Ceiling on FCU ³
 - Speed – LRC Speed
 - A/THR – Engage

1. Displayed on PERF CRUISE page in EO conditions. This should be set on FCU.

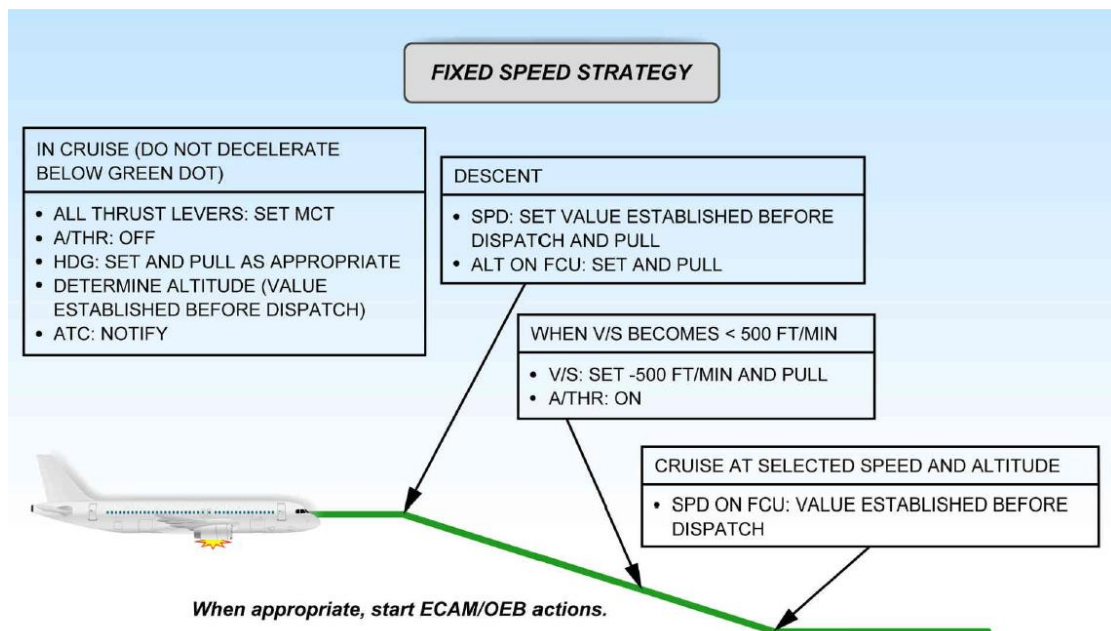
2. In order to fly an ascending cruise profile.

3. Alternate source: Airbus Fly Smart Application.



The Fixed Speed Strategy

This relates to ETOPS (FCOM PRO-SPO - Extended Range Operations)



ENGINE FIRE INFLIGHT

- Start with ECAM actions.
- After setting the affected engine's thrust to idle and master switch to off, one engine becomes inoperative.
- That means two malfunctions have to be dealt with in parallel i.e. Engine Fire and Engine Failure.
- While PM handles the engine fire ECAM procedure, PF carries out the initial actions for engine failure.
- If flying at a level which is above "one engine inoperative ceiling" then drift down will be applicable. In this case disconnect the A/THR once thrust levers are set to MCT. Keep A/THR on if drift down is not applicable.

ONE ENGINE INOPERATIVE GO-AROUND

It is similar to a go-around flown with all engines. Some additional items to consider are:

- Thrust – On application of TOGA apply rudder promptly to keep beta target centered.
- Pitch – 12.5° if SRS is not available. SRS engages if flap lever is Flap 1 or greater, in that case follow SRS.
- Lateral FD Mode – GA TRK (or NAV) must be considered with respect to terrain clearance.
- Instead of thrust reduction at 1000 feet, climb to engine-out acceleration altitude (min 1500 feet AGL), accelerate, cleanup and then set MCT (i.e., same procedures that are applicable to engine failure after V1).

STALL RECOVERY

FAC 1 and 2 OFF will establish the alternate law. Stabilize at 10,000 feet in a clean configuration.

