Tutorials (UPRT included)
Flow Patterns
Cockpit Panels

AIRBUS

June 2023

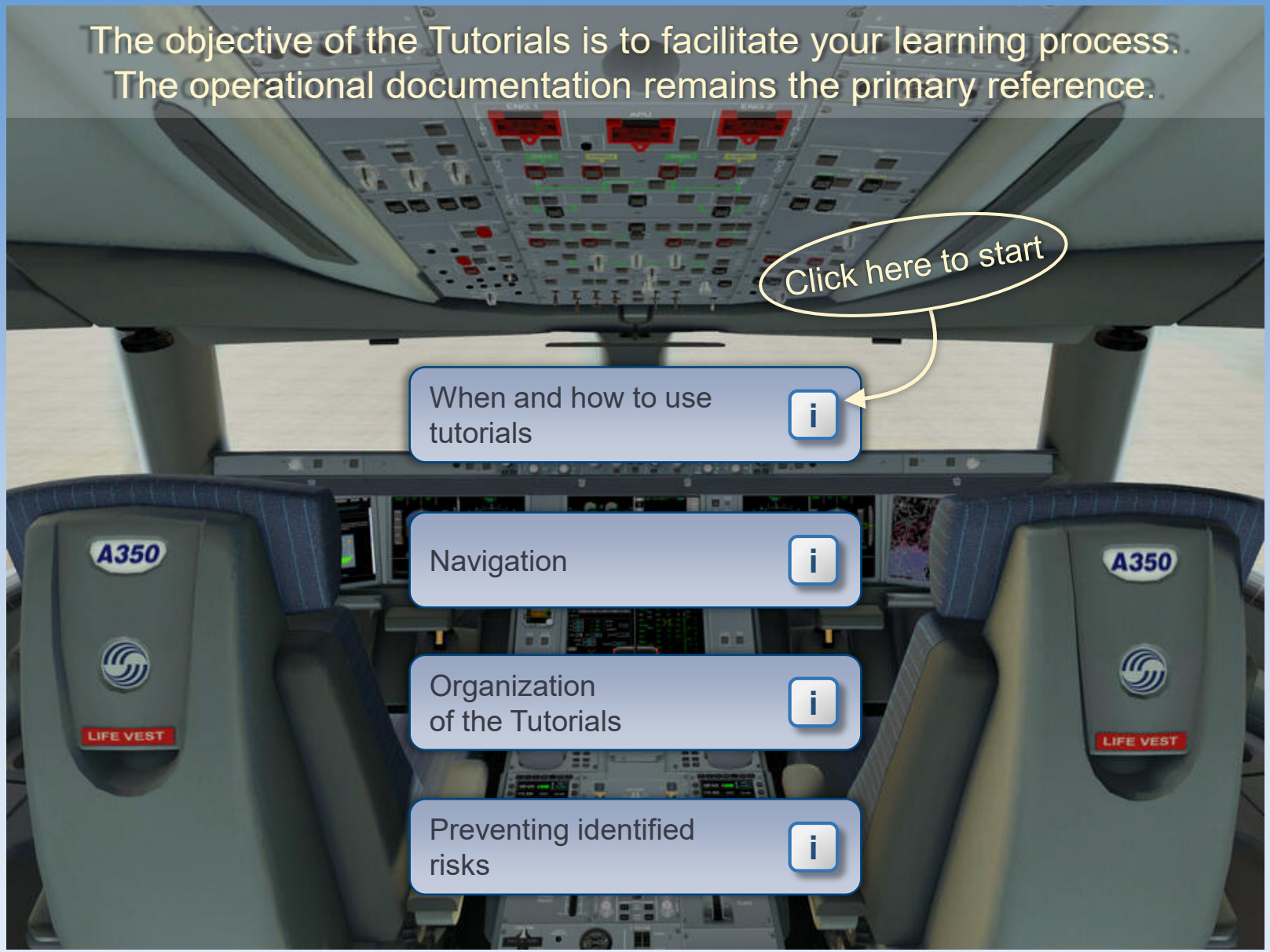
Reasons for Change

June 2023

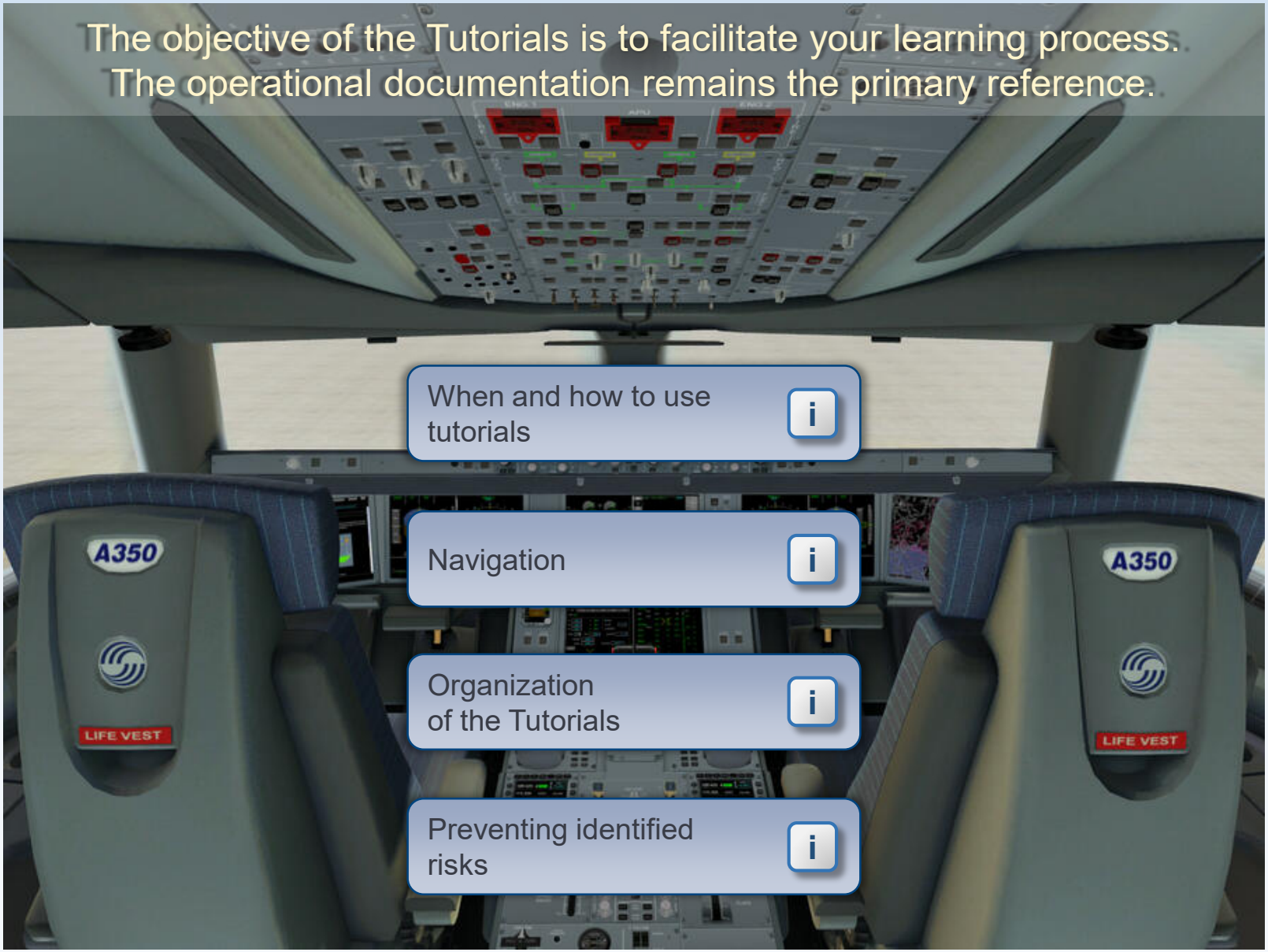
- Normal Procedures
  - **Head-Up Display**: The definition of yaw bar is revised.
  - **Low Visibility Operations**: Tutorial is revised for alignment with revised LVO course.
- Abnormal and Emergency Procedures
  - **Management of Abnormal Operations**: Tutorial is fully revised.
  - **Emergency Descent**: Management of signs is revised.

Note: Some above mentioned updates are related to TSARs 11-14341 and 25-14460.

USE OF TUTORIALS



USE OF TUTORIALS



When and How to Use the Tutorials

BACK

APT sessions

The trainee studies the tutorials **before the APT session**.

During briefing of the APT session, the instructor discusses with the trainees any question regarding the exercises.

The instructor **conducts the exercises** in the APT assisted by the tutorials.

FFS sessions

The trainee studies the tutorials **before the FFS session**.

During briefing of the FFS session, the instructor briefs the trainees with the support of the tutorials.

Tutorials are used **to assist debriefing** after the session as required.

BACK buttons are usually at the top right hand corner

When and How to Use the Tutorials

BACK

APT sessions

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NAVIGATION

BACK

Several buttons are used to navigate through the different pages of the tutorial.

The buttons are:

BACK — The BACK button is used to go back one step.

i — The i button is used to open an information page.

SOP — The SOP button is used to open a Standard Operating Procedure (SOP) page.

PROC — The PROC button is used to open a procedure (normal or abnormal) page.

NEXT / PREV — The NEXT and PREV buttons are used to navigate within a procedure that is on more than one page.

FLOW — The FLOW button is used to open an action flow page.

CALLOUTS — The CALLOUT button is used to open a callout page.

GOLD — The GOLD button is used to page with a reminder of the Golden Rules.

ORGANIZATION OF THE TUTORIALS – 1/3

NEXT

Main slide

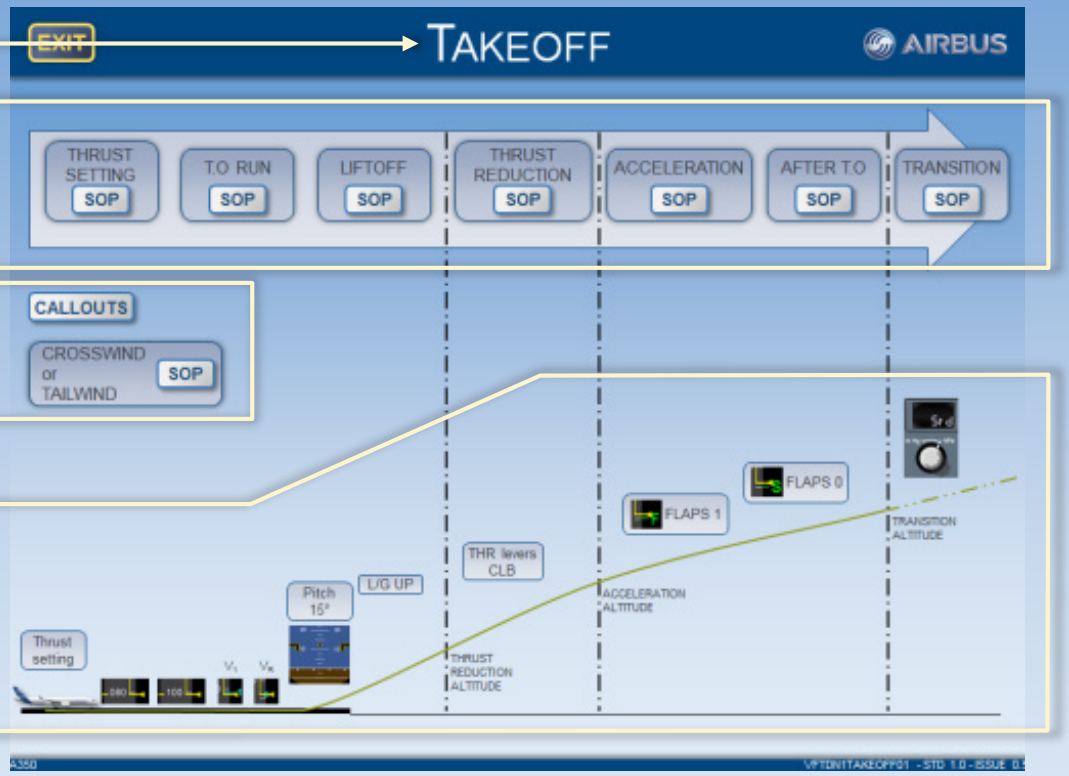
Slides must be read from top to bottom and from left to right.

Title of the Tutorial

Procedure steps

Complementary information

Illustration of the situation

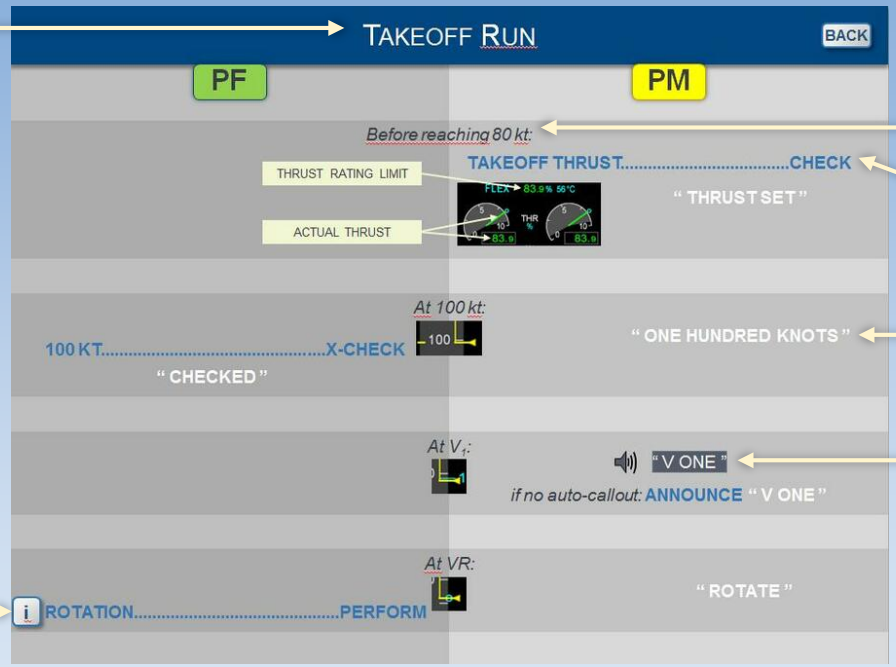


Indication that the Tutorial contains memory items

ORGANIZATION OF THE TUTORIALS – 2/3

PREV NEXT

Procedure slide



Title of slide

Condition or information

Action

Callout

Auto-callout

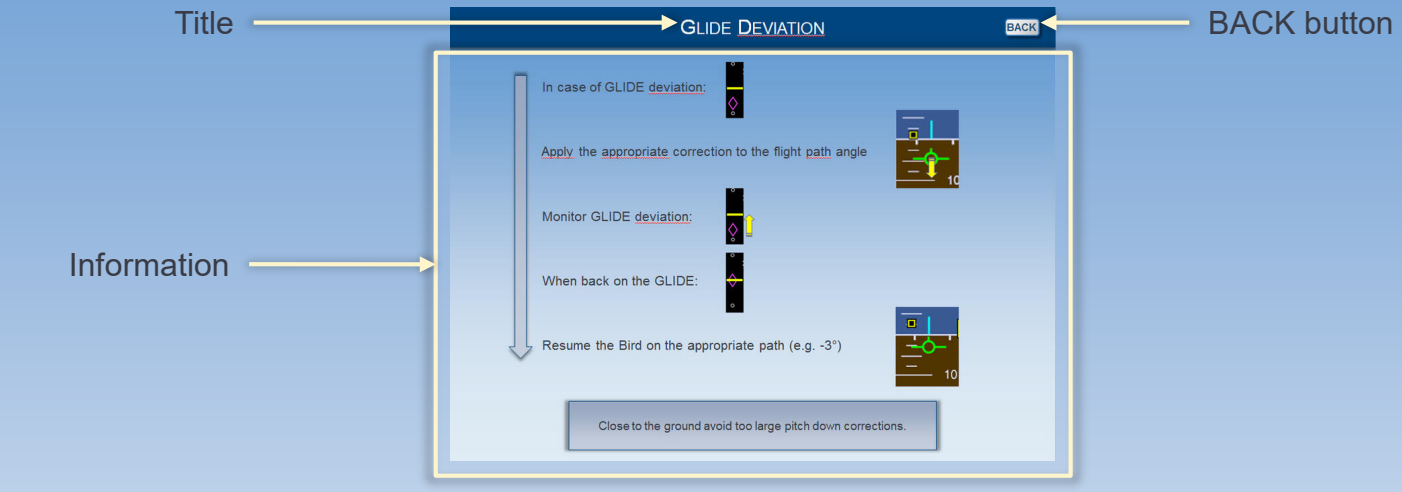
Link to more information

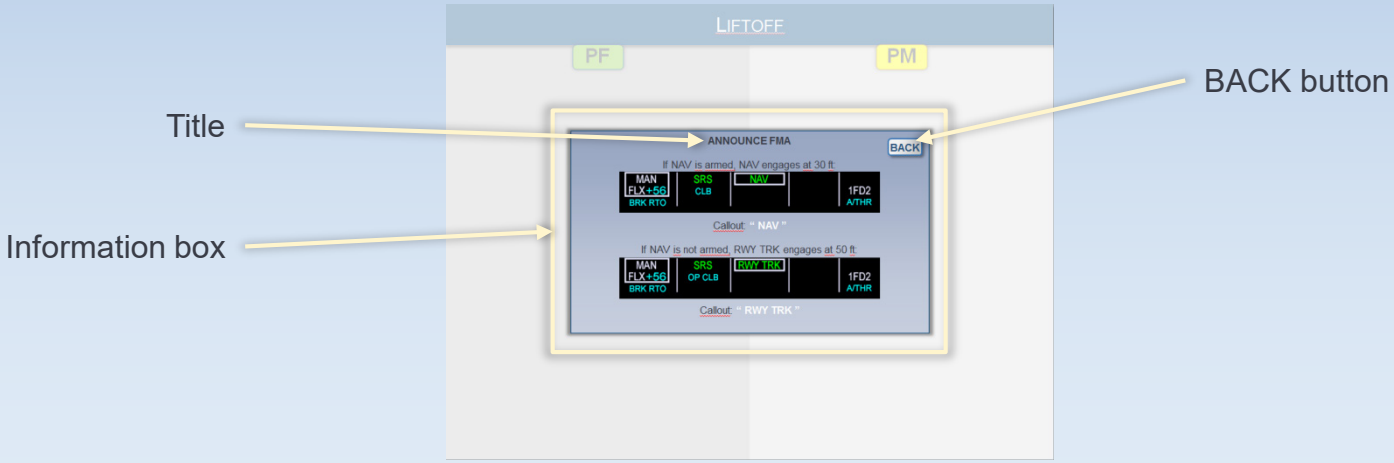
Memory item

ORGANIZATION OF THE TUTORIALS – 3/3

PREV BACK

Information slides





Preventing Identified Risks (Definitions in FCTM)

BACK

Possibility of flight crew incapacitation, or injury.

Possibility of damage to the aircraft.

Possibility of injury to the ground personnel.

The navigation may be affected.

Possibility of injury to passengers.

The handling or control of the aircraft may be affected.

It may not be possible to complete the initial flight.

GOLDEN RULES

GOLDEN RULE #1	**Fly, Navigate, Communicate** In that order, with the appropriate tasksharing.
GOLDEN RULE #2	**Use the appropriate level of automation at all times.**
GOLDEN RULE #3	**Understand the FMA at all times.**
GOLDEN RULE #4	**Take actions if things do not go as expected.**

#1 Fly, Navigate, Communicate

BACK

Fly! Navigate! Communicate! The flight crew must perform these three actions in sequence and must use appropriate tasksharing in normal and abnormal operations, in manual flight or in flight with the AP engaged.

Fly

PF — **Fly the aircraft** (Pitch, bank, airspeed, thrust, sideslip, heading, etc...)
→ Achieve and maintain desired targets and flight path.

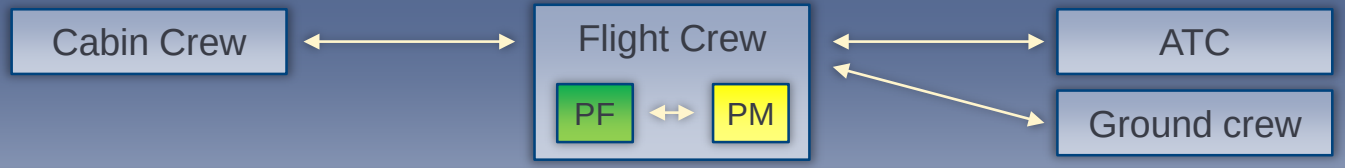
PM — **Actively monitor** the flight parameters
→ Call out any excessive deviation.

Navigate

Situational awareness

- Know **where you are**...
- Know **where you should be**...
- Know **where you should go**...
- Know **where the weather, terrain and obstacles are**...

Communicate



To ensure good communication, the flight crew should use **standard phraseology** and the **applicable callouts**.

Always keep in mind the key message: **Fly the aircraft! Fly the aircraft! Fly the aircraft!**

#2 Use the Appropriate Level of Automation at All Times

BACK

To use the appropriate level of automation at all times, the flight crew must:

Determine and select the appropriate level of automation, that can include manual flight

Understand the operational effect of the selected level of automation

Confim that the aircraft reacts as expected

#3 UNDERSTAND THE FMA AT ALL TIMES

BACK

To ensure correct situational awareness at all times, the flight crew must:

Monitor the FMA

Announce the FMA

Confirm the FMA

Understand the FMA

#4 Take Actions if Things Do Not Go as Expected

BACK

If the aircraft does not follow the desired flight path, or the selected targets

Take action !

PF

Change the level of automation
- Managed guidance → Selected guidance, or
- Selected guidance → Manual flying.

PM

- Communicate with the PF
- Challenge the actions of the PF, if necessary
- Take over, if necessary.