	PF	PM
Thrust Idle	Maintain Level	
Stall Warning	Call – STALL, I HAVE CONTROL Pitch – Slightly below Horizon ¹ Wings – Level	
Out of Stall ²	Thrust – Increase ³ Speed Brakes – Check Retracted Flaps 1 – If below 20,000 feet ⁴	Speed Brakes – Retract. Flaps 1 – Select
Out of VLS	Flight Path – Recover by increasing pitch ⁵	
S Speed ⁶	Call – FLAPS 0	Select – FLAPS 0
Approaching Level	Thrust and Speed – Adjust Level – Maintain	

1. *Approximately -5 degrees.*
2. *When there is no stall warning and speed is increasing.*
3. *Increase thrust as needed but very smoothly as it generates a pitch up tendency that must be avoided.*
4. *Maintain the pitch angle (approx. -5 deg) and avoid the aircraft pitch up tendency*
5. *Increase pitch smoothly (by slowly releasing the forward pressure on the stick instead of pulling it) to about 5-7°. Pitching up rapidly will give another stall warning which is to be avoided.*
6. *Any delay in retracting the flaps will give a VFE warning and pitching up quickly to avoid a VFE warning will generate a second STALL warning. So, in order to avoid both warnings be quick to respond and retract flaps when the speed trend arrow is touching the S speed and speed is close to it i.e. don't wait for S speed to be crossed.*

PRACTICING STEEP TURNS IN SIM

Altitude: Approx. 9000 feet. Weight: Approx. 60 tons. Target Bank Angle: 45°.

- Before Turning:
 - Speed: 250 knots.
 - N1: In some old machines about 68%, otherwise about 64%.
- After Initiating the Turn:
 - Pitch: Between 2.5 & 5° (if not using the bird).
 - N1: In some old machines increase by about 3-4% otherwise by 1-2%.

PREDICTIVE WINDSHEAR AT TAKEOFF

- Evaluate takeoff conditions by weather observation and experience.
- Delay takeoff.
- If taking off then select the most favorable runway considering wind shear location.
- Use weather radar / predictive windshear before takeoff to ensure flight path is clear.
- If suspecting Windshear – Set TOGA.
- If there is an aural alert “Windshear Ahead” before 100 knots – Abort.
- “Windshear Ahead” & “Monitor Radar” alert is inhibited when speed > 100 knots and height < 50 feet.
- Above 50 feet if there is a “Windshear Ahead” or “Monitor Radar Display” aural alert – Set TOGA.
- Configuration may be changed if windshear is not entered.
- If windshear is entered, follow reactive windshear procedure.

REACTIVE WINDSHEAR AT TAKEOFF

	PF	PM
In Windshear	Call – WINDSHEAR TOGA Thrust – TOGA Pitch – SRS ¹ Config – NO Change until out of W/S	Monitor and Call: ² <ul style="list-style-type: none"> • RA Height • Flight Path • A/C & Wind Speed Trend
Out of Windshear <i>Approx. 1300+ ft when Red WS Message on PFD Disappears</i>	Thrust – Climb ³ Pitch – Adjust ⁴ Flaps – Retract ⁵ Auto Flight – A/THR, AP, OP Climb ⁶	Configuration – Clean up Report to ATC: ⁷ <ul style="list-style-type: none"> • A/C Type • Windshear Height • Speed Loss

1. If a/c keeps on sinking, pull up to full aft sidestick. Once a/c starts climbing then again follow SRS. If speed trend increases rapidly towards VFE then disregard FDs and increase pitch to about 25° to bring the speed down. If speed is in VLS but aircraft is climbing then again disregard FDs and decrease pitch a little to increase speed. Basically, do not be glued to the FDs only, watch your speed too!

2. e.g., 500 feet descending, 600 feet climbing – Speed decreasing – Tailwind 70 knots etc.

3. Set CLB Thrust. Check FMA, if in TOGA LOCK then disconnect A/THR.

4. To approximately 10 degrees.

5. Be quick to retract flaps in order to avoid crossing the VFE limit. Also retract gears if they were extended.

6. If disconnected, re-engage A/THR & AP. Check FCU ALT to be greater than A/C ALT and select Open Climb.

7. For example “Airbus A320, encountered windshear at 200 feet, lost about 30 knots of speed”.

PREDICTIVE WINDSHEAR AT APPROACH AND LANDING

- Delay approach or Divert.
- If approach is continued then evaluate landing conditions by weather observation and experience.
- Select the most favorable runway considering appropriate approach aid.
- CONF 3 landing should be considered.
- Managed speed recommended (to take advantage of GS Mini function).
- VAPP may be increased by max VLS +15.
- In case of strong or gusty crosswind > 20 kt. Refer to QRH/PER-A [VAPP Determination without Failure](#)