FLOW PATTERNS

AIRBUS

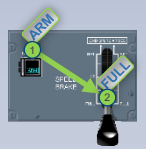
- Prelim. Cockpit Prep. – Power-Up FLOW
- Prelim. Cockpit Prep. – OIS / ANF / A/C Accep. FLOW
- Prelim. Cockpit Prep. – FIRE TEST / APU start FLOW
- Before Walkaround FLOW
- Cockpit Prep. – Overhead Panel FLOW
- Cockpit Prep. – Center Instrument Panel FLOW
- Cockpit Prep. – Pedestal FLOW
- Final Cockpit Preparation FLOW
- At Pushback/Start clearance FLOW
- After Start FLOW
- Taxi FLOW
- Line-up FLOW
- Takeoff – Acceleration FLOW
- Climb / 10 000 ft AAL FLOW
- Descent / 10 000 ft AAL FLOW
- Go-Around – Acceleration FLOW
- After Landing FLOW
- Parking FLOW
- Securing the Aircraft FLOW

Emergency Descent

Memory Items: Protect FLOW

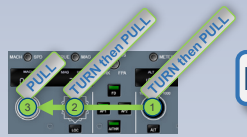
Memory Items: Initiate Descent

With use of AUTO EMER DESCENT function



FLOW

With use of Selected Guidance on AFS CP



FLOW

- Rejected Takeoff FLOW

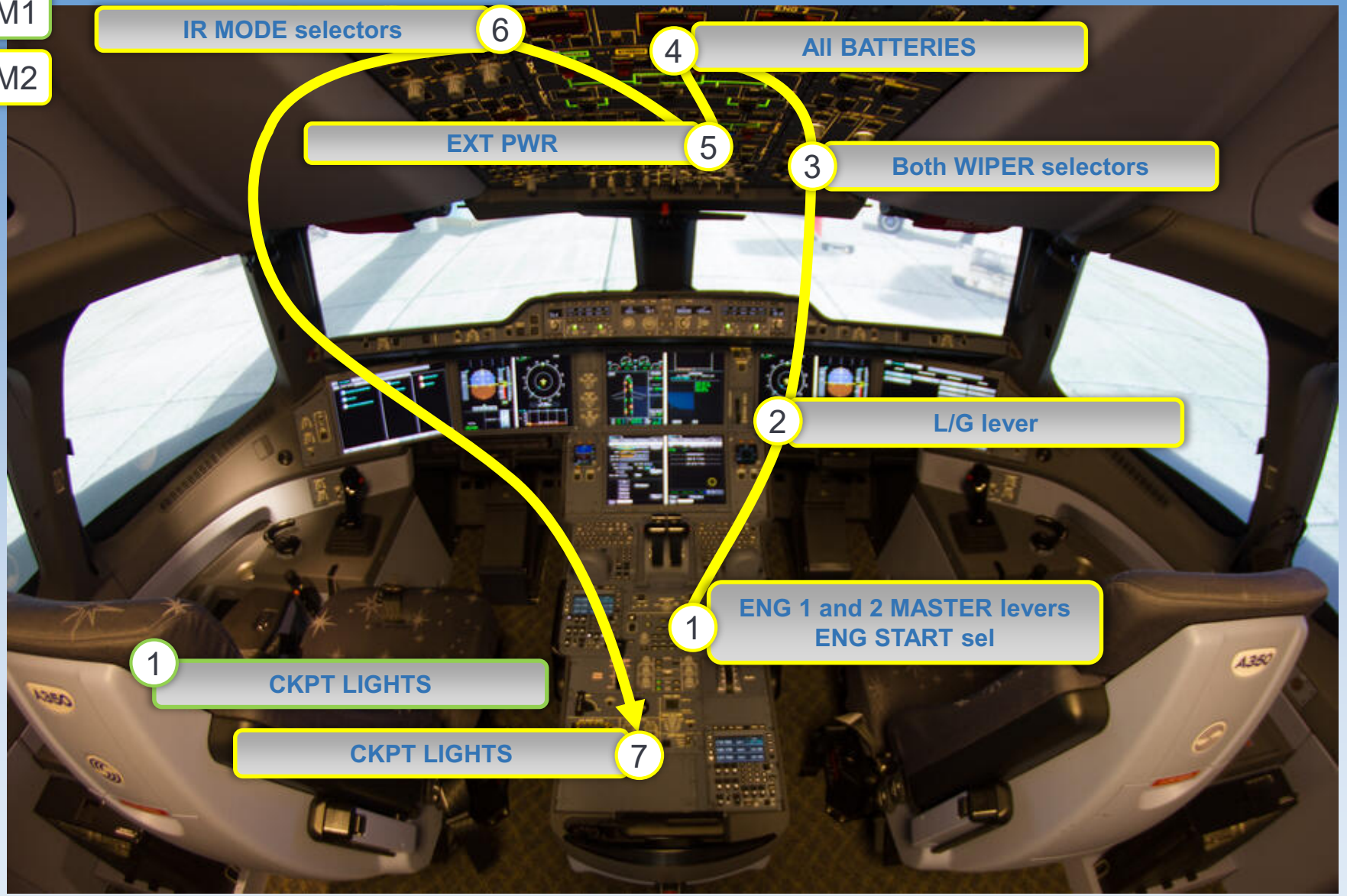
PRELIMINARY COCKPIT PREPARATION - FLOW

POWER-UP

BACK

CM1

CM2



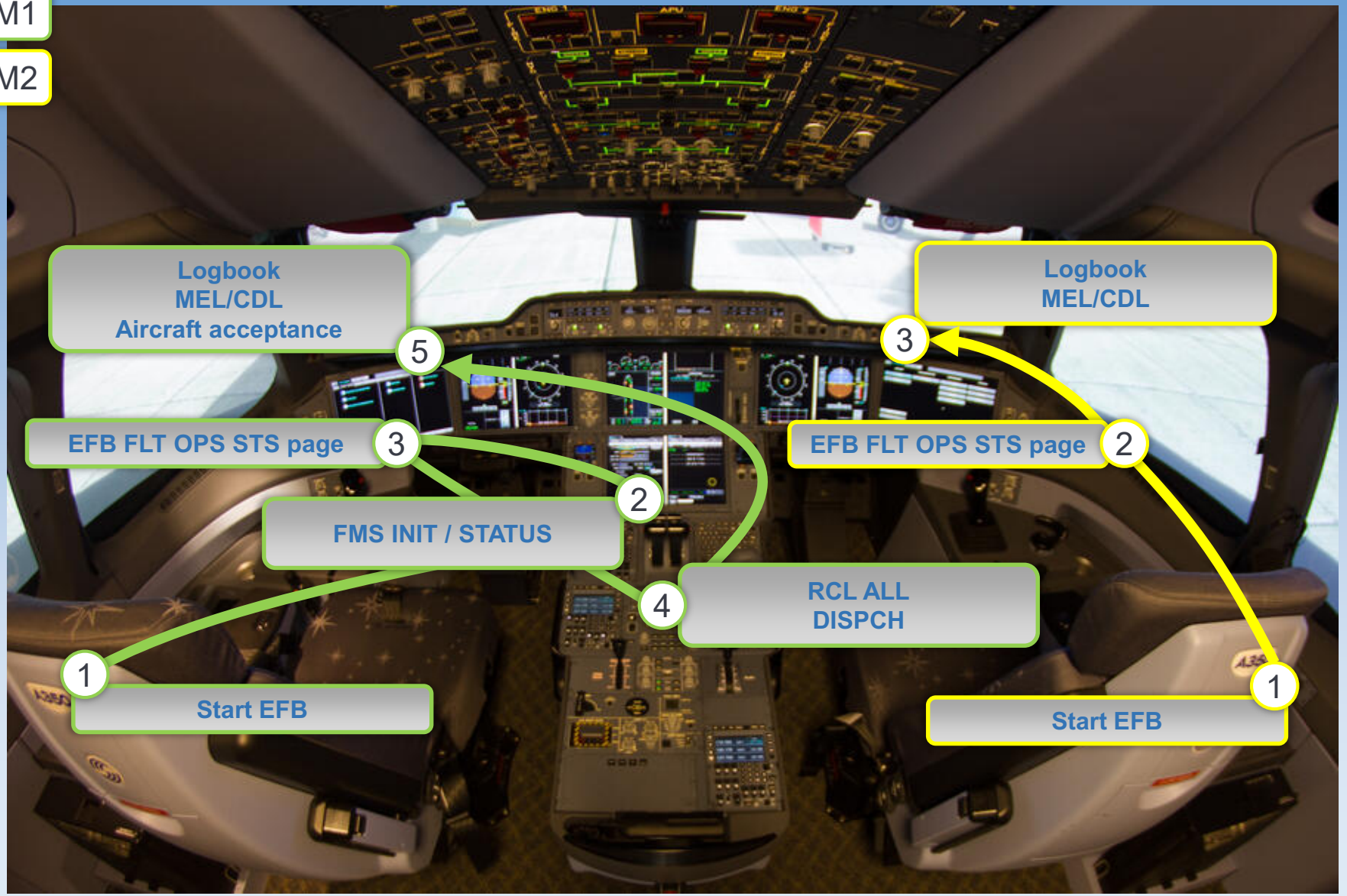
PRELIMINARY COCKPIT PREPARATION - FLOW

OIS INIT / ANF / AIRCRAFT ACCEPTANCE

BACK

CM1

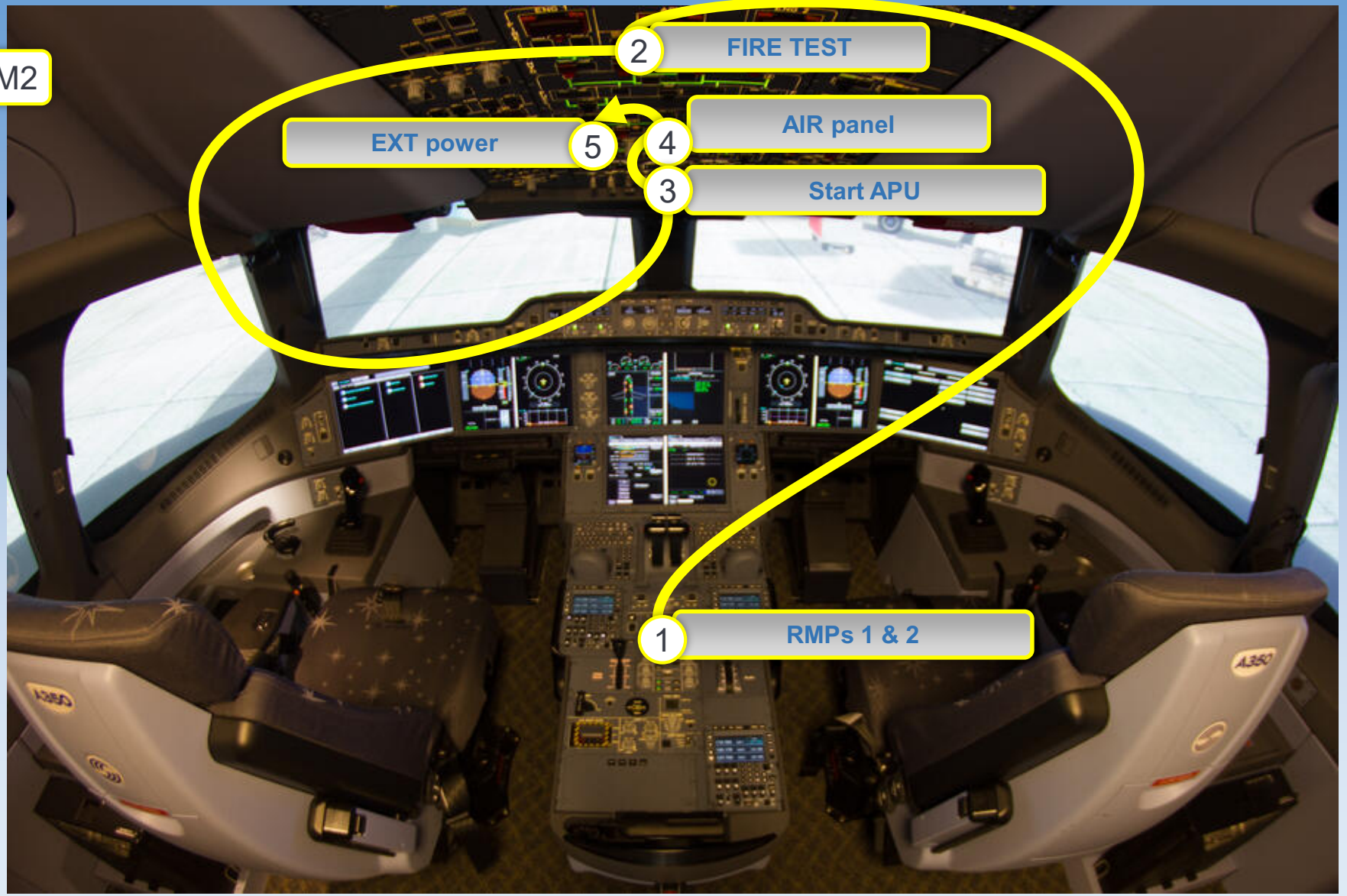
CM2



PRELIMINARY COCKPIT PREPARATION - FLOW

APU AND ENG FIRE TEST / APU START

BACK



BEFORE WALKAROUND - FLOW

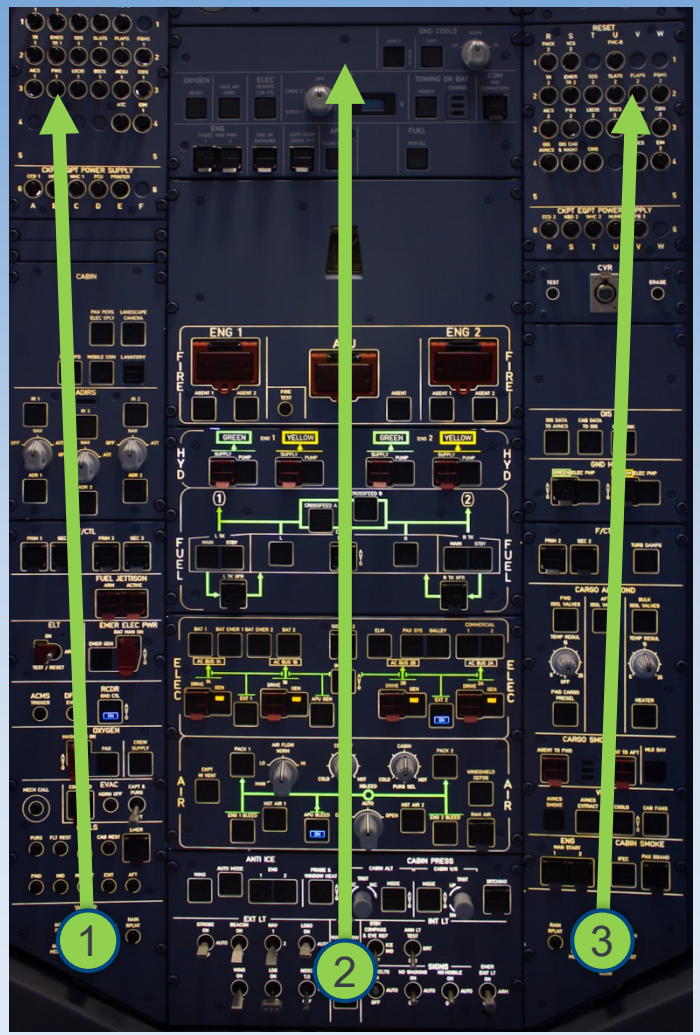
BACK

COCKPIT PREPARATION - FLOW
OVERHEAD PANEL

BACK

PF

General rule:
ALL WHITE LIGHTS OFF
Except on the MAINTENANCE panel.



1
CAPT/CAPT & PURS sw
RCDR GND CTL pb-sw
ELT
Left hand CKPT EQT & RESET panel

2
EXT LIGHTS
SIGNS
PROBES and WINDOWS HEAT
AIR panel
MAINTENANCE panel

3
CARGO VENT
CVR test
Right hand CKPT EQT & RESET panel

CENTER INSTRUMENT PANEL

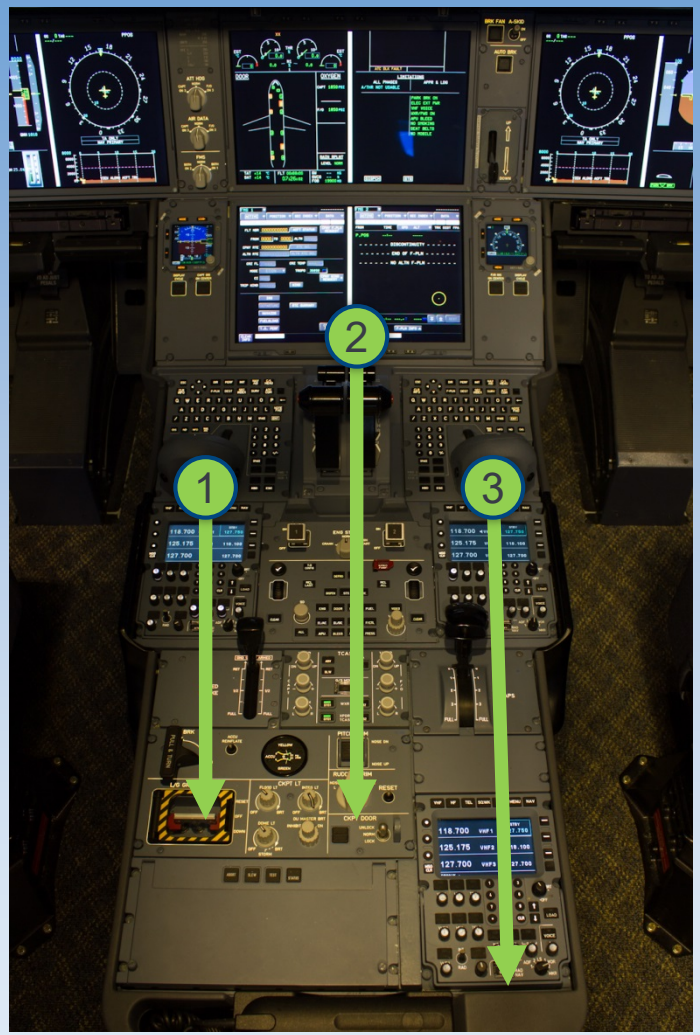
BACK

PF

COCKPIT PREPARATION - FLOW
PEDESTAL

BACK

PF



1. RMP 1
   PARK BRK
   L/G GRVTY EXTN

2. THR LEVERS
   THR REV LEVERS
   ENG 1 & 2 MASTER
   ENG START selector
   CKPT DOOR

3. RMPs 2 & 3

FINAL COCKPIT PREPARATION

BACK

CM1

CM2

SAFETY EXTERIOR INSPECTION

PRELIMINARY COCKPIT PREP

PF

PM

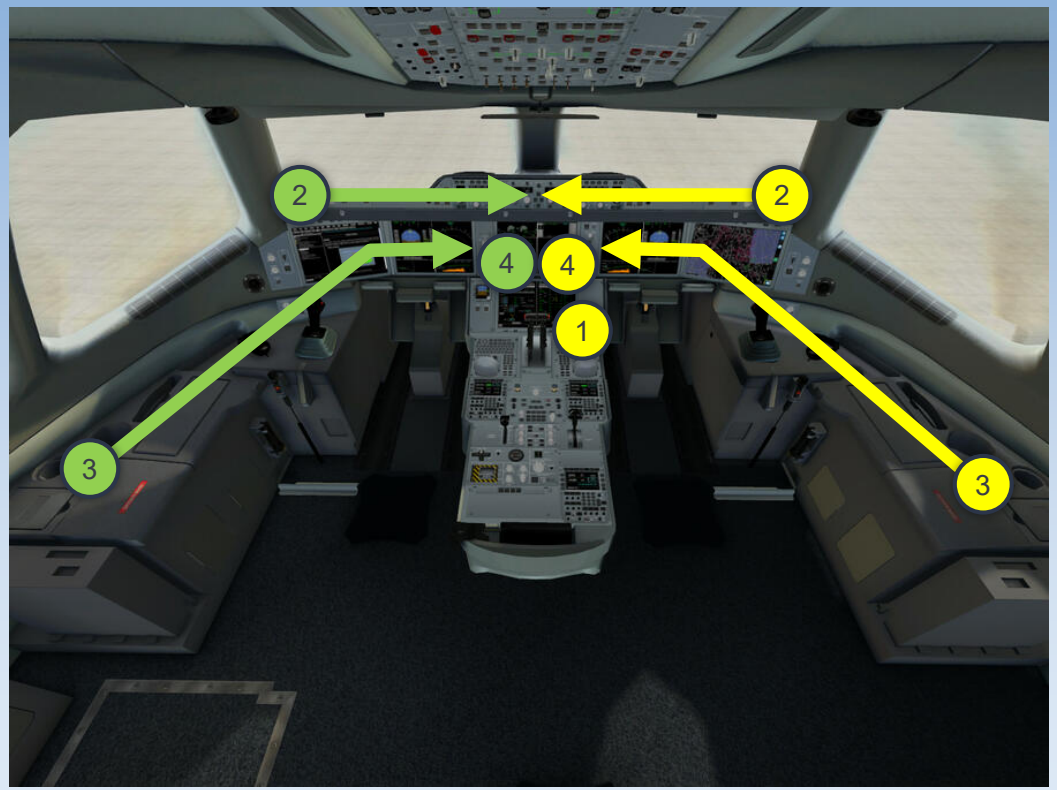
COCKPIT PREPARATION

BEFORE WALKAROUND

WALKAROUND

FINAL COCKPIT PREPARATION

DEPARTURE BRIEFING



When both pilots are seated:

1

FMS CROSSCHECK

2

GLARESHIELD

3

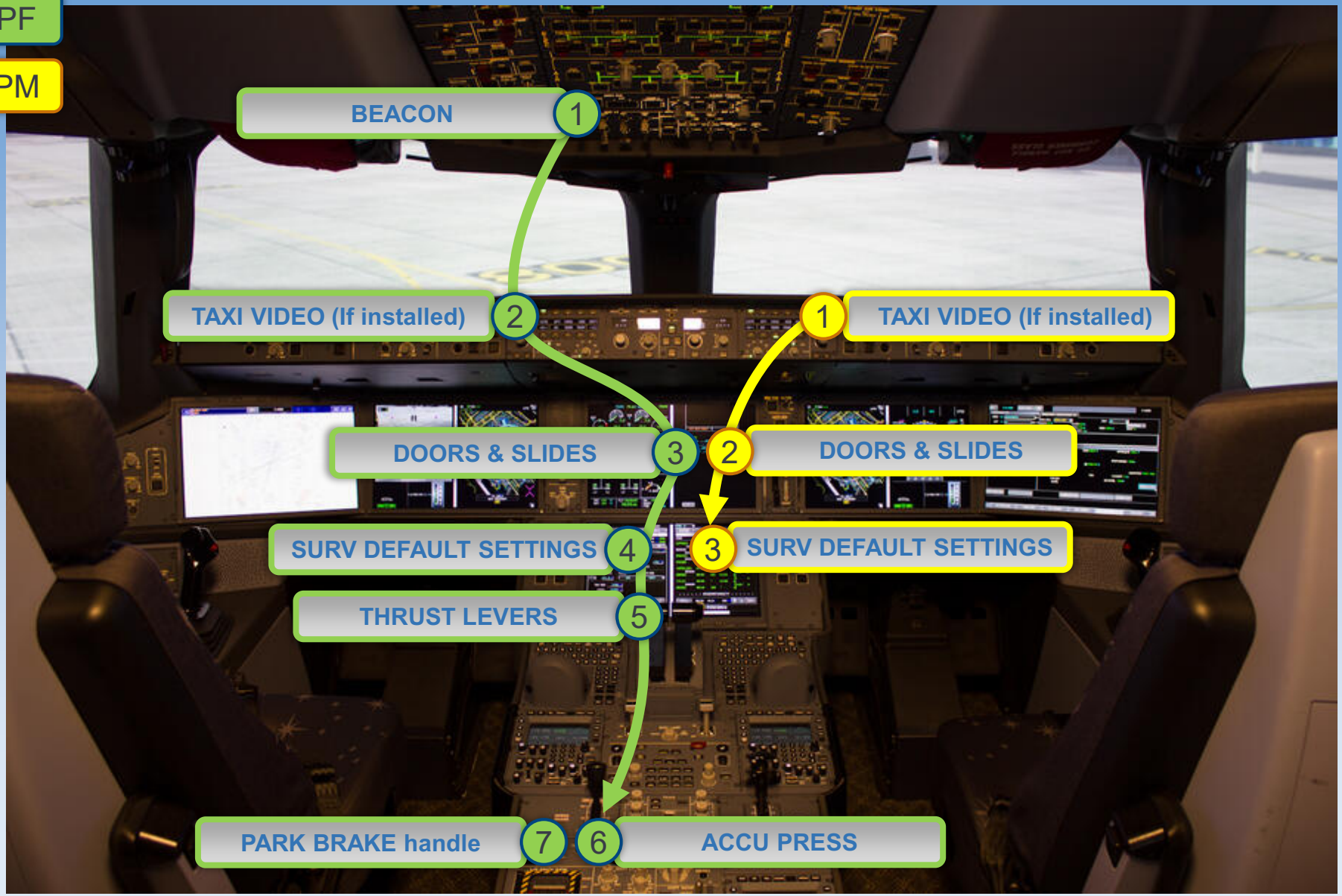
LATERAL CONSOLES
INSTRUMENT PANELS

4

FUEL ON BOARD

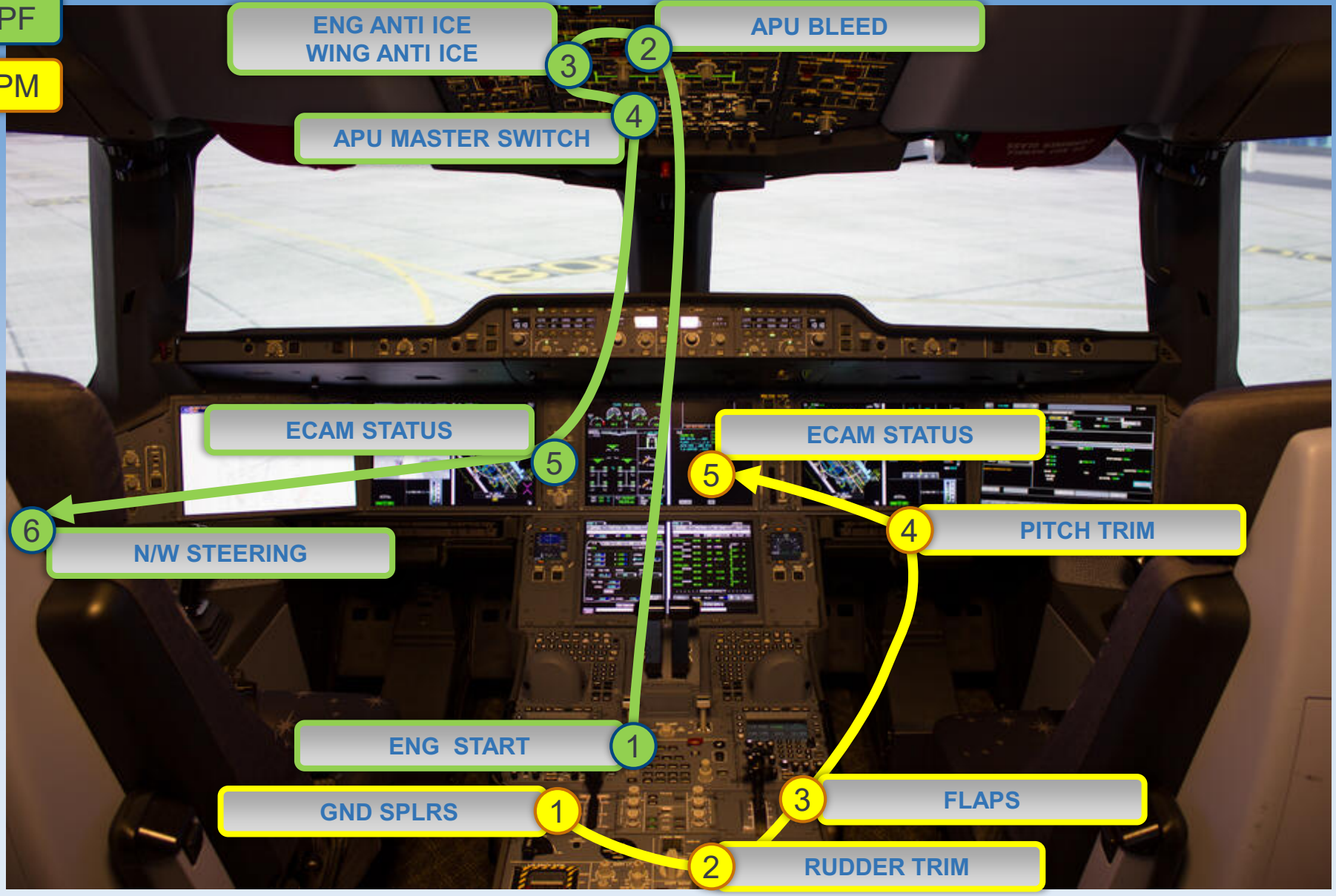
AT PUSHBACK/START CLEARANCE - FLOW

BACK



AFTER START - FLOW

BACK

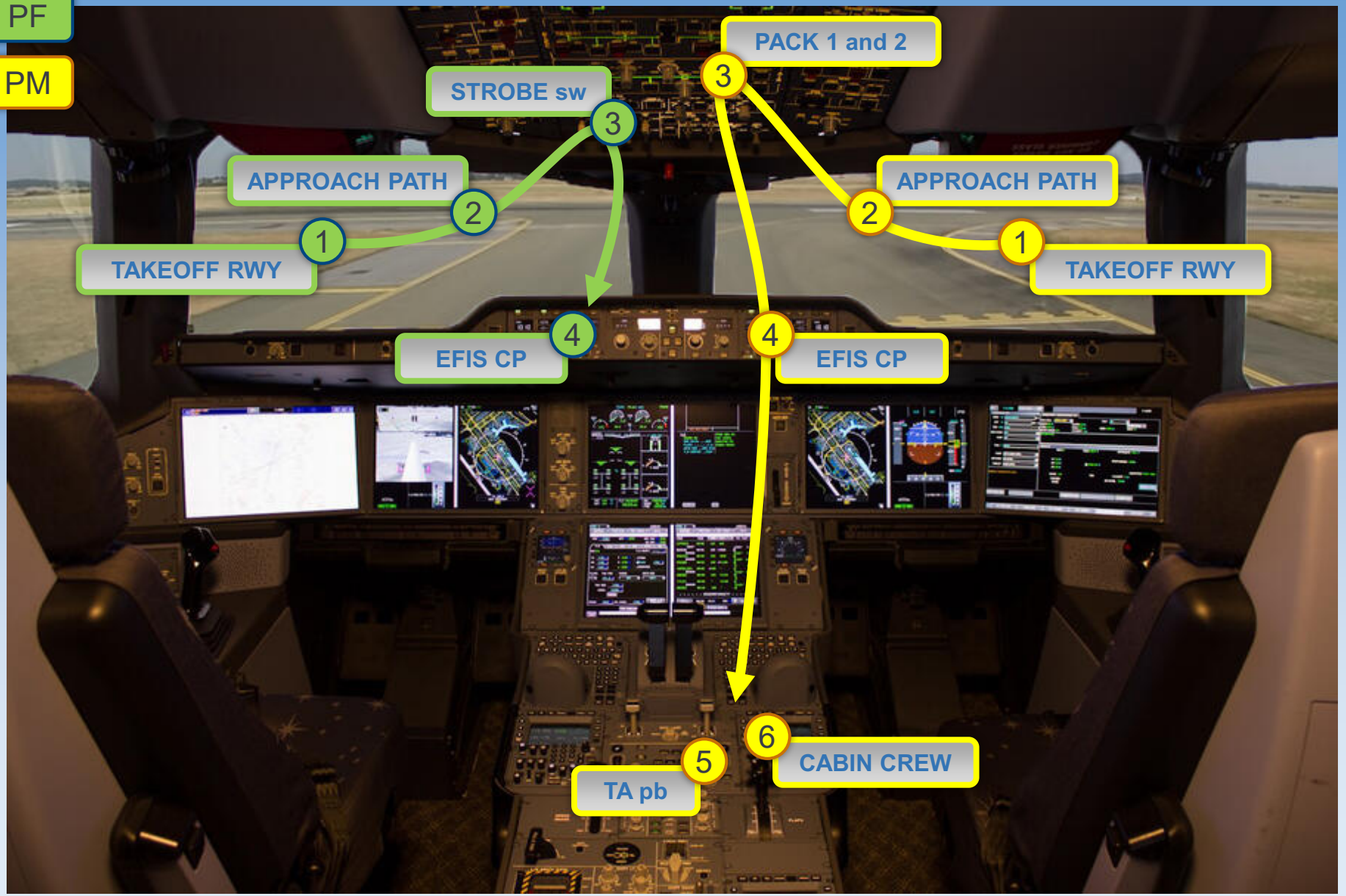


TAXI - FLOW

BACK

LINE-UP - FLOW

BACK



ACCELERATION - FLOW

BACK

CLIMB / 10 000 FT AAL – FLOW

BACK

PF

PM

DESCENT 10 000 FT AAL - FLOW

BACK

PF

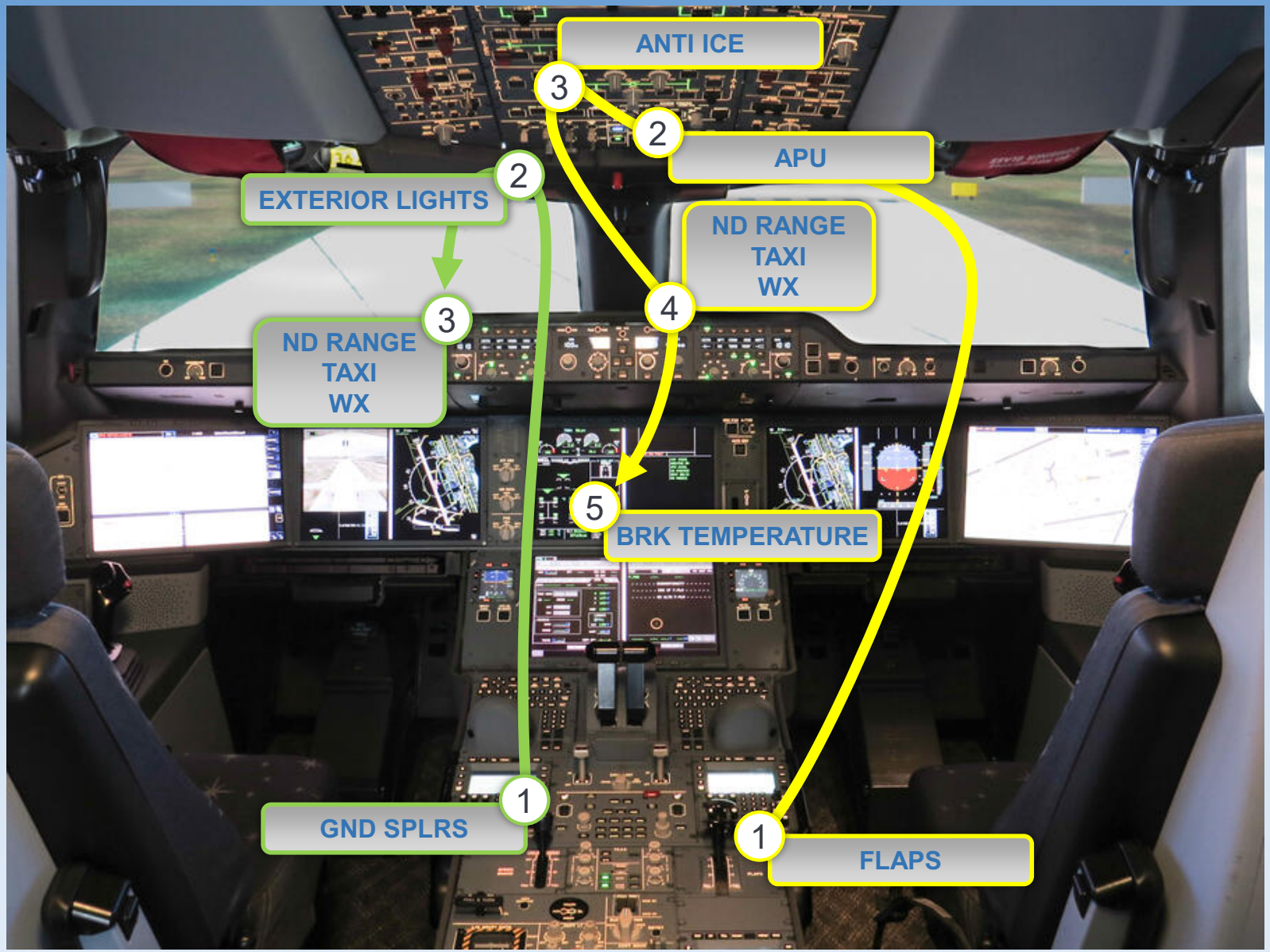
PM

AFTER LANDING – FLOW

BACK

PF

PM

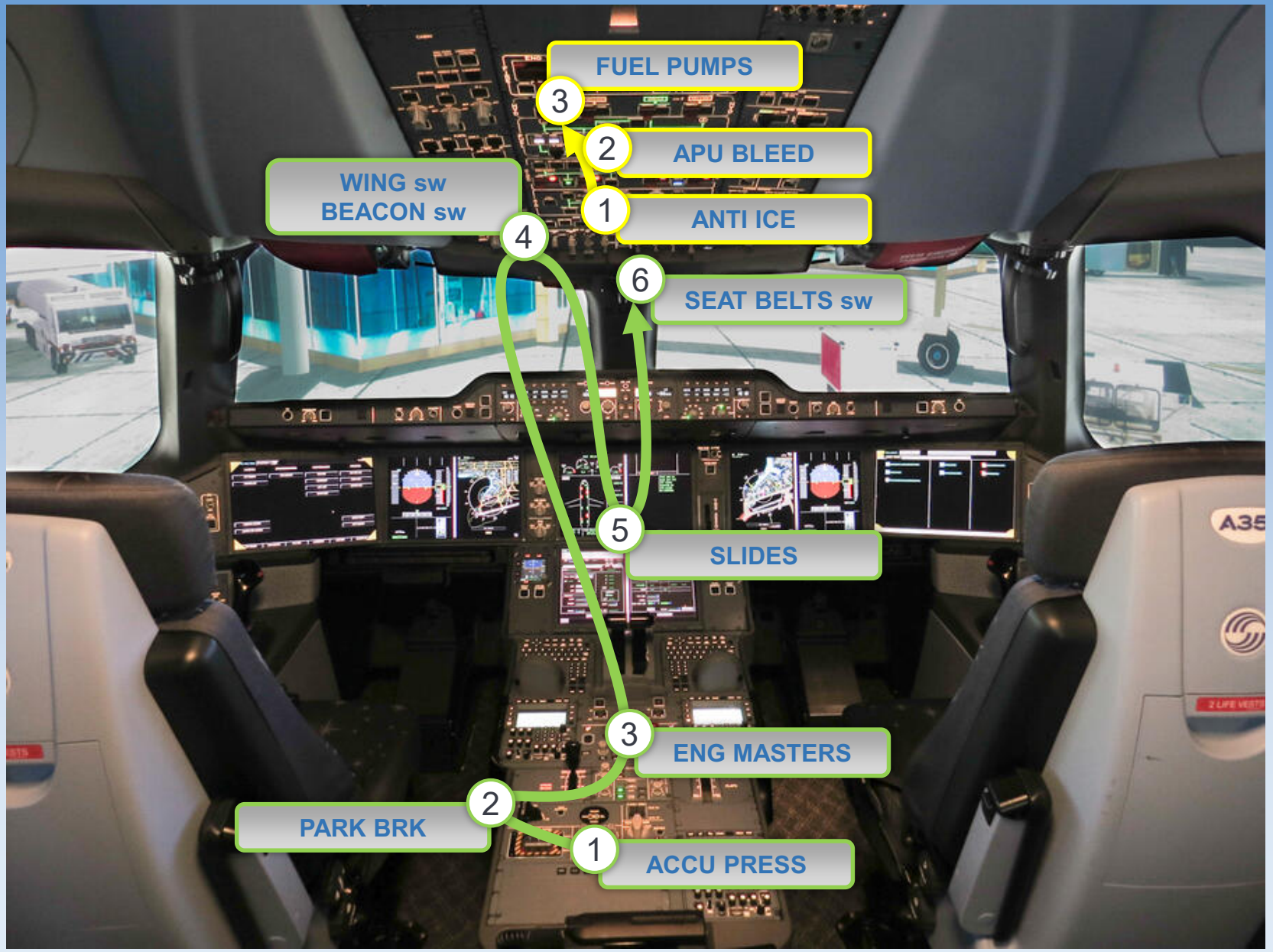


PARKING – FLOW

BACK

PF

PM

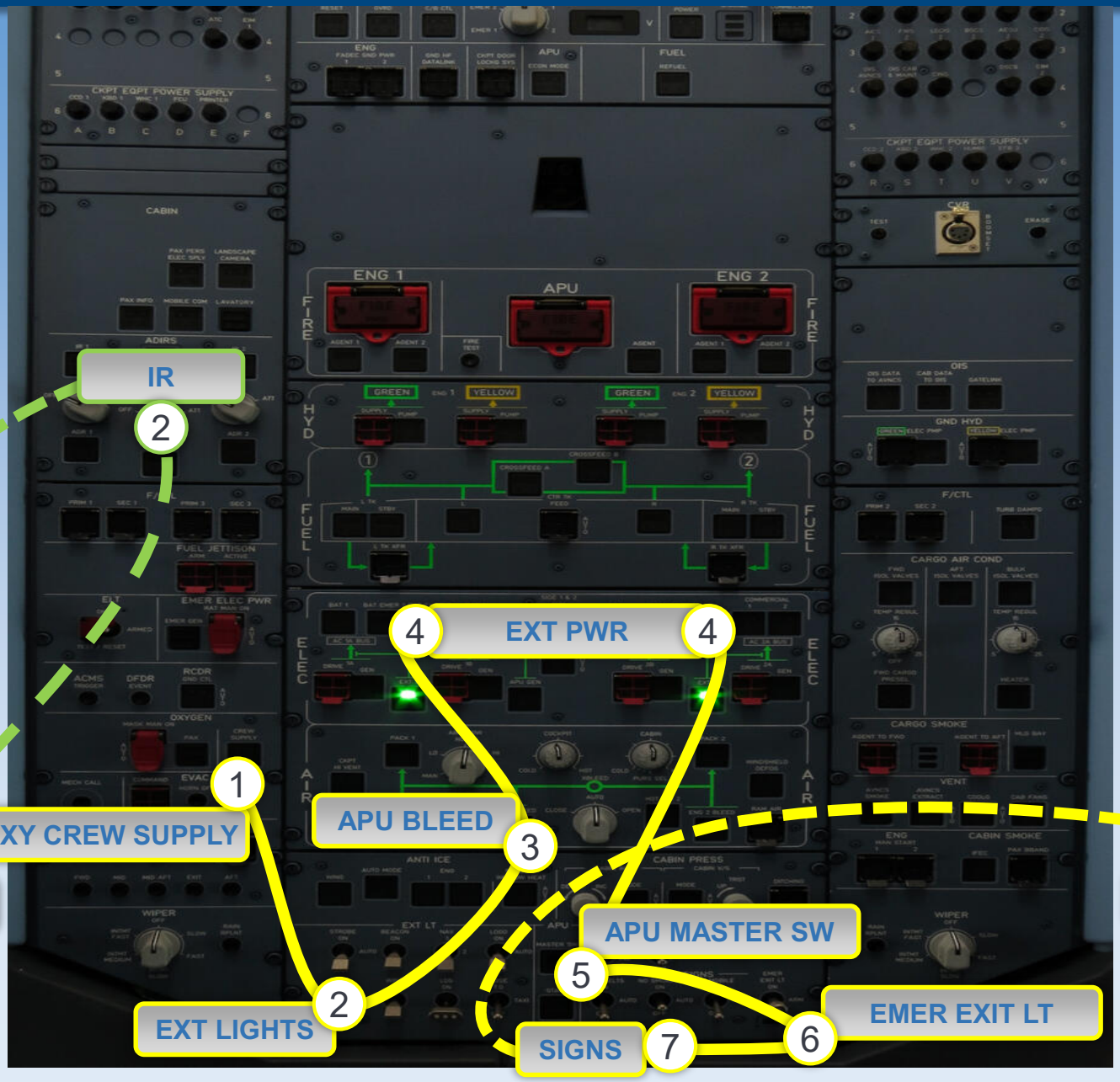


SECURING THE AIRCRAFT – FLOW

BACK

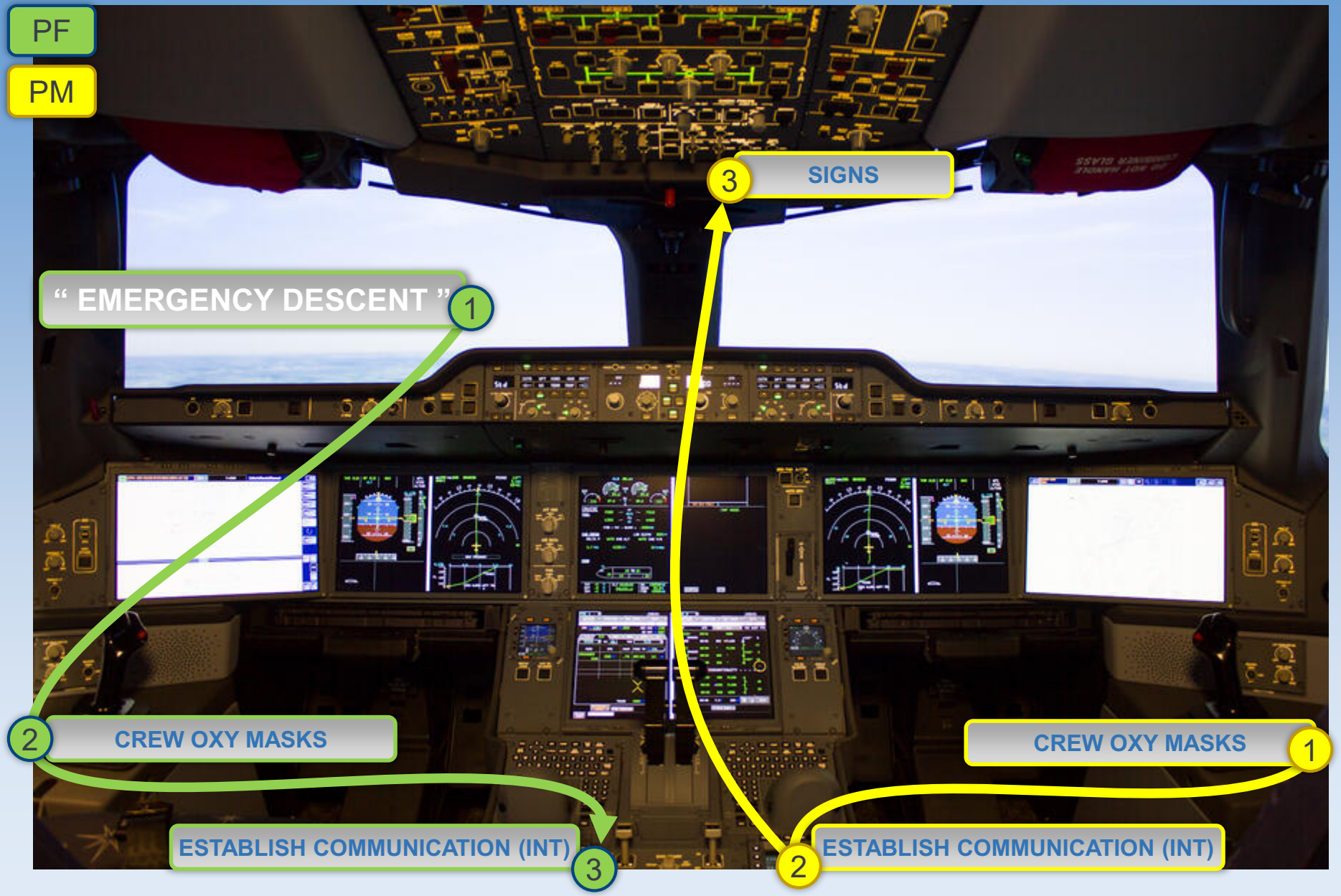
CM1

CM2



EMERGENCY DESCENT – MEMORY ITEMS: PROTECT

BACK



EMERGENCY DESCENT - MEMORY ITEMS: INITIATE DESCENT

USE OF AUTO EMER DESCENT FUNCTION

BACK

PF

PM

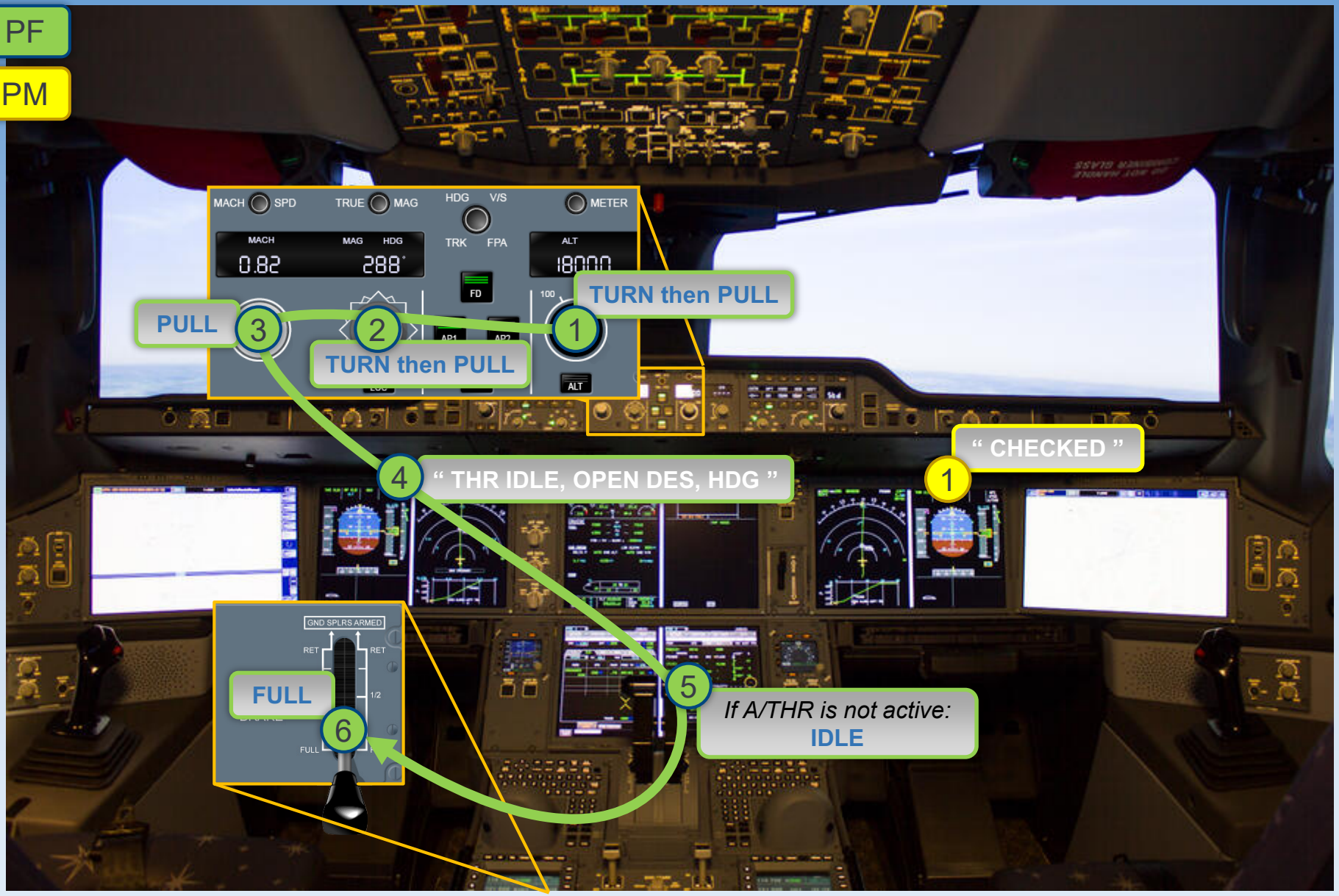
EMER DESCENT - MEMORY ITEMS: INITIATE DESCENT

USE OF SELECTED GUIDANCE ON AFS CP

BACK

PF

PM



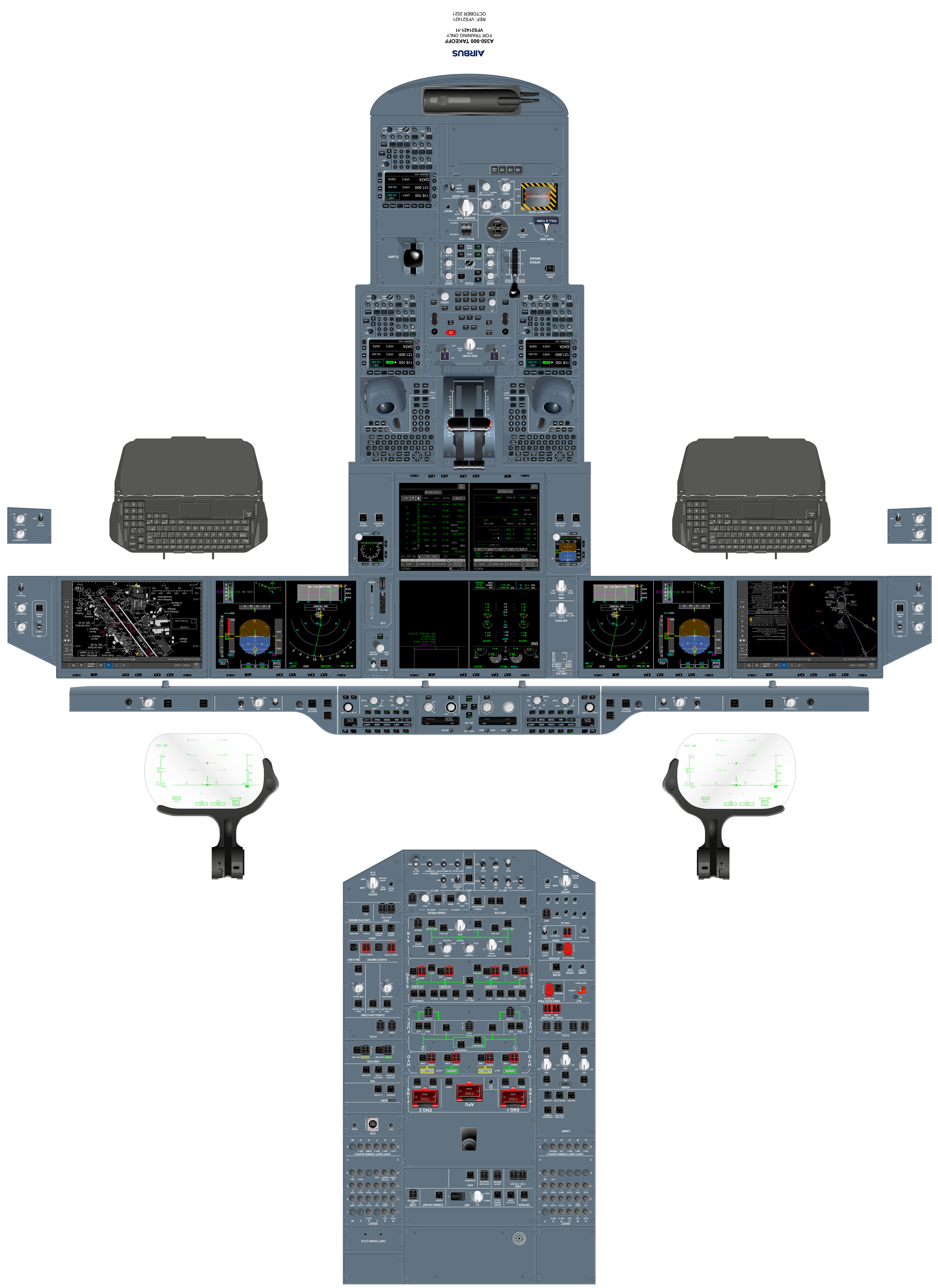
REJECTED TAKEOFF - FLOW

BACK

AIRBUS

A350-900 TAKEOFF
FOR TRAINING ONLY
VFS21421-11

REF: VFS21421
OCTOBER 2021



COCKPIT PREPARATION

AIRBUS

CM1

CM2

SAFETY EXTERIOR INSPECTION
SOP

PRELIMINARY COCKPIT PREP.
SOP FLOW

PF

PM

COCKPIT PREPARATION
SOP FLOW

BEFORE WALKAROUND
SOP FLOW

WALKAROUND

FINAL COCKPIT PREPARATION
SOP FLOW

DEPART. BRIEF.
SOP

When the flight crew arrives at the aircraft, they must check for, or be informed of any obstructions near the aircraft, engineering activity, or refueling activity, etc.

Do not pressurize the hydraulic systems (GND HYD panel) until clearance is obtained from ground personnel.

Note: The ACCU REINFLATE pb can be used without ground personnel clearance.

SAFETY EXTERIOR INSPECTION

BACK

CM1

CM2

SAFETY EXTERIOR INSPECTION

PRELIMINARY COCKPIT PREP

PF

PM

COCKPIT PREPARATION

BEFORE WALKAROUND

WALKAROUND

FINAL COCKPIT PREPARATION

DEPARTURE BRIEFING

1

SAFETY EXTERIOR INSPECTION

SOP

LANDING GEAR DOORS

If any landing gear door is open, do not pressurize the hydraulic systems until clearance is obtained from ground personnel.

SAFETY EXTERIOR INSPECTION – SOP