TCAS EVENT

	PF	PM
Traffic Advisory	Call – TCAS, I HAVE CONTROLS	ATC – Inform
Resolution Advisory	<u>Climb RA in APP with CONF3 or FULL:</u> Go Around <u>All RAs other than above:</u> AP – OFF Call – FDs OFF Pitch – To Keep VSI in Green Band	FDs – Set Both OFF ATC Call – TCAS RA
Clear of Conflict	Pitch – 2.5° to Level OFF Call – FDs ON AP – ON ALT – OP CLB / DES ¹	FDs – Set Both ON ATC – Inform

1. Resume last ATC clearance. Get the required aircraft data from ATC for filing the ASR.

UPSET RECOVERY

NOSE HIGH

- AP & A/THR OFF if unable to prevent flight path divergence.
- Apply nose down pitch – incremental use of pitch trim if required – excessive use is prohibited.
- Use maximum thrust if low speed is a concern. Increasing thrust may limit nose down pitch control.
- If normal pitch control is ineffective then bank or maintain bank (less than 60°) to drop the nose.
- Avoid stall due to premature recovery in low speed conditions.
- Avoid excessive g-loading in high speed conditions.

NOSE LOW

- AP & A/THR OFF if unable to prevent flight path divergence.
- Recover from stall first if that is the case (might have to push down the nose a little initially).
- Roll to wings level and then pitch up (be gradual else the stall warning might come up).
- Control speed by reducing thrust and/or speed brakes if required.
- Avoid stall due to premature recovery in low speed conditions.
- Avoid excessive g-loading in high speed conditions.

GPWS EVENT

PF calls PULL UP TOGA and carries out the memory items. PM monitors RA, a/c trajectory and informs ATC.



EMERGENCY DESCENT *

* One toggle movement of MAN V/S CTL toggle switch equals a cabin rate of change of approx. +/- 50 fpm. Rely on CAB PR EXCESS CAB ALT ECAM warning, even if not confirmed on CAB PRESS SD page since the warning is triggered by a cabin pressure sensor, different from the one used to control pressure & display cabin altitude on SD.

PF	PM
Call – EMERGENCY DESCENT	
<ul style="list-style-type: none"> ① CREW OXY MASKSUSE ② EMER DESCENT INITIATE ALT TURN PULL HDC TURN PULL SPD 1 PULL ③ FMA ANNOUNCE ④ If A/THR is not active: THR LEVERS IDLE ⑤ SPD BRK 2 FULL 	<ul style="list-style-type: none"> ① CREW OXY MASKSUSE ② SIGNS ON ③ FMA CHECK <p style="text-align: right; color: yellow;">CALL PA + ATC</p>
<ul style="list-style-type: none"> • Select – Terrain on ND ³ • Set Level – FL100 / MEA ⁴ • Adjust – Heading • Select Speed – Max / Appropriate 	<p>PA Call – EMERGENCY DESCENT REMAIN SEATED</p> <p>ATC Call – MAYDAY EMERGENCY DESCENT</p>
Call for ECAM Actions	Do ECAM Actions

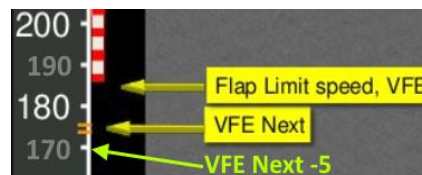
1. SPEED/MACH pb to SPEED, to prevent increase in IAS or to reduce speed. This minimizes stress on a/c structure.
2. Allow speed to increase before using speed brakes. At high flight levels, extend speed brakes while monitoring VLS to avoid activation of angle of attack protection which may result in retraction of speed brakes and AP disconnection.
3. For better situational awareness in reference to terrain in the area where you are descending.
4. MORA on ND is the highest MORA value within a radius of 40 NM around the aircraft.

EMERGENCY DESCENT – CONTINUED

PF	PM
At ALT* – Retract Speed Brakes	From ATC – Request Regional QNH / MSA
At Level OFF: <ul style="list-style-type: none"> • Check and Set Target Speed • Order PM to remove Oxygen • Ask PM How he/she is feeling 	At Level OFF: <ul style="list-style-type: none"> • Remove Oxygen Mask • Inform PF how you are feeling.
Remove Oxygen	
Close the Oxygen Mask Stowage Compartment Doors	
Press the PRESS TO RESET Oxygen control slide, to deactivate mask microphone, and to cut off oxygen	
Call – “LCC (Lead Cabin Crew) to Cockpit”	
Check Cabin status	
Carry out the assessment, decision & information protocol and execute the plan.	

ABNORMAL SLATS / FLAPS

- For any slats / flaps problem – Speed Pull.
- If this happens during approach – Delay the approach (enter hold etc.) to complete the ECAM procedure.
- Do the LANDING WITH FLAPS OR SLATS JAMMED QRH procedure.
- Set speed before moving flap lever. Target speed will be VFE Next -5.
- When speed is VFE Next, select flaps lever one step down.
- ECAM will determine the speed Increment to VREF.
- Add the speed increment to VLS of FULL Flaps (on APPR PERF page) and then enter it as VAPP.



Note: Make sure CONF FULL is selected while adding the increment to VLS and setting it as VAPP because VLS for CONF 3 is higher than FULL Flaps CONF.

- Select CONF 3 on APPR PERF page since landing in this case will be with Flaps 3.



- After Flaps 3, select VAPP and land.

DUAL HYDRAULIC (G+B) FAILURE

- **AVIGATE**: Speed selected at actual speed.
- **NAVIGATE**: Land ASAP.
- **COMMUNICATE**: May Day.
- Call for ECAM actions.
- After STATUS – Go to Dual Hydraulic QRH summary.
- The cruise part of the summary has reference for the Inflight Performance.
- For approach review ECAM status again and then QRH summary for approach, landing and go-around.
- Add the speed increment to FULL Flaps VLS on APPR PERF page and then enter it as VAPP.
- Select CONF 3 on APPR PERF page since landing in this case will be with Flaps 3.
- Ask for a longer final (15 miles would do) for slow configuration changes.
- Start configuring on the final track.
- Extend the landing gear at 200 knots to revert sooner in direct law. This provides, below 200 knots, a better pitch control than in alternate law with one elevator lost and all slats lost.
- Set speed before moving the flap lever. Target speed will be VFE Next -5 knots.
- When flaps 3 is selected – Select VAPP.
- A/THR OFF – As it may not satisfactorily maintain speed.

DUAL HYDRAULIC (G+Y) FAILURE

- Same concept and philosophy, however, in this case take gears at the end because the stabilizer is lost. In alternate law, the auto trim function is provided through the elevators. Landing gear extension activates the direct law, so auto trim function is lost. However, the mean elevator position at that time is memorized, and becomes the reference for centered sidestick position. This is why, in order to ensure proper centered sidestick position for approach and landing, the procedure requires to wait for stabilization at VAPP, before landing gear extension. If this procedure is missed, the flare and pitch control in case of go-around may be difficult. The PFD message USE MAN PITCH TRIM after landing gear extension should thus be disregarded.
- A/THR is not set to OFF in this case.

Remaining systems				
Flight phase	Systems	HYD G+B SYS LO PR	HYD G+Y SYS LO PR	HYD B+Y SYS LO PR
Cruise	Auto pilot	Inop	Inop	Inop
	Yaw damper	YD2 only	Inop	YD1 only
	Control law	ALTN LAW and DIRECT LAW when L/G DN	ALTN LAW and DIRECT LAW when L/G DN	NORM LAW
	Stabilizer	Avail	Inop ⁽¹⁾	Avail
	Spoilers	2 SPLRS/wing	1 SPLR/wing	2 SPLRS/wing
	Elevator	R ELEV only	Avail	L ELEV only
	Aileron	Inop	Avail	Avail

ENG 1+2 BLEED FAULT – OVERVIEW OF THE LENGTHY QRH PROCEDURE

SCENARIO 1: On either side the problem is either BLEED FAULT or BLEED ABNORMAL PRESSURE

- Reset on either side is allowed in this case.
- If reset is unsuccessful, descend to FL100/MEA-MORA.
- While passing through FL200 if APU bleed is available then no need to descend to FL100.
- ENG bleeds can be reset once again at FL200.
- If APU bleed not available then continue to FL100/MEA-MORA.
- At FL100/MEA-MORA, ENG bleeds can be reset once again. If unsuccessful then set RAM Air ON.