BACK

CM1

CM2

WHEEL CHOCKS.....CHECK

LANDING GEAR DOORS.....CHECK POSITION

APU AREA.....CHECK

PRELIMINARY COCKPIT PREPARATION

BACK

CM1

CM2

SAFETY EXTERIOR INSPECTION

PRELIMINARY COCKPIT PREP

PF

PM

COCKPIT PREPARATION

BEFORE WALKAROUND

WALKAROUND

FINAL COCKPIT PREPARATION

DEPARTURE BRIEFING

1 POWER-UP SOP FLOW

2 OIS INITIALIZATION ANF AIRCRAFT ACCEPTANCE SOP FLOW

3 APU and ENG FIRE TEST APU START SOP FLOW

4 OIS PREPARATION SOP

PRELIMINARY COCKPIT PREPARATION - SOP

POWER-UP

BACK

CM1

CKPT LIGHTS.....AS RQRD

CM2

ENG 1 and 2 MASTER levers.....OFF

ENG START selector.....NORM

L/G lever.....DOWN

Both WIPER selectors.....OFF

All BAT pb-sw.....CHECK / ON

EXT PWR.....ON

All IR MODE selectors.....NAV

CKPT LIGHTS.....AS RQRD

OIS INIT / ANF / AIRCRAFT ACCEPTANCE – 1/2

BACK

CM1	CM2
OIS Initialization:	
EFB LAPTOP.....START	EFB LAPTOP.....START
FMS ACTIVE/INIT page:	
FLT NBR.....INSERT / CHECK	
FMS DATA/STATUS page:	
ACFT STATUS.....CHECK	
FMS ACTIVE/INIT page:	
FROM/TO.....INSERT / CHECK	
OIS:	
EFB FLT OPS STS page.....CHECK	EFB FLT OPS STS page.....CHECK
ANF Database:	
ANF DATABASE.....CHECK	

2/2 →

OIS INIT / ANF / AIRCRAFT ACCEPTANCE – 2/2

BACK

CM1

CM2

← 1/2

Aircraft Acceptance:

RCL ALL pb.....PRESS 3s

DISPCH pb.....PRESS

LOGBOOK AND MEL/CDL ITEMS.....CHECK

AIRCRAFT CONFIGURATION SUMMARY.....CHECK

OEB.....CHECK

APU AND ENG FIRE TEST / APU START

BACK

CM1

CM2

RMP 1 and 2.....CHECK ON / SET

FIRE TEST.....PERFORM

APU.....START

When APU is AVAIL:

AIR Panel.....SET

EXT PWR.....AS RQRD

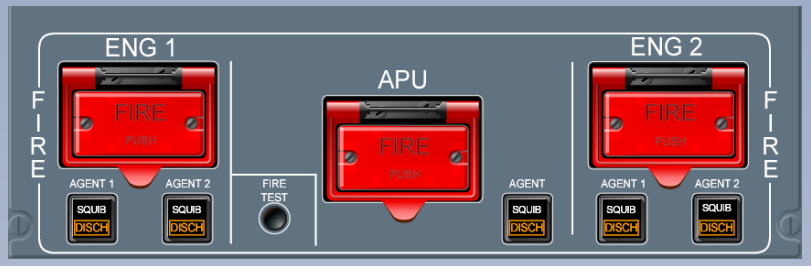
ENG AND APU FIRE TEST

BACK

When pressing the FIRE TEST pb, check that the fire detection and extinguishing systems are operational:

- The continuous repetitive chime sounds 

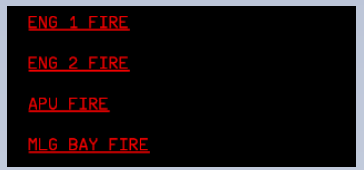
- The ENG and APU FIRE pb-sw come on red
- The SQUIB and DISCH lights of the ENG and APU agents come on



- The FIRE light of the MLG BAY come on red

- The MASTER WARN lights flash

- The ECAM displays the FIRE alerts



- The FIRE lights on the ENG MASTER levers come on red.

OIS PREPARATION

BACK

CM1

CM2

Preliminary Performance Determination:

AIRFIELD DATA.....OBTAIN

MEL/CDL ITEMS.....CHECK ACTIVATED

NAV CHARTS CLIPBOARD.....PREPARE

PRELIMINARY TAKEOFF PERF.....COMPUTE

OIS PRELIMINARY T.O. PERF DATA.....CROSSCHECK

AIRFIELD DATA.....OBTAIN

MEL/CDL ITEMS.....CHECK ACTIVATED

PRELIMINARY TAKEOFF PERF.....COMPUTE

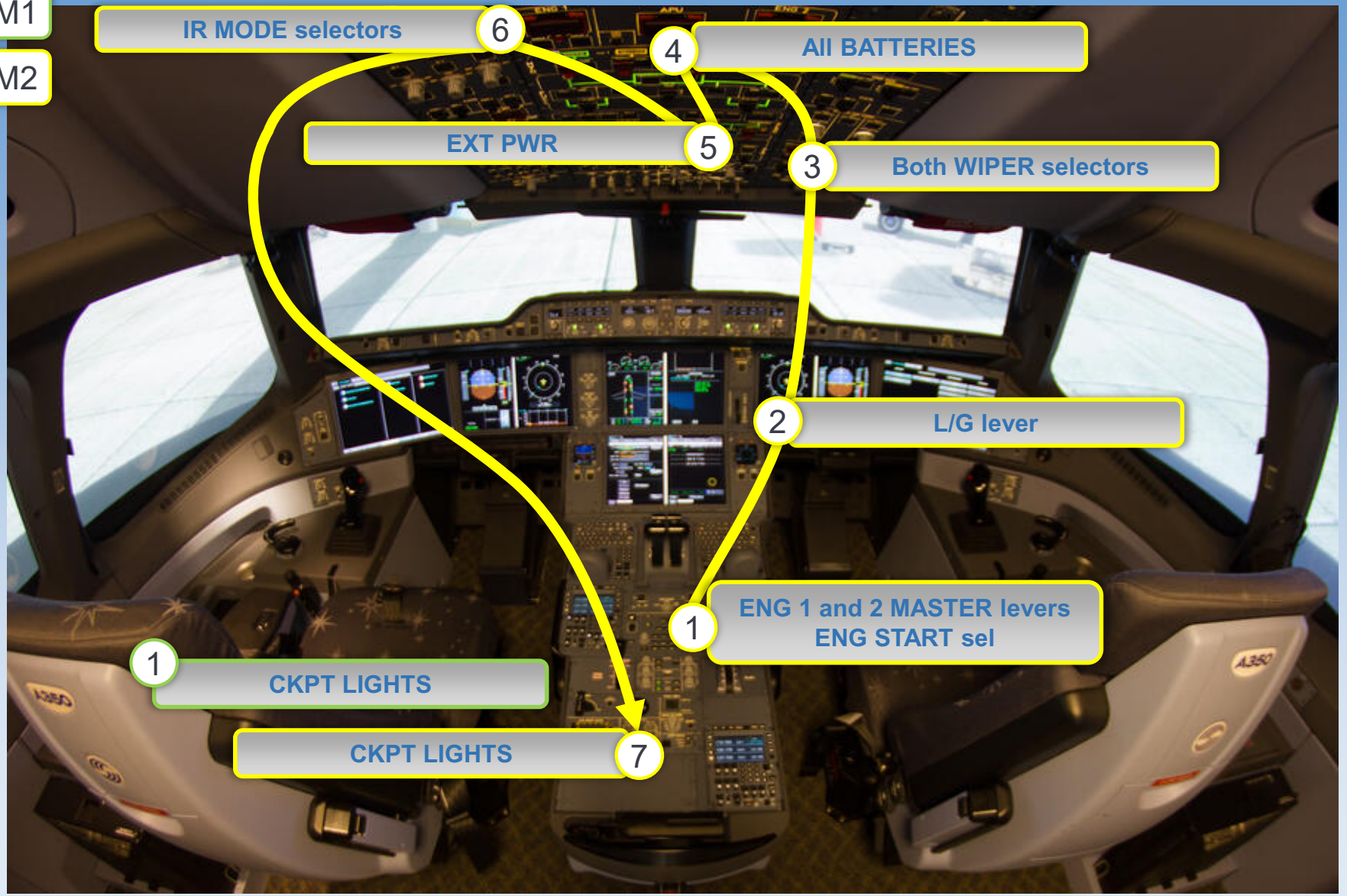
PRELIMINARY COCKPIT PREPARATION - FLOW

POWER-UP

BACK

CM1

CM2



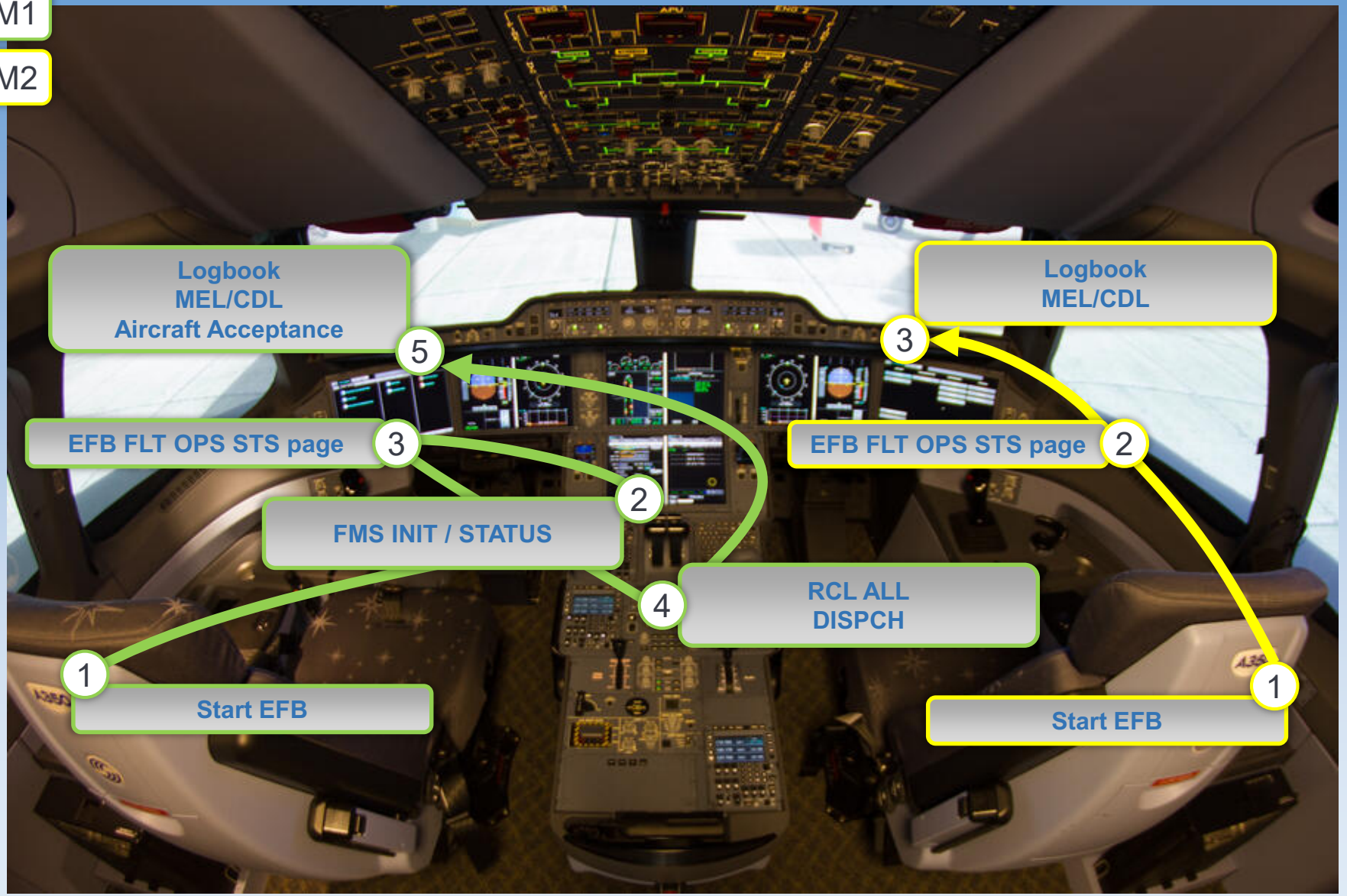
PRELIMINARY COCKPIT PREPARATION - FLOW

OIS INIT / ANF / AIRCRAFT ACCEPTANCE

BACK

CM1

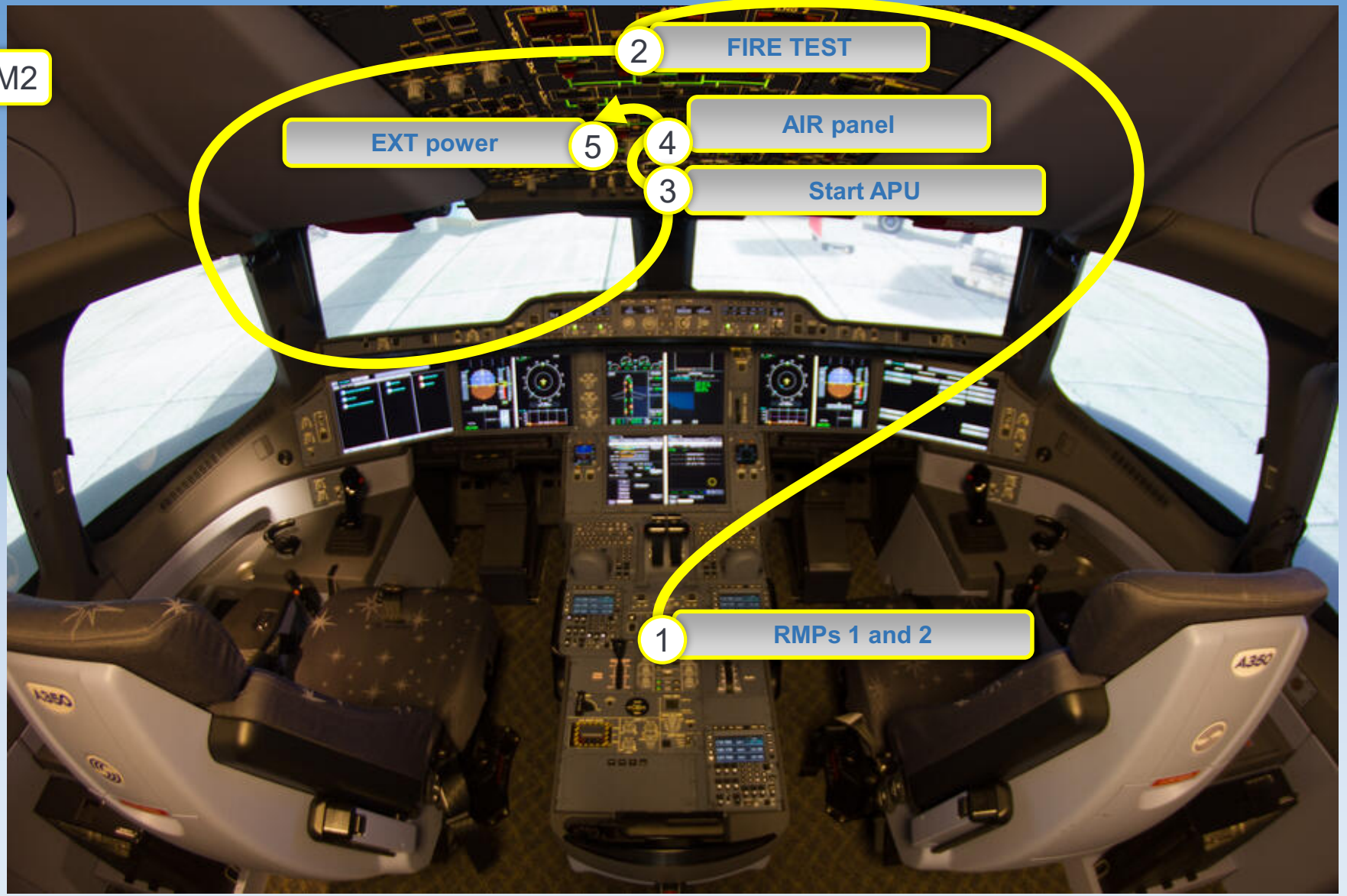
CM2



PRELIMINARY COCKPIT PREPARATION - FLOW

APU AND ENG FIRE TEST / APU START

BACK



BEFORE WALKAROUND

BACK

CM1

PRELIMINARY COCKPIT PREP

PF

PM

COCKPIT PREPARATION

BEFORE WALKAROUND

WALKAROUND

FINAL COCKPIT PREPARATION

DEPARTURE BRIEFING

1

BEFORE WALKAROUND

SOP

FLOW

BEFORE WALKAROUND - FLOW

BACK

BEFORE WALKAROUND - SOP

BACK

PF

PM

On System Display:

OXY Quantity.....CHECK

RAIN RPLNT Quantity.....CHECK

HYD Quantity.....CHECK

ENG OIL Quantity.....CHECK

FLAPS.....CHECK POSITION

SPD BRK.....CHECK RET / DISARMED

ACCU Pressure.....CHECK

PARK BRK handle.....ON

PARK BRK Indication.....CHECK DISPLAYED

EMERGENCY EQUIPMENT.....CHECK

GEAR PINS and COVERS.....
.....CHECK ONBOARD and STOWED

Start exterior walkaround

BEFORE WALKAROUND - SOP

PF

PM

FLAPS AND SPEED BRAKES CHECKS

BACK

If the control surfaces position does not agree with the FLAPS lever or the SPEED BRAKE lever positions, do not apply hydraulic power until clearance is obtained from maintenance personnel.

COCKPIT PREPARATION

BACK

CM1

CM2

SAFETY EXTERIOR INSPECTION

PRELIMINARY COCKPIT PREP

PF

PM

COCKPIT PREPARATION

BEFORE WALKAROUND

WALKAROUND

FINAL COCKPIT PREPARATION

DEPARTURE BRIEFING

1 OVERHEAD SOP FLOW

2 CENTER INSTRUMENT PANEL SOP FLOW

3 PEDESTAL SOP FLOW

4 MFD PREPARATION SOP

OVERHEAD PANEL

BACK

PF

PM

During the flow:

The only amber lights are the GEN pb-sws.
All White Lights.....OFF
Except on the MAINTENANCE panel.

CAPT/CAPT & PURS sw.....AS RQRD
RCDR GND CTL pb-sw.....ON
ELT.....ARMED
CKPT EQPT & RESET pbs (LH side).....CHECK

EXTERIOR LIGHTS.....SET
SIGNS Panel.....SET
PROBE & WINDOW HEAT pb-sw.....AUTO
AIR Panel.....CHECK / SET
MAINTENANCE Panel.....CHECK

CARGO AIR COND Panel.....AS RQRD
CVR TEST pb.....PRESS
CKPT EQPT & RESET pbs (RH side).....CHECK

CENTER INSTRUMENT PANEL

PF

PM

AIR DATA selector.....AUTO

FMS selector.....NORM

ISIS.....CHECK

ANTI SKID sw.....ON

COCKPIT PREPARATION - SOP

PEDESTAL

BACK

PF	PM
RMP 1.....CHECK ON / SET	
ACCU pressure.....CHECK	
PARK BRK handle.....ON	
PARK BRK indication.....CHECK DISPLAYED	
L/G GRAVITY EXTENTION sw.....OFF	
THRUST levers.....IDLE	
THRUST REVERSER levers.....STOWED	
ENG 1 and 2 MASTER levers.....OFF	
ENG START selector.....NORM	
CKPT DOOR sw.....NORM	
RMP 2.....CHECK ON / SET	
RMP 3.....CHECK ON / SET	

MFD PREPARATION

BACK

PF

PM

MFD ATC COM / MSG RECORDS page:

MSG RECORD.....CHECK NO STORED MSG

MFD ATC COM / CONNECT page:

ADS-C (if expected).....CHECK ARMED

MFD SURV / CONTROLS page:

XPDR.....STBY

FMS.....PREPARE

Follow the cursor jump to go through the FMS initialization.

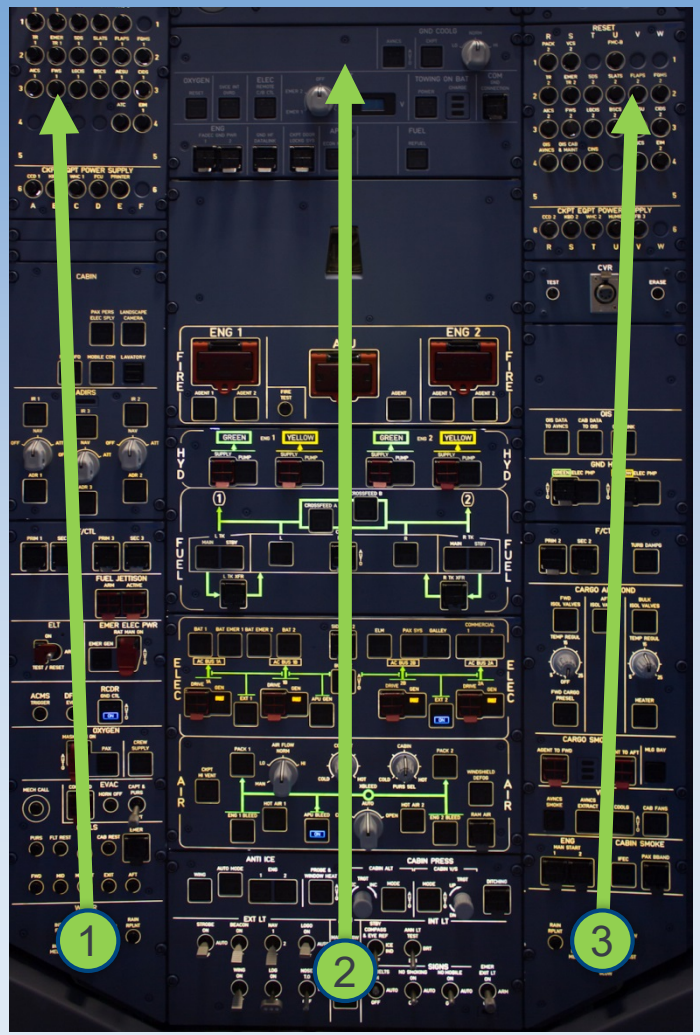
ACTIVE F-PLN.....CHECK / COMPLETE

SEC F-PLNs.....AS REQUIRED

COCKPIT PREPARATION - FLOW
OVERHEAD PANEL

BACK

PF



General rule:
ALL WHITE LIGHTS OFF
Except on the MAINTENANCE panel.

1
CAPT/CAPT & PURS sw
RCDR GND CTL pb-sw
ELT
Left hand CKPT EQT & RESET panel

2
EXT LIGHTS
SIGNS
PROBES and WINDOWS HEAT
AIR panel
MAINTENANCE panel

3
CARGO VENT
CVR test
Right hand CKPT EQT & RESET panel

CENTER INSTRUMENT PANEL

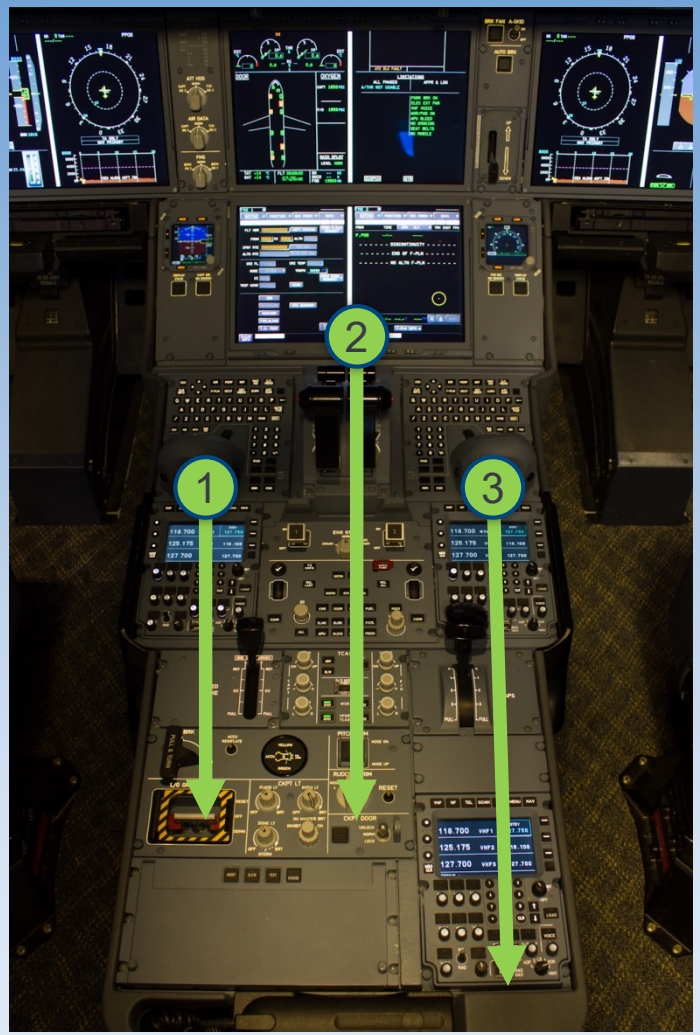
BACK

PF

COCKPIT PREPARATION - FLOW
PEDESTAL

BACK

PF



1. RMP 1
   PARK BRK
   L/G GRVTY EXTN

2. THR LEVERS
   THR REV LEVERS
   ENG 1 & 2 MASTER
   ENG START selector
   CKPT DOOR

3. RMPs 2 & 3

FINAL COCKPIT PREPARATION

BACK

CM1

CM2

SAFETY EXTERIOR INSPECTION

PRELIMINARY COCKPIT PREP

PF

PM

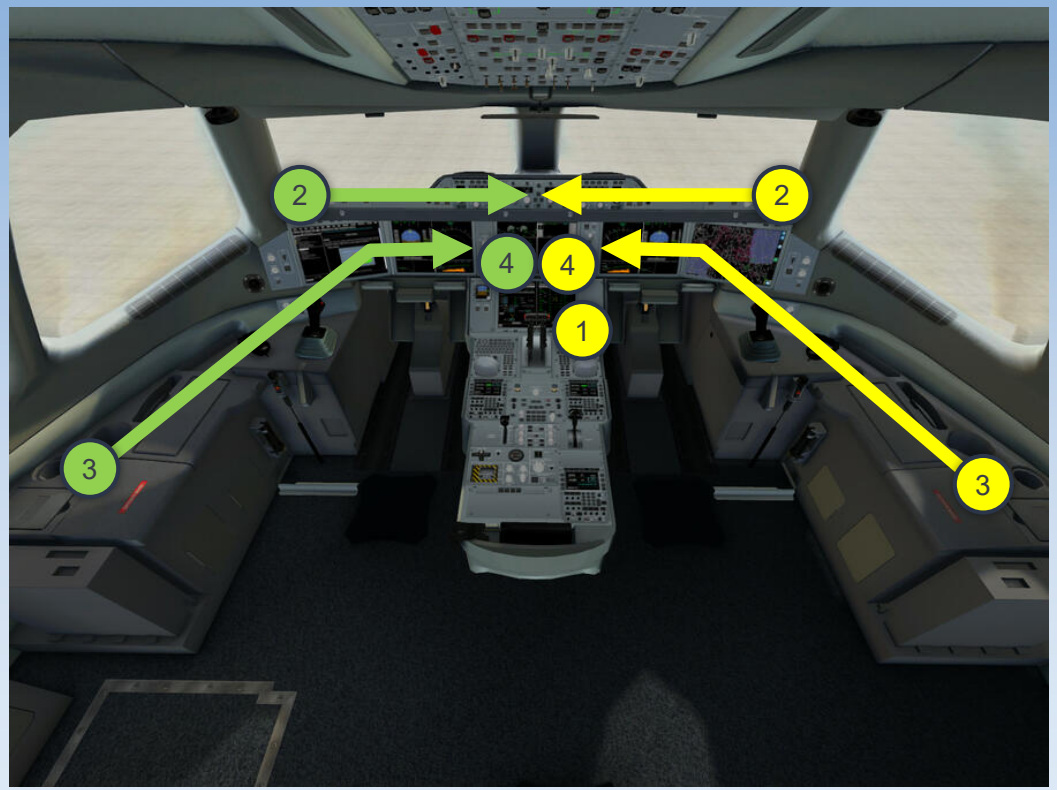
COCKPIT PREPARATION

BEFORE WALKAROUND

WALKAROUND

FINAL COCKPIT PREPARATION

DEPARTURE BRIEFING



When both pilots are seated:

1. FMS CROSSCHECK — SOP
2. GLARESHIELD — SOP
3. LATERAL CONSOLES INSTRUMENT PANELS — SOP
4. FUEL ON BOARD — SOP

MFD SURV / FMS CROSSCHECK

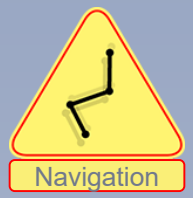
BACK

PF

PM

FMS PREPARATION…….CROSSCHECK

FMS Preparation…….CROSSCHECK



The following items have to be carefully crosschecked by the PM before the Departure briefing:

- **Waypoints & constraints** of the expected **departure route** v.s the **Departure chart**
- **Waypoints** of the **flight plan Initial cruise altitude**
- **Initial cruise altitude**
- **Total track miles**

} v.s the **Computerized Flight Plan (CFP)**

- **Performance data** displayed on the **PM's OIS** with the **T.O panel** of the MFD ACTIVE/PERF page. (it includes RED/ACCEL/EO ACCEL settings if applicable)

- Setup of the **SEC F-PLN**

The PM:

→ should have the **same mental image** of the intended departure procedure, trajectory and constraints than **the PF**

→ should check with the PF if anything is not clear.