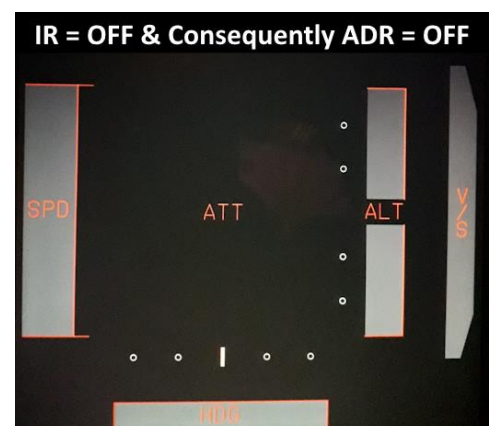
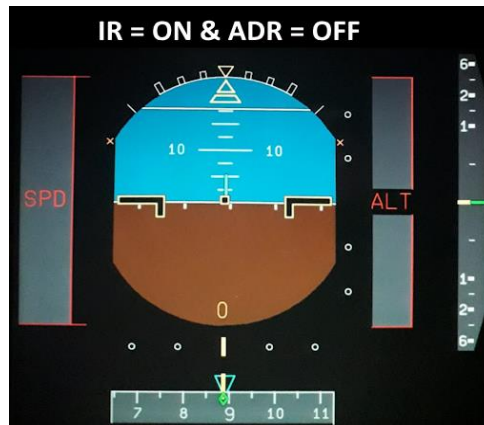
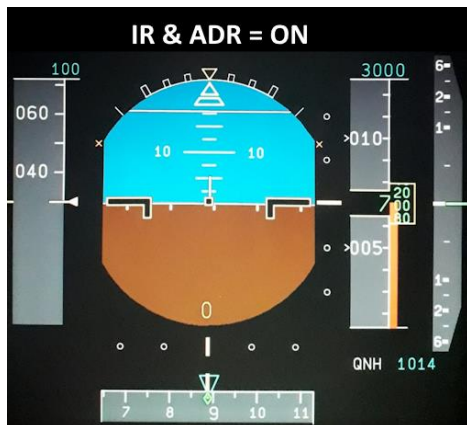
SCENARIO 2: On one side the bleed is not available due to engine fire, leak or start valve open while on the other side the problem is either BLEED FAULT or BLEED ABNORMAL PRESSURE.

- In this case reset is only allowed on the side with BLEED FAULT or BLEED ABNORMAL PRESSURE.
- If fire, leak etc. is on #1 side then continue to FL100/MEA-MORA because APU bleed cannot be used, since it supplies the left side which has to be isolated. At FL100/MEA-MORA if engine bleed 2 cannot be reset then set RAM Air ON.
- If fire, leak etc. is on #2 side then at FL200 APU bleed (if available) can be used to supply #1 side and there is no need to descend to FL100/MEA-MORA. ENG 1 bleed can be reset again.
- If APU bleed not available, continue to FL100/MEA-MORA and reset ENG 1 bleed again.
- If engine bleed 1 still cannot be reset then set RAM Air ON.

SCENARIO 3: No side indicates BLEED FAULT or BLEED ABNORMAL PRESSURE.

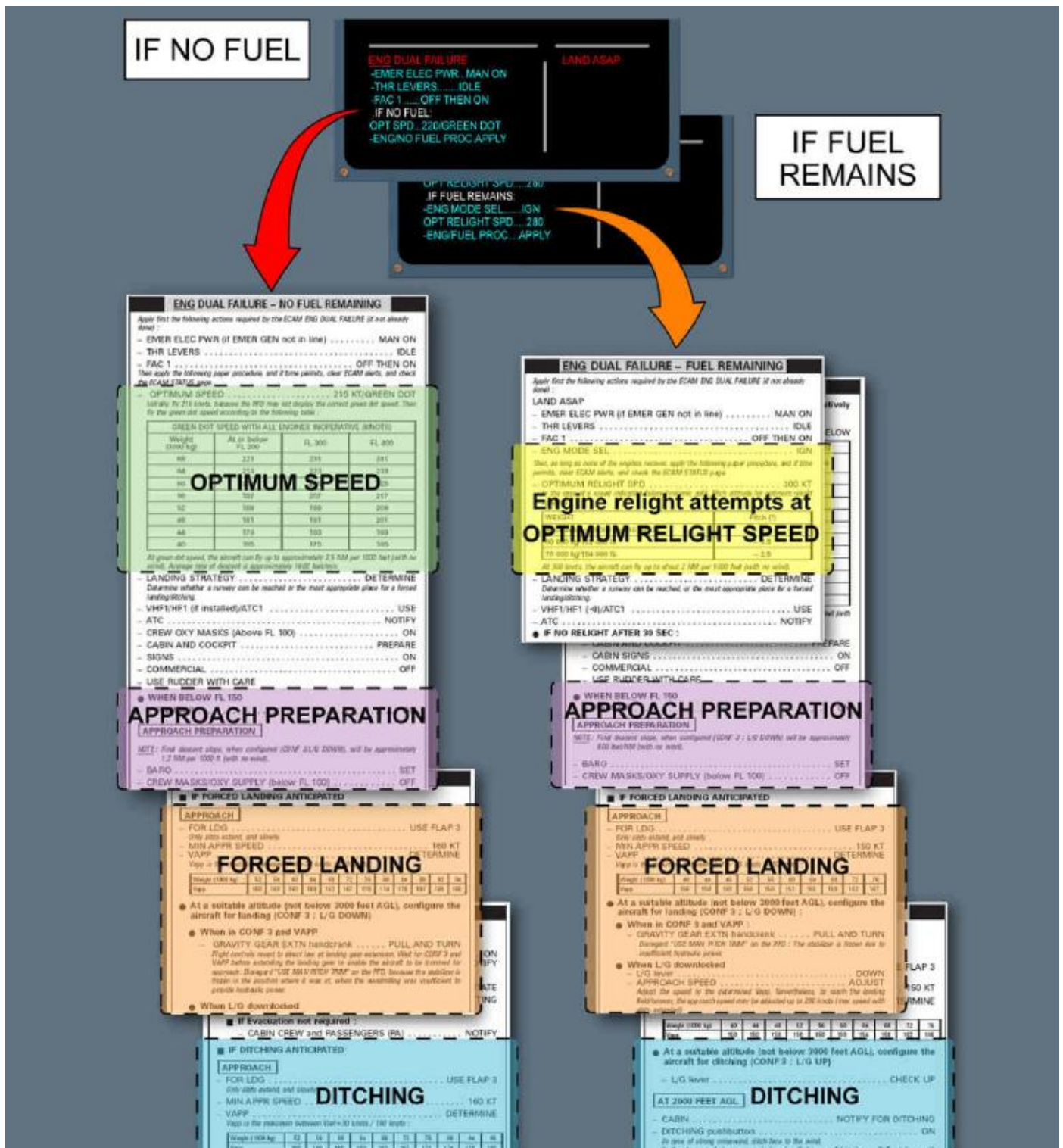
- In this case bleed reset is not possible on either side.
- Descend to FL100/MEA-MORA and set RAM Air ON.