LATERAL CONSOLE / INSTRUMENT PANELS

BACK

PF

OXYGEN MASK.....TEST

PFD / ND.....CHECK

PM

OXYGEN MASK.....TEST

PFD / ND.....CHECK

FINAL COCKPIT PREPARATION - SOP

GLARESHIELD

BACK

PF	PM
When both flight crewmembers are seated:	
LOUDSPEAKER knob.....SET	LOUDSPEAKER knob.....SET
BARO REF.....SET/CROSSCHECK	BARO REF.....SET/CROSSCHECK
EFIS CP.....SET	EFIS CP.....SET
AFS CP.....CHECK / SET	AFS CP.....CROSSCHECK

FINAL COCKPIT PREPARATION - SOP

FUEL ON BOARD

BACK

PF

PM

FOB.....CHECK

FOB.....CHECK

FOB.....CHECK

The flight crew crosschecks that the sum of the FOB recorded at the end of the last flight and the fuel uplift (if any) is consistent with the current FOB.

DEPARTURE BRIEFING

BACK

PF

PM

DEPARTURE BRIEFING.....PERFORM

i

" COCKPIT PREPARATION C/L "

COCKPIT PREPARATION C/L .....PERFORM

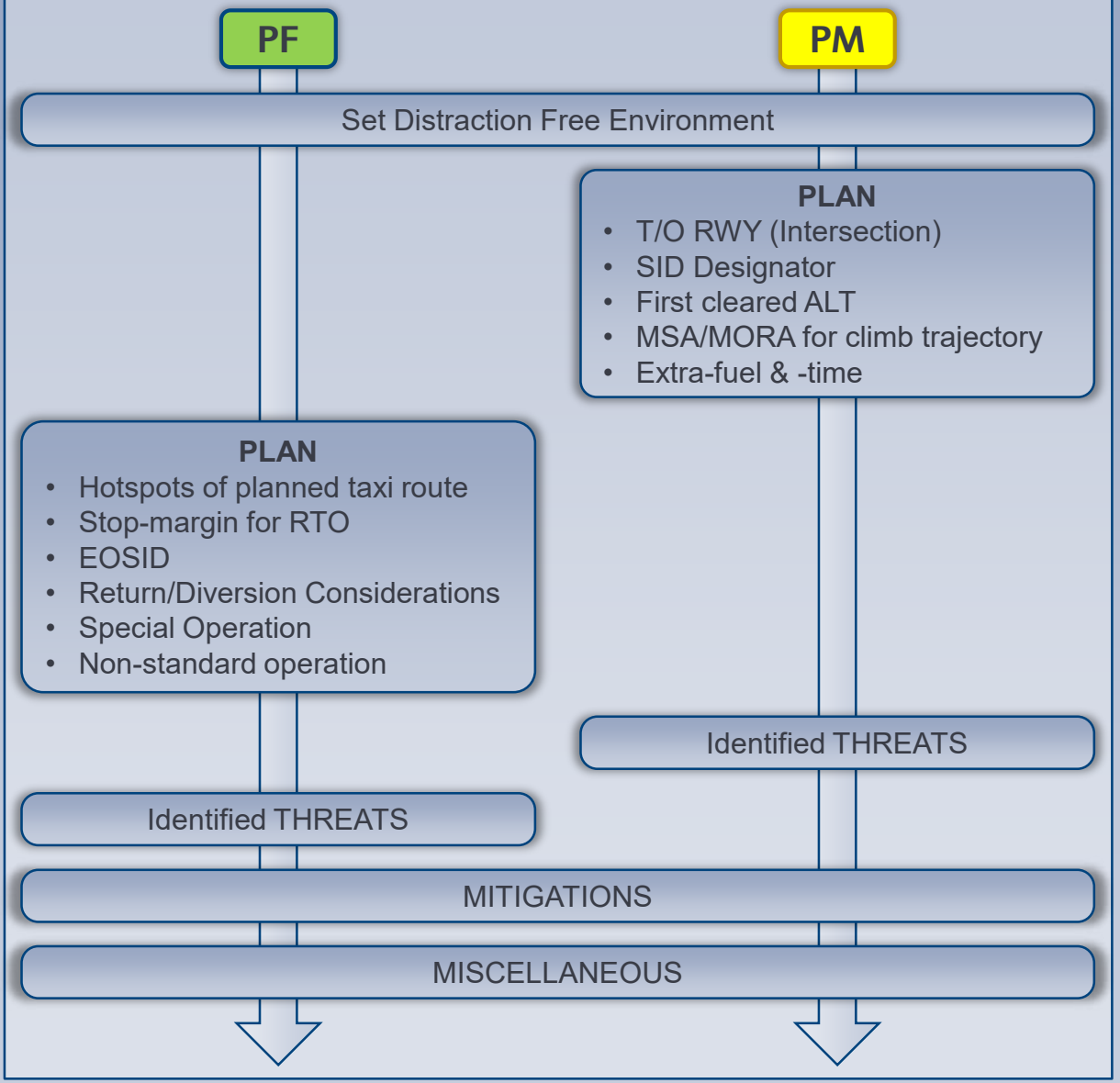
" COCKPIT PREPARATION COMPLETE "

DEPARTURE BRIEFING

DEPARTURE BRIEFING.....PERFORM

BACK

Structure and minimum items of the Departure Briefing



Briefing Recommendations i

PLAN

The PM should start to brief the main items of the PLAN. This ensures that both pilots share the same mental image of the flight trajectory.

The PF briefs the hotspots of potential taxi-routes if any, and considers at least the following items:

- Consideration for RTO
- The EOSID/Engine-out trajectory
- The considerations for a return landing or diversion if so required (weather/weight).

MISCELLANEOUS is intended to consider additional items e.g.:

- Intended use of automation after takeoff
- Supplementary Procedures if not yet briefed.

DEPARTURE BRIEFING

Briefing Recommendations

BACK

Briefing requires **out-of-the-box thinking**, beyond the pure reflection of routine and standard operations.

It should have a **threat-focused** view and **identify and prioritize likely threats** to the intended operation. It should then detail the **actions to mitigate these threats**.

A briefing should be **conversational, interactive** and use open questions that involve all flight crewmembers **to share their experience and expectations**.

It should normally **not be a repetition of the detailed setting and checking of the flight trajectory in the FMS**.

BEFORE PUSHBACK / START / AFTER START

PF

PM

Before Pushback or Start
Before Pushback/Start clearance
SOP

" BEFORE START C/L "

" BEFORE START C/L COMPLETE "

Before Pushback or Start
At Pushback/Start clearance ATC
SOP
FLOW

When communication with the ground crew is established:

Engine Start
MECH

" STARTING ENGINE 1 " SOP

" STARTING ENGINE 2 "

After Start
SOP
FLOW

" AFTER START C/L "

" AFTER START C/L COMPLETE "

BEFORE PUSHBACK/START CLEARANCE

BACK

PF

FINAL LOADSHEET.....CHECK

Note: If the THS and the Loadsheet CG differ more than 1%, check ZFW and ZFCG inserted in FMS.

FUEL ON BOARD.....CHECK

OIS FINAL T.O PERF.....
.....CONFIRM or RECOMPUTE

FMS T.O DATA.....CHECK / REVISE AS RQRD

SEATING POSITION.....ADJUST

HUD (If installed).....DEPLOY / ADJUST

MECH

"BEFORE START C/L"

PM

FINAL LOADSHEET.....CHECK

FUEL ON BOARD.....CHECK

OIS FINAL T.O PERF.....
.....CONFIRM or RECOMPUTE

OIS FINAL T.O PERF.....XCHECK WITH AVNCS

SEATING POSITION.....ADJUST

HUD (If installed).....DEPLOY / ADJUST

AIR COND UNITS.....CHECK DISCONNECTED

EXT PWR.....CHECK AVAIL

EXT PWR DISCONNECTION.....REQUEST

BEFORE START C/L.....PERFORM

"BEFORE START C/L COMPLETE"

BEFORE PUSHBACK/START CLEARANCE

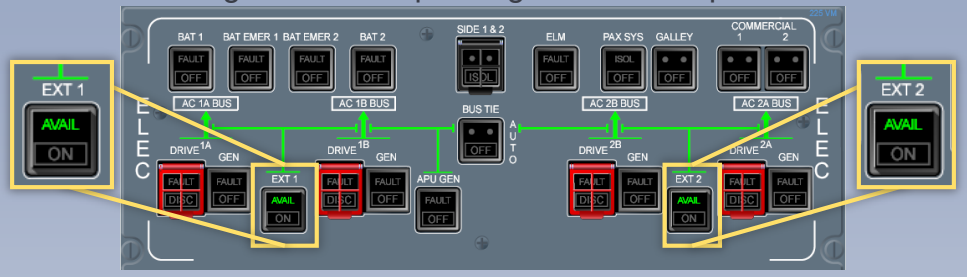
PF

PM

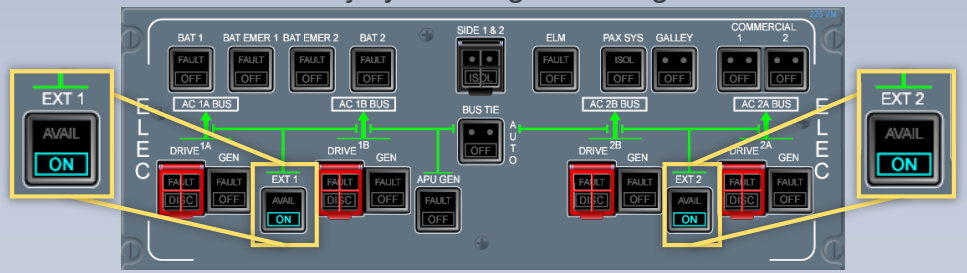
EXTERNAL POWER DISCONNECTION

BACK

Check the **AVAIL** light before requesting the external power disconnection.



Do not request ground power disconnection if it is **ON**. The disconnection while ON may result in severe injury for the ground engineer.



BEFORE PUSHBACK OR START
AT PUSHBACK/START CLEARANCE

BACK

PF

BEACON sw.....ON

TAXI VIDEO (If installed).....AS RQRD

DOORS.....CHECK CLOSED

SLIDES.....CHECK ARMED

SURV DEFAULT SETTINGS.....SELECT

THRUST levers.....IDLE

ACCU PRESS.....CHECK

If pushback is required:

i N/W STEER DISC MEMO.....CHECK DISPLAYED

" BEFORE START C/L "

PARK BRK handle.....OFF

If pushback is not required:

PARK BRK.....ON / CHECK DISPLAYED

" BEFORE START C/L "

When pushback is completed:

PARK BRK.....ON / CHECK DISPLAYED

PM

PUSHBACK/START CLEARANCE.....OBTAIN

ATC

TAXI VIDEO (If installed).....AS RQRD

DOORS.....CHECK CLOSED

SLIDES.....CHECK ARMED

SURV DEFAULT SETTINGS.....SELECT

BEFORE START C/L.....PERFORM

" BEFORE START C/L COMPLETE "

BEFORE START C/L.....PERFORM

" BEFORE START C/L COMPLETE "

AT PUSHBACK/START CLEARANCE

PF

PM

If the **N/W STEER DISC** memo is not displayed, the nose wheel steering is not inhibited. In consequence, pushback in such a condition will damage the nose landing gear.

BACK

ENGINES START

BACK

PF

PM

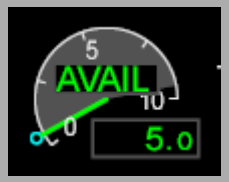
THRUST LEVERS.....IDLE

ENG START selector.....IGN START

" STARTING ENGINE 1 "

ENG 1 MASTER lever.....ON

ENG IDLE PARAMETERS.....CHECK



Keep idle for 30s.

Repeat the start sequence for ENG 2.

" STARTING ENGINE 2 "

AFTER START – 1/2

BACK

PF

ENG START selector.....NORM

At least 30 s after the second engine start:
(30 s after AVAIL indication is displayed on the ED)
APU BLEED pb-sw .....OFF

At least 30 s after the second engine start:
(30 s after AVAIL indication is displayed on the ED)
ENG 1 and 2 ANTI ICE pb-sw.....AS RQRD

At least 15 sec after APU BLEED is set to OFF:
WING ANTI ICE pb-sw.....AS RQRD

If the APU is not required:
APU MASTER SW pb-sw.....OFF

ECAM STATUS.....CROSSCHECK

PM

GND SPLRS.....ARM

RUDDER TRIM.....CHECK NEUTRAL

FLAPS lever.....SET FOR TAKEOFF
FLAPS.....CHECK POSITION

PITCH TRIM.....CHECK

ECAM STATUS.....CHECK

2/2 →

AFTER START – 2/2

BACK

PF

PM

← 1/2

N/W STEERING.....CLEAR TO DISCONNECT

N/W STEER DISC MEMO.....
.....CHECK NOT DISPLAYED

MECH “ CLEAR TO DISCONNECT ”

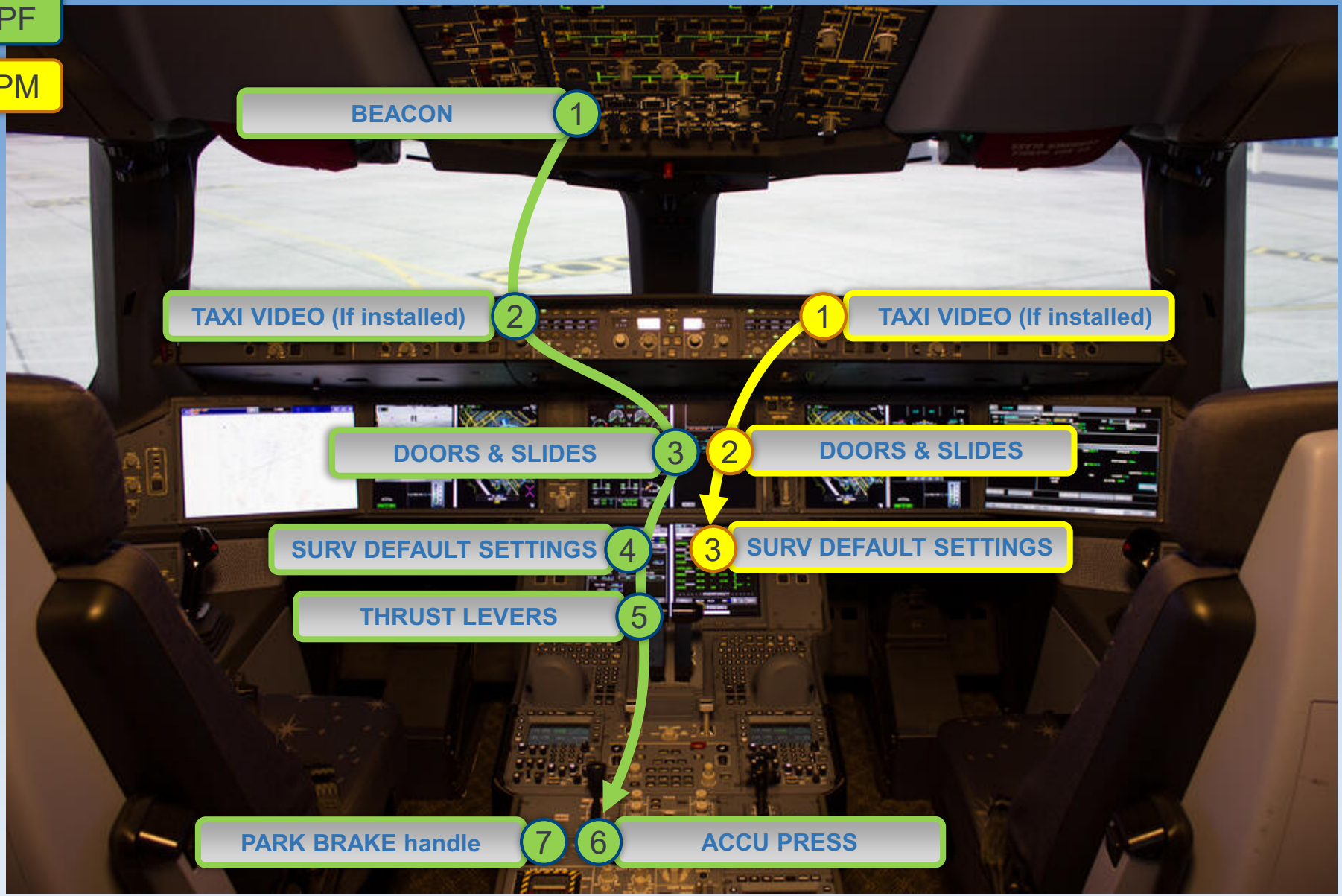
“ AFTER START C/L ”

AFTER START C/L.....PERFORM

“AFTER START C/L COMPLETE ”

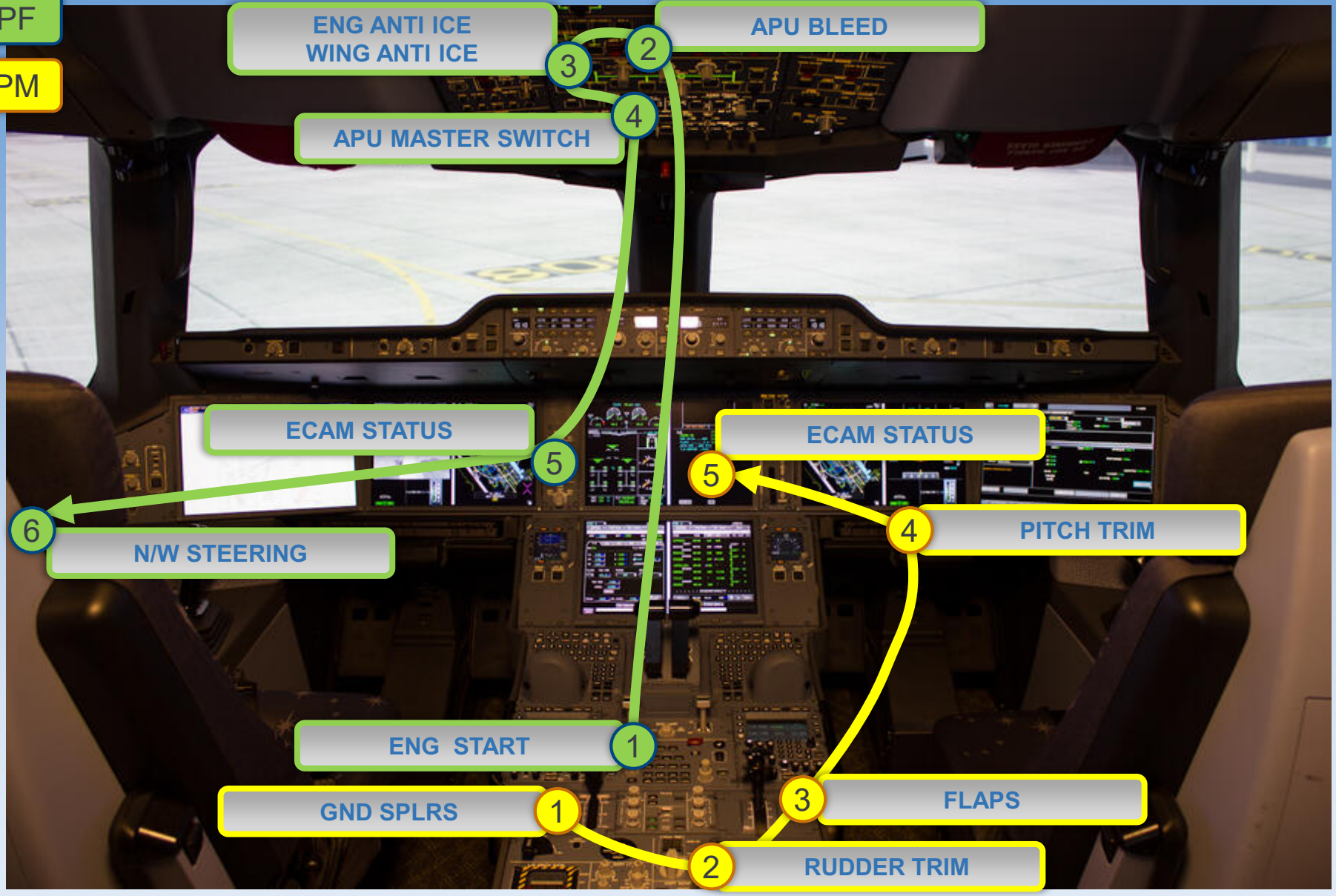
AT PUSHBACK/START CLEARANCE - FLOW

BACK



AFTER START - FLOW

BACK



TAXI / BEFORE TAKEOFF

AIRBUS

Before Taxi — SOP

Taxi — SOP

Departure Change (*) — SOP

(*) if required

Before Takeoff — SOP — FLOW

Taxi Speeds i

180° turn on RWY i

TAXI / BEFORE TAKEOFF

TAXI SPEEDS

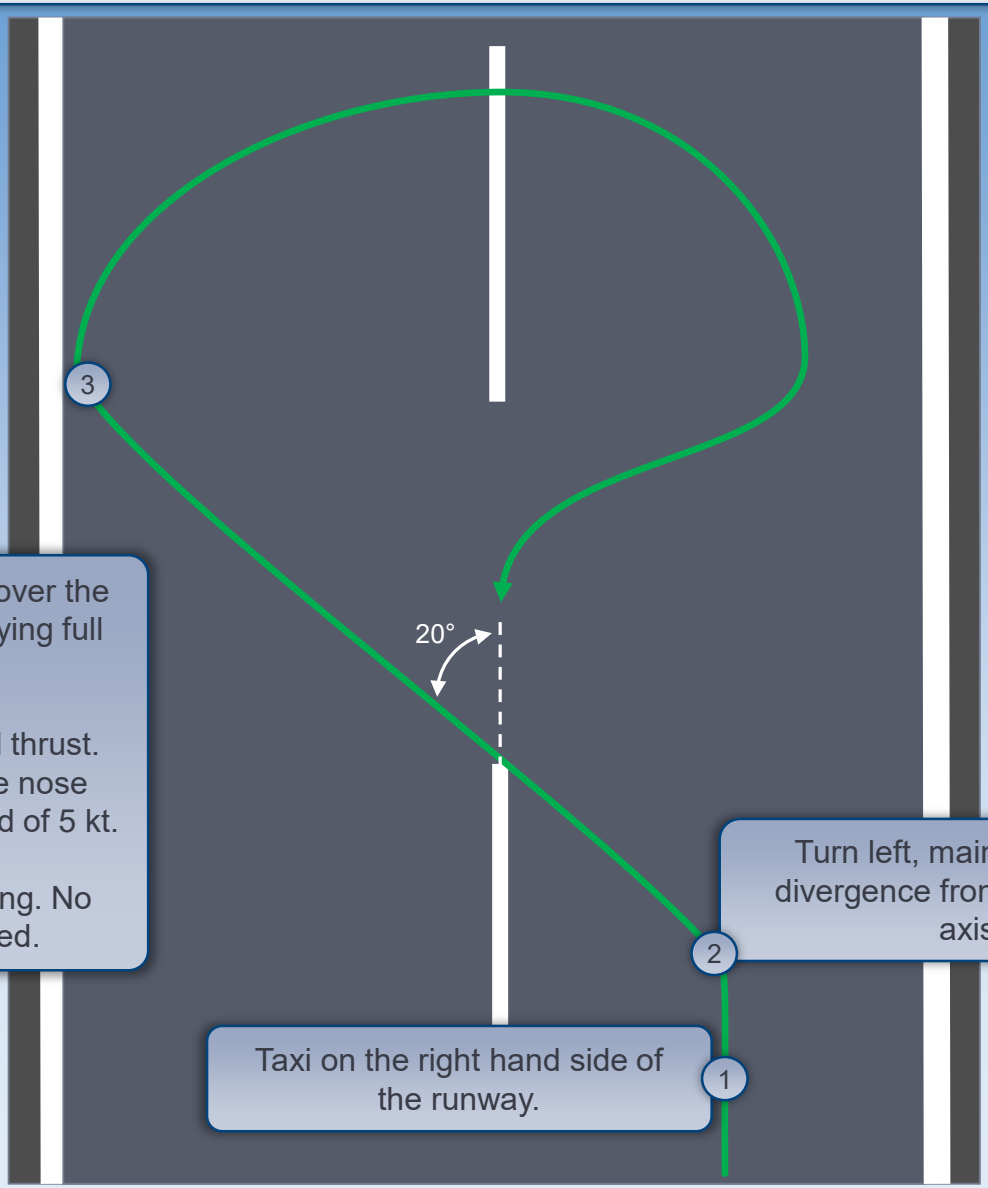
BACK

Max taxi speed in straight taxiway: 30 kt
Max taxi speed in turn: 10 kt

180° Turn on Runway

BACK

The minimum turn width is 52 m (without margins) for the A350-900.
This distance is based on the following procedure.



When the CM1 is physically over the runway edge, turn right applying full tiller deflection.

If needed, use asymmetrical thrust. To prevent from a slip of the nose gear, maintain a ground speed of 5 kt.

Do not use differential braking. No brake pivot turn is allowed.

Turn left, maintaining 20° divergence from the runway axis.

Taxi on the right hand side of the runway.

This is for CM1. The procedure is symmetrical for CM2.

BEFORE TAXI

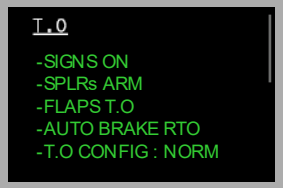
BACK

PF	PM
	TAXI CLEARANCE.....OBTAIN
TAXI pb (if installed).....AS RQRD	TAXI pb (if installed).....AS RQRD
ND RANGE sel.....ZOOM, AS APPROPRIATE	ND RANGE sel.....ZOOM, AS APPROPRIATE
EXTERIOR LIGHTS.....SET	
PARK BRK handle.....OFF	
" BRAKE CHECK "	
BRAKES PEDALS.....PRESS	
	BRAKE FAN pb-sw (if installed).....AS RQRD

When crossing or entering a runway, turn on the STROBE lights.

TAXI

BACK

PF	PM
“ FLIGHT CONTROL CHECK ”	
F/CTL.....CHECK	F/CTL.....CHECK
	ATC CLEARANCE.....CONFIRM
T.O DATA.....CHECK	T.O DATA.....CHECK
	F-PLN / SPD.....CHECK
FMS ACTIVE/PERF page.....SELECT	FMS ACTIVE/F-PLN page.....SELECT
	AFS CP.....SET
	FD.....CHECK ON
PFD / ND.....CHECK	PFD / ND.....CHECK
	DEPARTURE BRIEFING.....CONFIRM
EFIS CP.....AS RQRD	EFIS CP.....AS RQRD
  FLOW	A/BRK pb.....ARM SQUAWK.....CONFIRM / SET T.O CONFIG pb.....TEST T.O MEMO.....CHECK NO BLUE
CABIN REPORT.....RECEIVE	CABIN REPORT.....RECEIVE
“ TAXI C/L ”	
	TAXI CHECKLIST.....PERFORM
	“ TAXI C/L COMPLETE ”

DEPARTURE CHANGE

BACK

If the takeoff conditions change during the taxi phase, and if the previous performance computation is no longer appropriate:

PF	PM
OIS FINAL T.O PERF DATA.....RECOMPUTE	OIS FINAL T.O PERF DATA.....RECOMPUTE
	FMS T.O DATA.....REVISE
OIS FINAL T.O PERF DATA..... .....XCHECK WITH AVNCS	FLAP LEVER.....AS APPROPRIATE
	F-PLN / SPD.....CHECK
RE-BRIEFING.....COMPLETE	
“DEPARTURE CHANGE C/L ”	DEPARTURE CHANGE CHECKLIST..... .....PERFORM
	“ DEPARTURE CHANGE C/L COMPLETE ”

TAXI - FLOW

BACK

BEFORE TAKEOFF – 1/2

BACK

PF

PM

(If installed) with all BRAKES Temp < 150 deg C:

BRAKE FAN pb.....OFF

If the PARK BRK handle is ON:
Before to set PARK BRK to OFF:

BOTH BRAKE PEDALS.....FULLY PRESS

PARK BRK handle.....OFF

BOTH BRAKE PEDALS.....REALESE

2/2 →

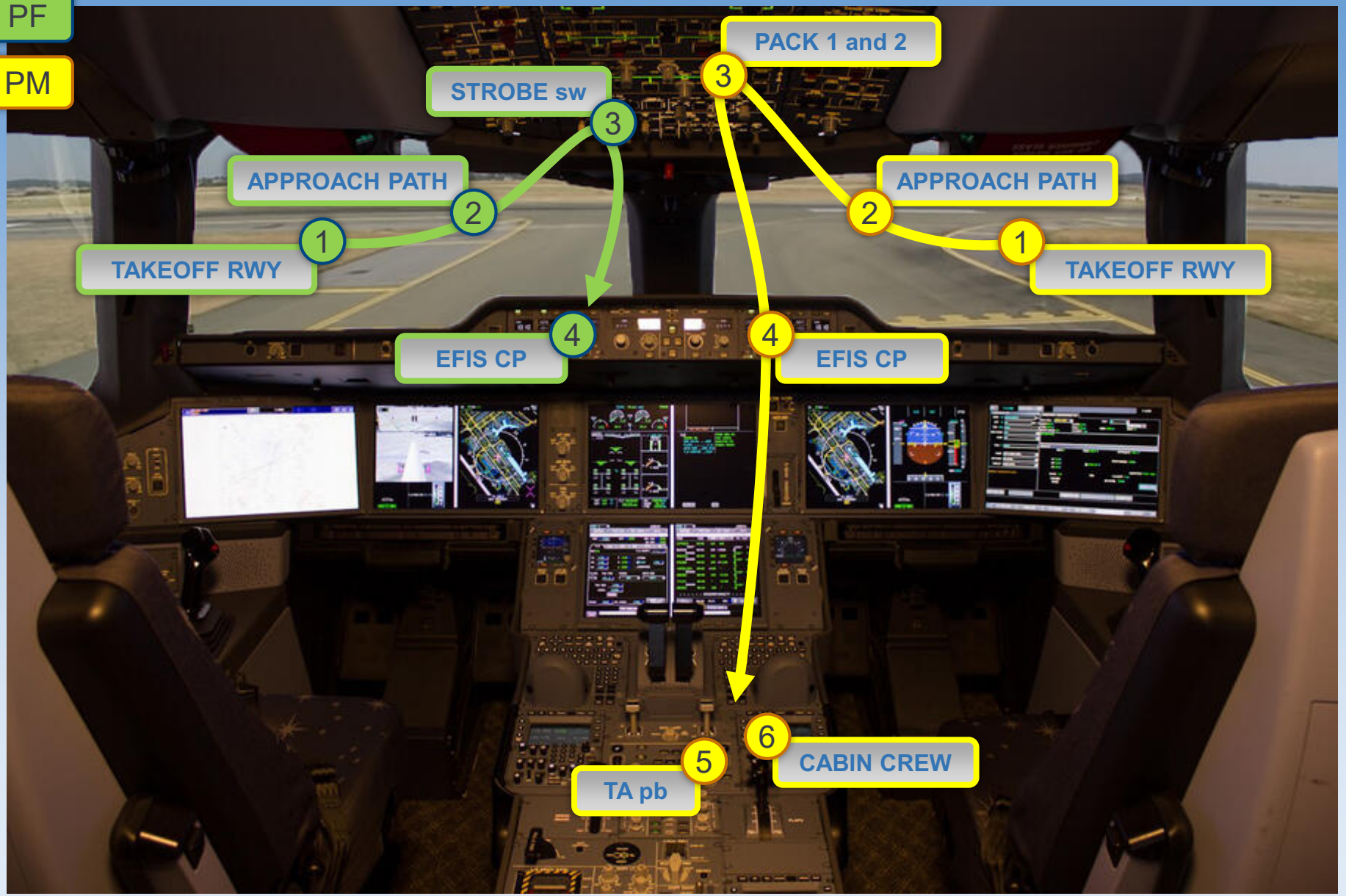
BEFORE TAKEOFF – 2/2

BACK

PF	PM
	← 1/2
	LINE-UP CLEARANCE.....OBTAIN
Before entering the takeoff runway:	
TAKEOFF RUNWAY.....CONFIRM	TAKEOFF RUNWAY.....CONFIRM
APPROACH PATH.....CLEAR OF TRAFFIC	APPROACH PATH.....CLEAR OF TRAFFIC
STROBE sw…….....ON	PACK 1 and 2.....AS RQRD
EFIS CP.....SET	EFIS CP.....SET
	If required:
	TA pb.....TA ONLY
SLIDING TABLE.....STOW	SLIDING TABLE.....STOW
	PA “ CABIN CREW, BE READY FOR TAKEOFF ”
“ LINE-UP C/L”	
	LINE-UP CHECKLIST.....COMPLETE
	“ LINE-UP C/L COMPLETE ”

LINE-UP - FLOW

BACK



TAKEOFF

AIRBUS

THRUST SETTING — SOP

T.O ROLL — SOP

LIFTOFF — SOP

THRUST REDUCTION — SOP

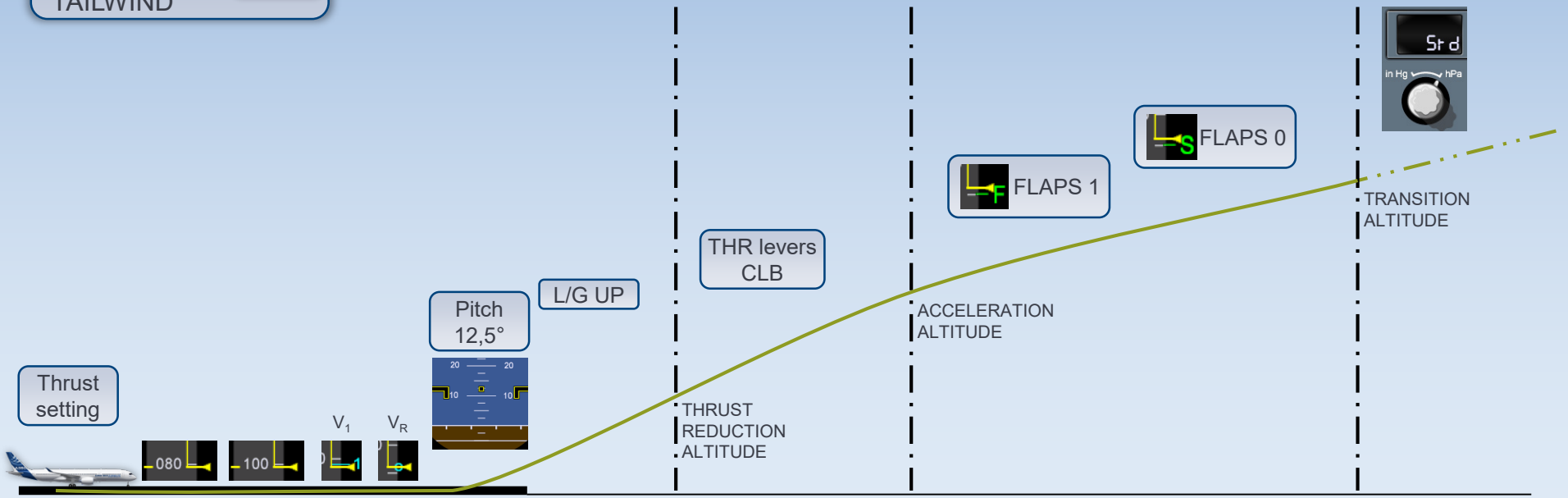
ACCELERATION — SOP — FLOW

AFTER T.O — SOP

TRANSITION — SOP

CALLOUTS

CROSSWIND or TAILWIND — SOP



THRUST SETTING

BACK

PF

PM

T.O CLEARANCE.....OBTAIN

LDG sw.....ON
NOSE sw.....ON

“ TAKE OFF ”

THR.....25 %

BRAKES.....RELEASE
Half stick forward.

THRUST levers.....FLEX or TOGA

CHRONO.....START

The captain places hand on thrust levers until V1.

DIRECTIONAL CONTROL.....USE RUDDER

“ MAN FLX 56, SRS, RWY, A/THR blue ”

“ CHECKED ”

GOLDEN RULE #3 Understand the FMA at all time.

TAKEOFF ROLL

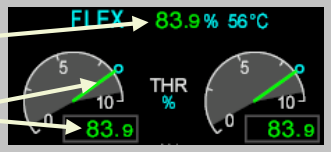
BACK

PF | **PM**

Before reaching 80 kt:

THRUST RATING LIMIT

ACTUAL THRUST



“ THRUST SET ”

Release the sidestick gradually (in pitch) to reach neutral position at 100 kt.

Scan the airspeed, thrust and EGT throughout the takeoff roll.

At 100 kt:

100 KT.....CROSSCHECK

“ CHECKED ”

“ ONE HUNDRED KNOTS ”

At V_1:

“ V ONE ”

if no auto-callout: **ANNOUNCE “ V ONE ”**

At VR:

“ ROTATE ”

ROTATION.....PERFORM

TAKEOFF ROLL

PF

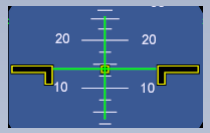
PM

ROTATION

BACK

Perform the rotation with a continuous rotation rate of about 3°/s.

Rotate to 12,5° of pitch. Do not follow the horizontal FD bar.



When both FD bars are available, follow FD bars.

The tail strike pitch limit indicator provides the maximum pitch limit.

Minimize lateral inputs on ground and during the rotation to avoid spoiler extension.

LIFTOFF

BACK

PF | **PM**

When Vertical Speed is positive and Radio Altitude increases:

“ POSITIVE CLIMB ”

“ GEAR UP ”

LANDING GEAR.....SELECT UP

“ GEAR UP ”

“ NAV ”

i

“ CHECKED ”

At least 5 seconds after lift-off:

AP 1(2).....AS RQRD

“ AP1 ”

“ CHECKED ”

LIFTOFF

PF

PM

ANNOUNCE FMA

BACK

If NAV is armed, NAV engages at 30 ft:

Callout: “ **NAV** ”

If NAV is not armed, RWY TRK engages at 50 ft:

Callout: “ **RWY TRK** ”

THRUST REDUCTION

BACK

PF

PM

At thrust reduction altitude, LVR CLB flashes on the FMA:

THRUST LEVERS.....CL

" THR CLB, A/THR "

" CHECKED "

If takeoff was performed with packs off:

PACK 1 and 2.....ON

ACCELERATION

BACK

PF | **PM**

At acceleration altitude:

“ CLB, ALT blue ”

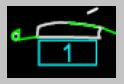
“ CHECKED ”

At F speed <u>with</u> positive speed trend:

“ FLAPS 1 ”

“ SPEED CHECKED ”

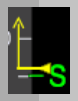
FLAPS 1.....SELECT



“ FLAPS 1 ”

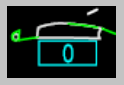
At S speed <u>with</u> positive speed trend:

“ FLAPS 0 ”



“ SPEED CHECKED ”

FLAPS 0.....SELECT



“ FLAPS 0 ”

GND SPOILERS.....DISARM

L/G.....CHECK UP

EXTERIOR LIGHTS.....SET

ACCELERATION - FLOW

BACK

AFTER TAKEOFF

BACK

PF

PM

If APU was used for takeoff:

APU BLEED pb-sw.....OFF

APU MASTER SW pb-sw.....OFF

If the takeoff was performed with TA ONLY:

TA pb.....TA/RA

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

TRANSITION ALTITUDE

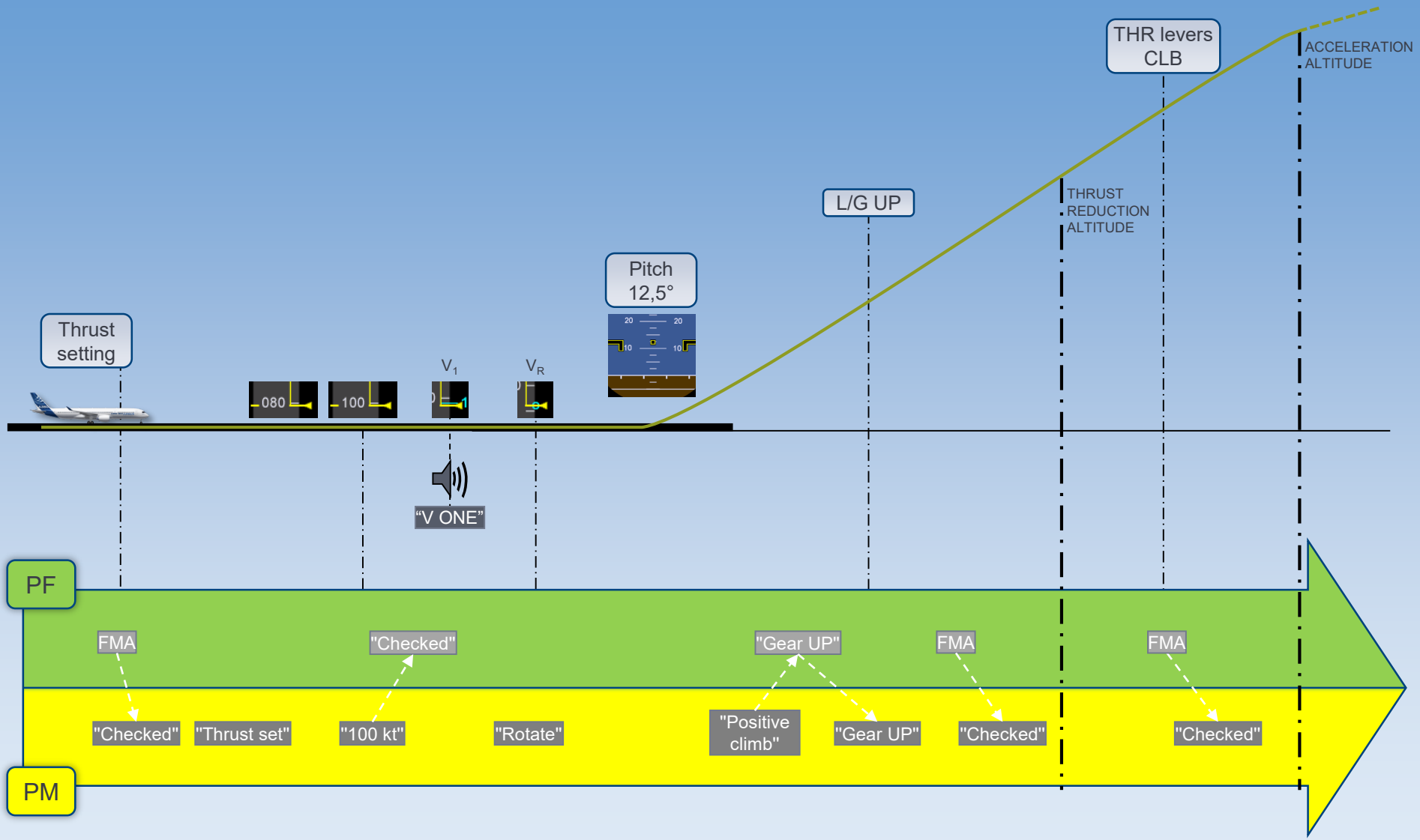
BACK

PF	PM
At transition altitude:	
" SET STANDARD "	
BARO REF.....SET STANDARD	BARO REF.....SET STANDARD
CM1 sets STD on the ISIS.	
	"STANDARD CROSSCHECKED "
	"PASSING FL ___ NOW "
FLIGHT LEVEL.....CHECK	
" CHECKED "	
	ANTI ICE pb-sw.....AS RQRD