IR OR ADR FAULT

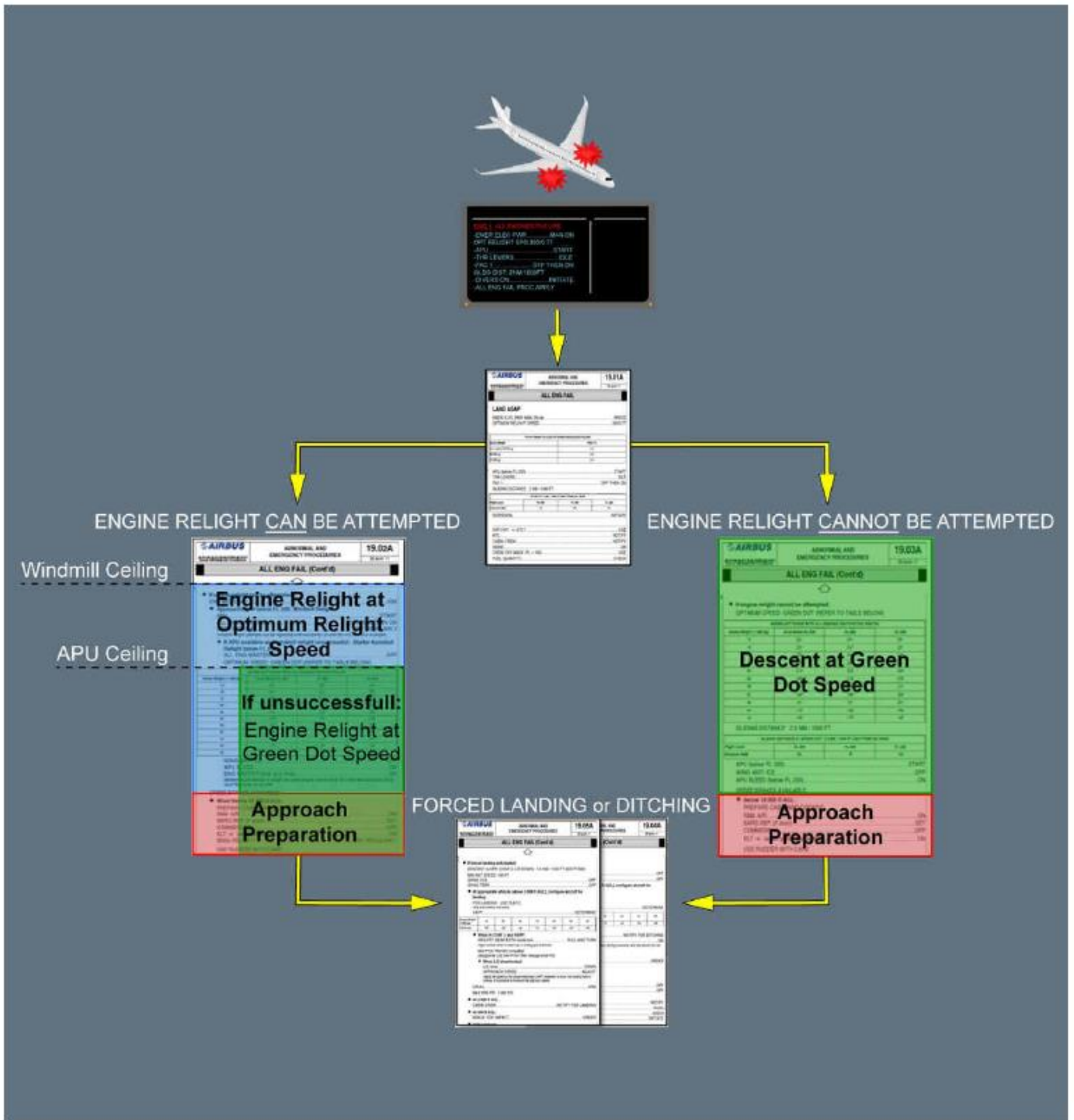


DUAL ENGINE FAILURE

- In case of partial loss of thrust (no engine flameout) on one or more engines, the residual N2 may remain slightly above the ENG FAIL alert threshold and ENG DUAL / ALL ENGINES FAILURE alert on ECAM is not triggered.
- If there is Time to Relight – Apply ENG DUAL FAILURE or ALL ENG FAIL QRH PROC as applicable.
- If No Time to Relight then – Apply EMER LANDING QRH PROC.
- Carry out ECAM actions first.
- ECAM for ENG DUAL FAILURE (AP-BLV, BLA, BLT) will lead to one of the following QRH procedures:
 - Dual Engine Failure with Fuel Remaining.
 - Dual Engine Failure without Fuel Remaining.



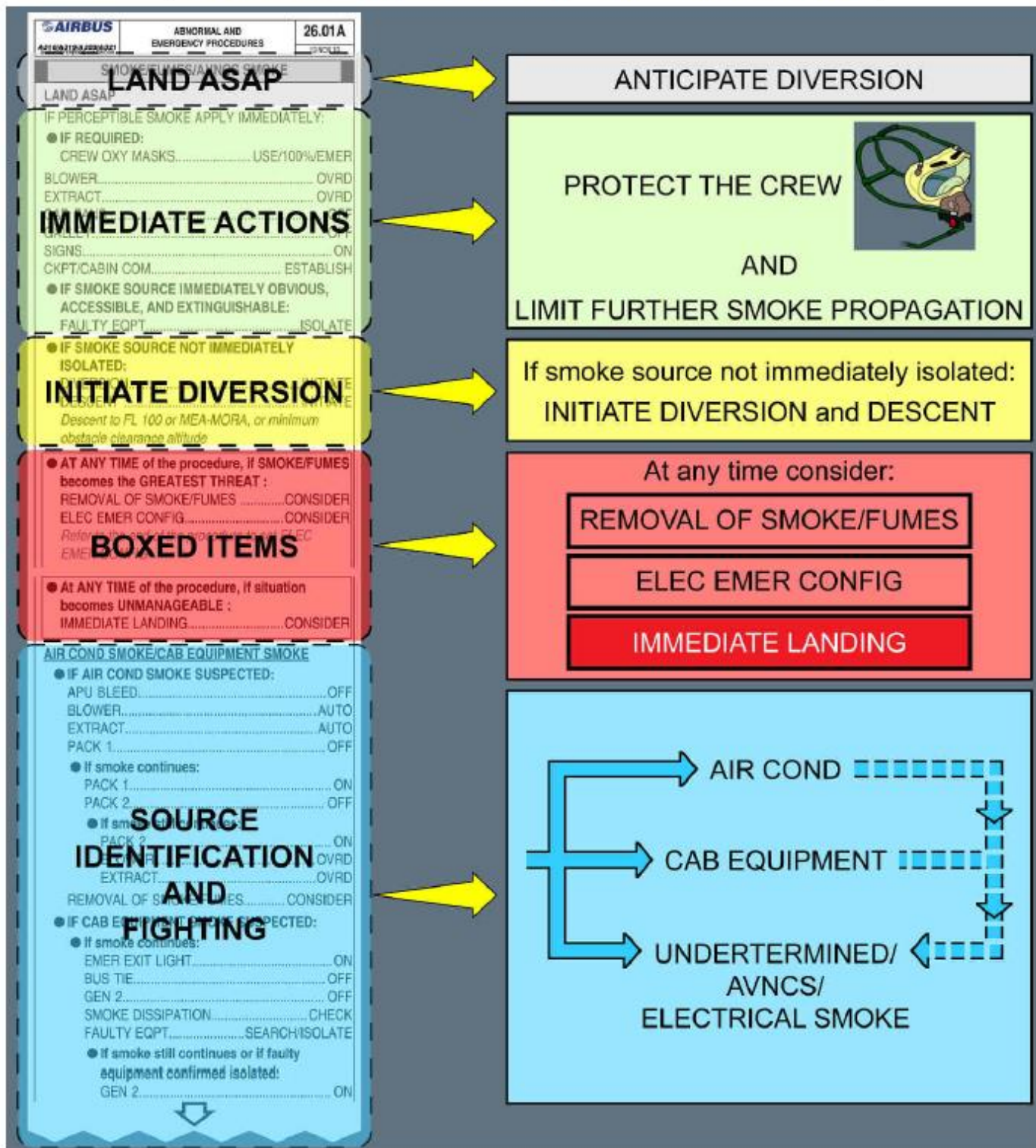
- ECAM for ENG ALL ENGINES FAILURE will lead to ALL ENG FAIL QRH procedure.
 - The procedure includes the engine relight options i.e. subject to fuel, if relight can or cannot be attempted.



HANDLING SMOKE AND FUMES

- If No ECAM – QRH Smoke Procedure Apply.
- If ECAM:
 - For Avionic Smoke Warning – Apply ECAM if smoke is perceptible.
 - For Other Smoke Warning (e.g. lavatory) – Must apply ECAM. If doubtful go to QRH smoke procedure.

SMOKE/FUMES/AVNCS SMOKE Procedure Presentation in QRH



IMMEDIATE ACTIONS

- Flight crew protection.
- Avoiding any further contamination of the cockpit/cabin.
- Communication with cabin crew.

SMOKE ORIGIN IDENTIFICATION AND FIGHTING

- Smoke from cockpit's ventilation outlets, or if detected in cabin, suspect an AIR COND SMOKE. In addition, very shortly thereafter, several SMOKE warnings (cargo, lavatory, avionics) will be triggered. The displayed ECAM procedures must therefore be applied.
- Following an ENG or APU failure, smoke may emanate from the faulty item through the bleed system and be perceptible. It will be re-circulated throughout the aircraft, until it disappears from the air conditioning system.
- If smoke detected, while an equipment is faulty, suspect that smoke is coming from this equipment.
- Do the avionics smoke procedure if:
 - Source of the smoke remains unknown.
 - Application of Airconditioning/Cabin equipment smoke is unsuccessful

MISC REFERENCES

PROCEDURES	REFERENCE
Ditching, Emergency Decent, Forced Landing, Bomb on Board, Windshield / Window Arcing or Cracked, Overweight Landing, Severe Turbulence, Tailstrike, Volcanic Ash.	QRH > Abnormal and Emergency Procedures > MISC
Above Items + Stall, Emergency Evacuation, Emergency Landing All Engine Failure.	FCOM > Abnormal and Emergency Procedures > MISC
Smoke / Fire from Lithium Batteries	QRH > Abnormal and Emergency Procedures > SMOKE

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