TAKEOFF – CALLOUTS 1/2

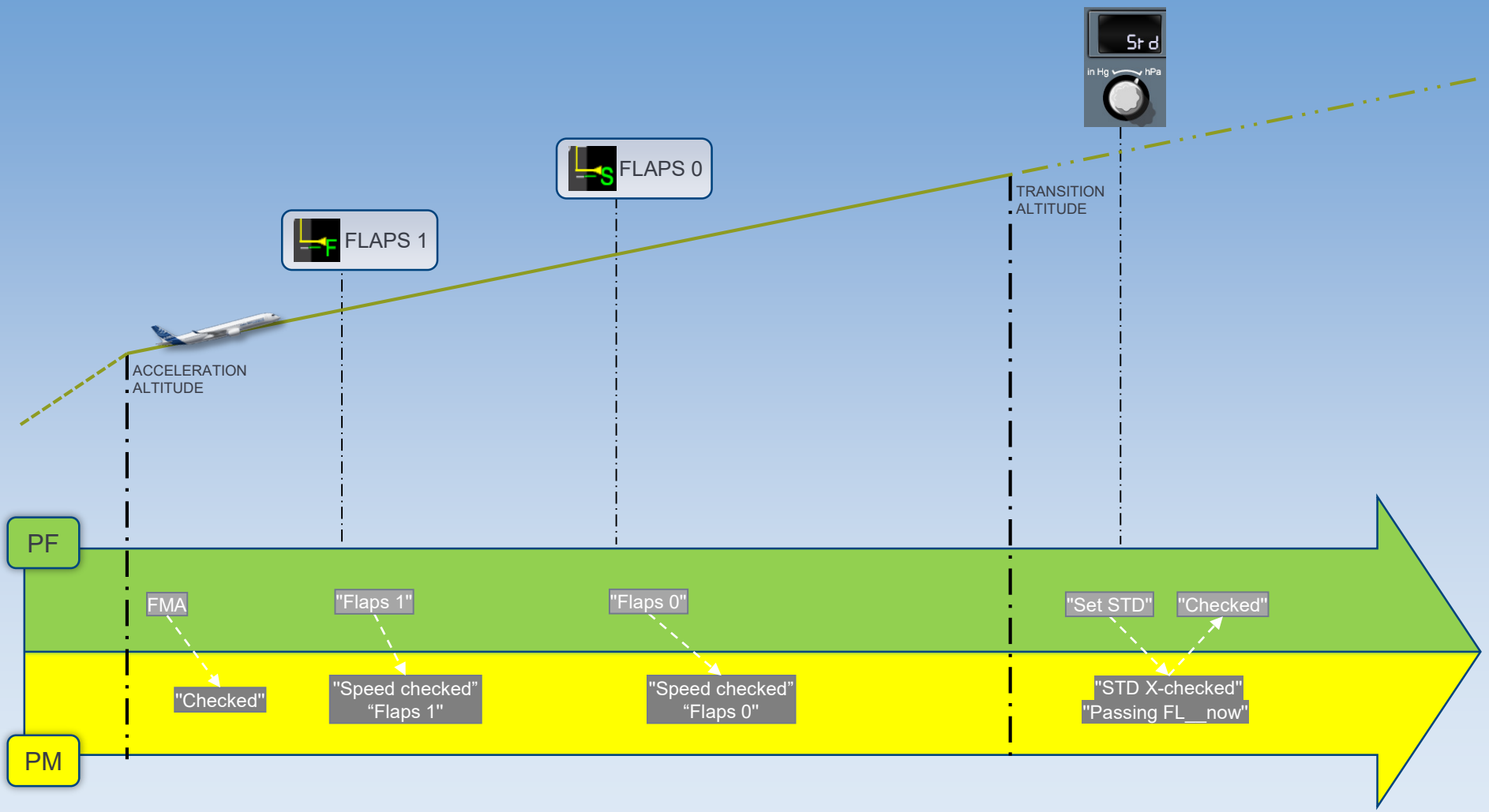
NEXT

BACK



TAKEOFF – CALLOUTS 2/2

PREV BACK



CROSSWIND OR TAILWIND TAKEOFF

BACK

PF

PM

In the case of tailwind, or if the crosswind is above 25 kt:

BRAKES.....RELEASE

SIDESTICK.....FULL FORWARD

Maintain full forward stick until the airspeed reaches 80 kt.

N1.....INCREASE

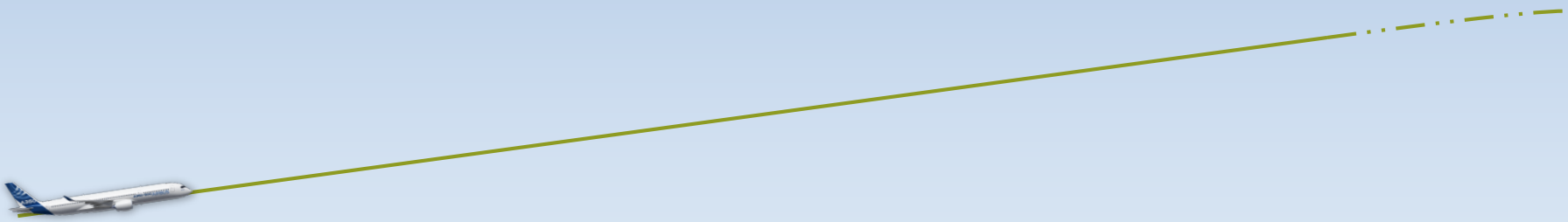
Increase progressively N1 to reach CL detent at 20 kt ground speed and FLX(or TOGA) detent at 40 kt ground speed.

CLIMB

Climb / 10 000 ft AAL

SOP FLOW

End of climb i



CLIMB / 10 000 FT AAL

FLOW

BACK

PF

PM

At 10 000 ft AAL:

EFIS OPTIONS.....AS RQRD

LDG sw.....OFF

SEAT BELTS sw.....AS RQRD

EFIS OPTIONS.....AS RQRD

ECAM MEMO.....REVIEW

NAVAIDS.....CLEAR

OPT FL/REC MAX FL.....CHECK

CLIMB / 10 000 FT AAL – FLOW

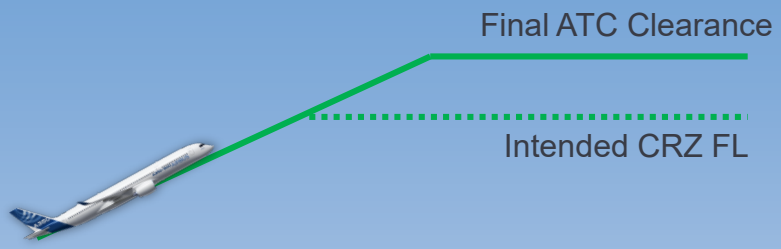
PF

PM

END OF CLIMB – SWITCH TO CRZ PHASE

BACK

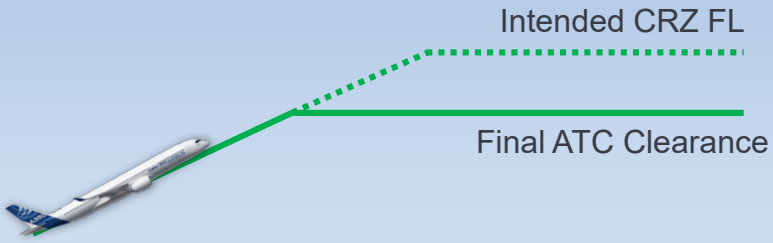
Final ATC clearance at or above intended CRZ FL:

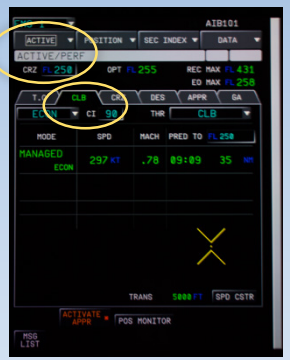


PERF CRZ FL is automatically updated.

The FMS switches to CRZ phase.

Final ATC clearance below intended CRZ FL:

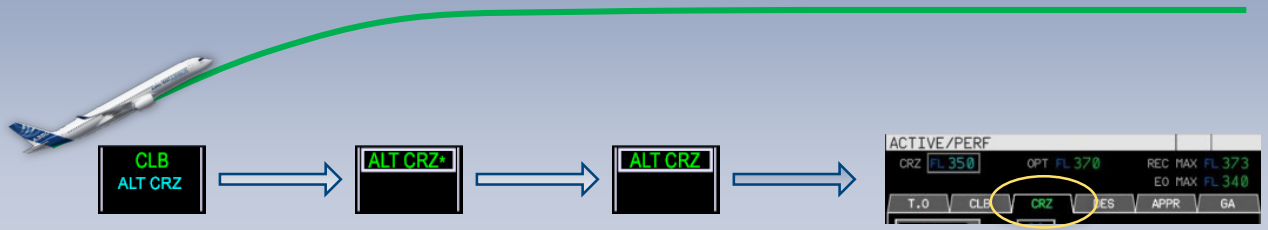




PERF CRZ FL is not automatically updated.

The FMS does not switch to CRZ phase.

SWITCH TO CRZ PHASE



CRUISE

Cruise **SOP**

Level Change **i**

Offset **i**

CRUISE

BACK

PF

PM

“ ALT CRZ ”

“ CHECK ”

Periodicaly:

ECAM MEMO / SD PAGES.....REVIEW

FLIGHT PROGRESS.....CHECK

FLIGHT PROGRESS

- Check the fuel prediction
- Check regularly the fuel: FOB at departure = FOB + FU.

STEP FLIGHT LEVEL.....AS APPROPRIATE

If NAV PRIMARY LOST:

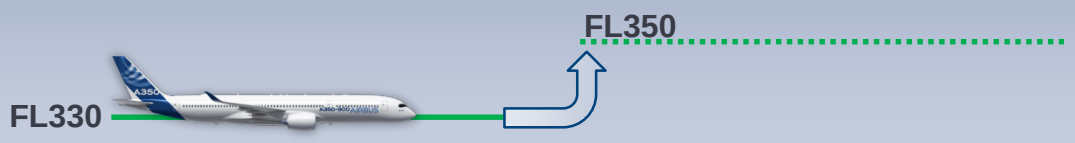
NAVIGATION ACURACY.....MONITOR

LEVEL CHANGE

BACK

If the new flight level is above the current CRZ FL

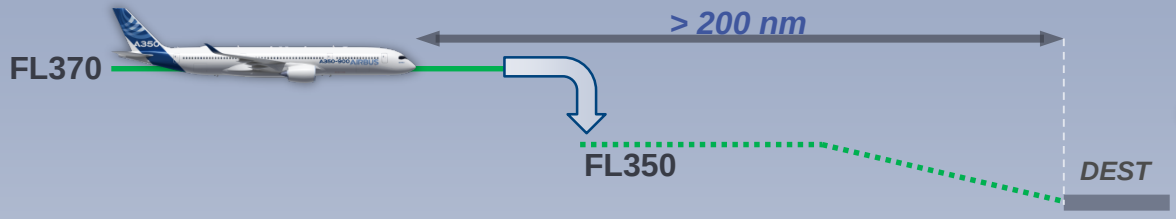
→ The CRZ FL is automatically updated in the ACTIVE/PERF page.



If the new flight level is below the current CRZ FL:

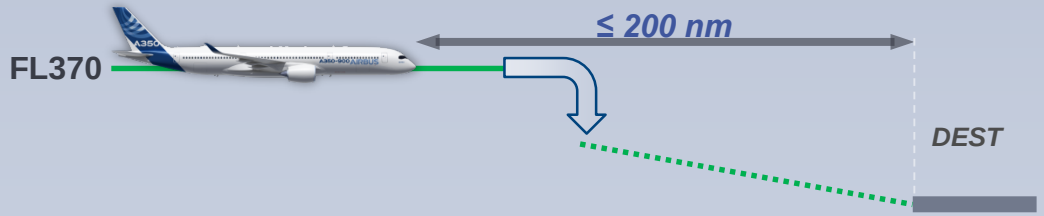
- If the distance to destination is more than 200 nm

→ The CRZ FL is automatically updated in the ACTIVE/PERF page.



- If the distance to destination is 200 nm or less, or
- If the selected altitude is lower than FL 200 or the highest DES ALT CSTR:

→ The FMS automatically switches from CRZ phase to DES phase.



OFFSET

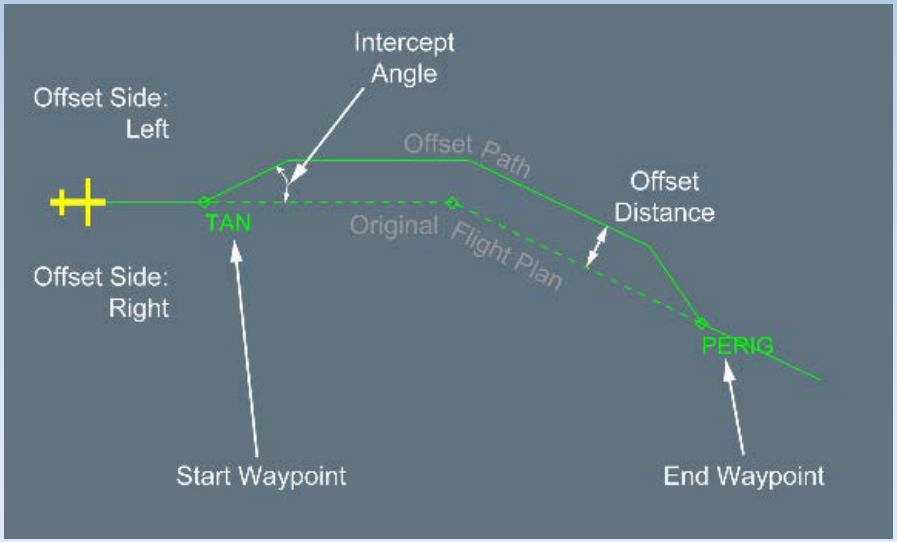
BACK

OFFSET REVISION……SELECT

OFFSET……INSERT

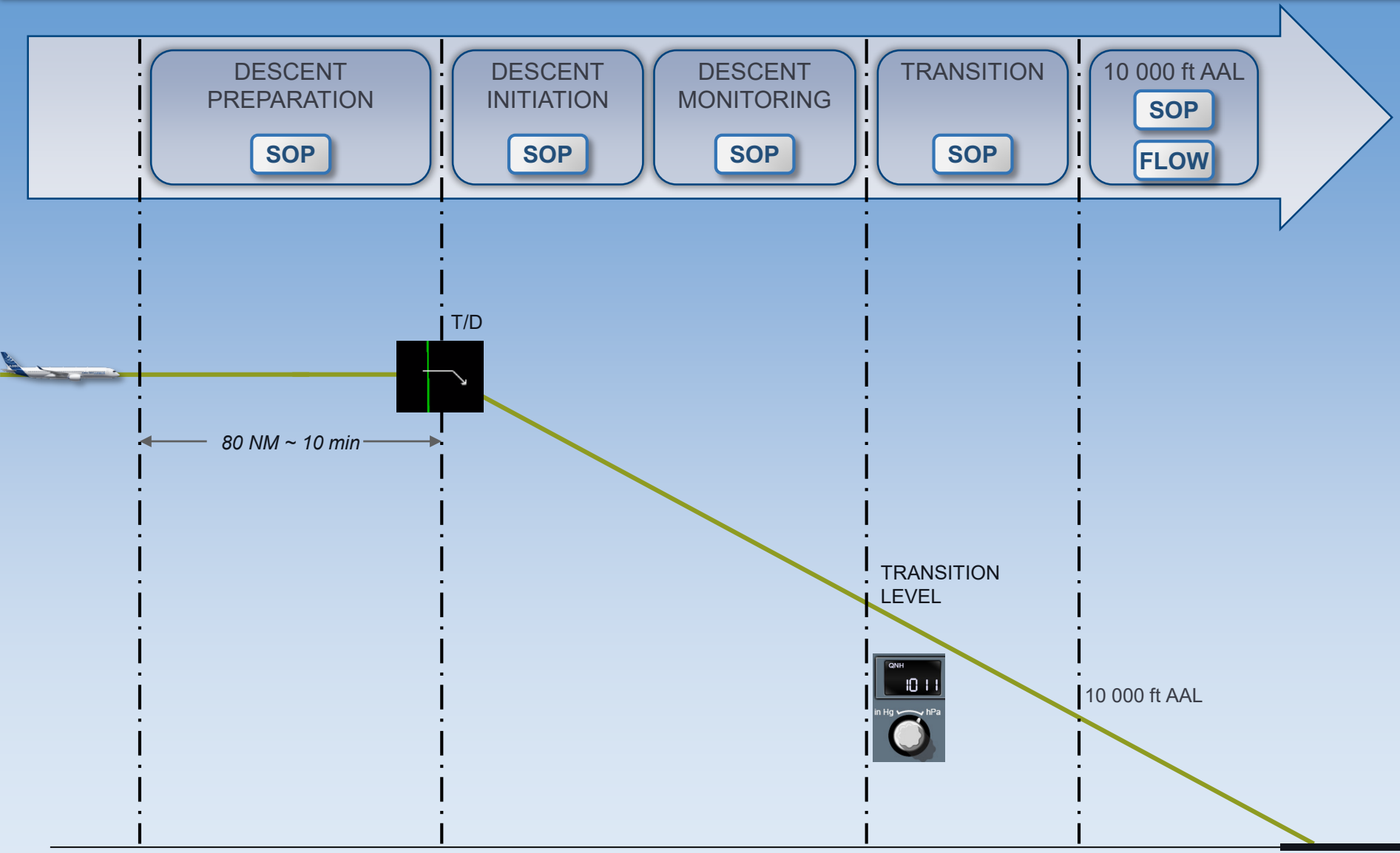
To resume own navigation:

OFFSET……CANCEL



DESCENT / APPR PREPARATION

AIRBUS



DESCENT PREPARATION

BACK

PF	PM
	WEATHER/LDG INFORMATION.....OBTAIN
NAV CHARTS CLIPBOARD.....PREPARE	
BARO REF.....PRESET	BARO REF.....PRESET
	STATUS PAGE/STATUS MORE PAGE.....CHECK
LANDING CONDITIONS.....CONFIRM	LANDING CONDITIONS.....CONFIRM
If a landing assessment is required:	
SYNCHRO ECAM button.....CLICK	SYNCHRO ECAM button.....CLICK
LANDING PERF DATA.....COMPUTE	LANDING PERF DATA.....COMPUTE
LANDING PERFORMANCE.....CROSSCHECK	
FMS.....PREPARE	FMS PREPARATION.....CROSSCHECK
LDG ELEVN.....CHECK	
RWY COND / BRK ACTION.....SELECT	
RUNWAY SHIFT (if required).....ENTER	
BTV (if used).....PREPARE	
BRK MED or BTV.....ARM	
RUNWAY LENGTH (if BTV).....CHECK	
ARRIVAL BRIEFING.....PERFORM	
	ANTI ICE pb-sw.....AS RQRD
	DESCENT CLEARANCE.....OBTAIN
CLEARED ALTITUDE on AFS CP.....SET	

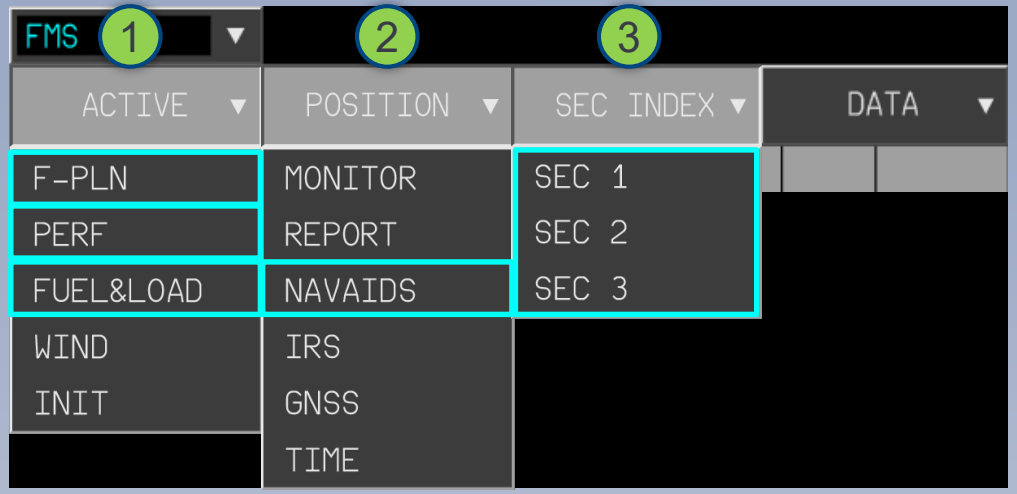
DESCENT PREPARATION

PF

PM

FMS PREPARATION

BACK



1

- **F-PLN** — Insert lateral and vertical revisions for arrival, as needed
- **PERF** — Check and insert data for Descent, Approach and Go-Around
- **FUEL&LOAD** — Check fuel data

2 **NAVAIDS** — Navaids selection or deselection

3

- **SEC 1**
- **SEC 2**
- **SEC 3**

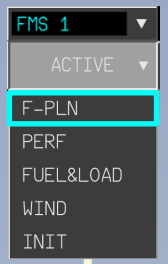
Revise SEC F-PLN according to circumstances, for example: runway change, circling, alternative approach…

NAVIGATION

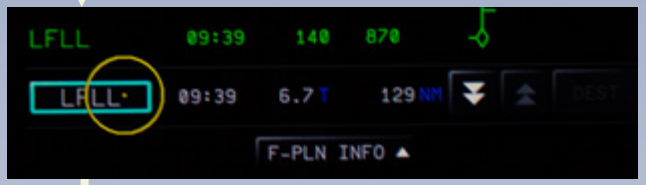
DESCENT PREPARATION

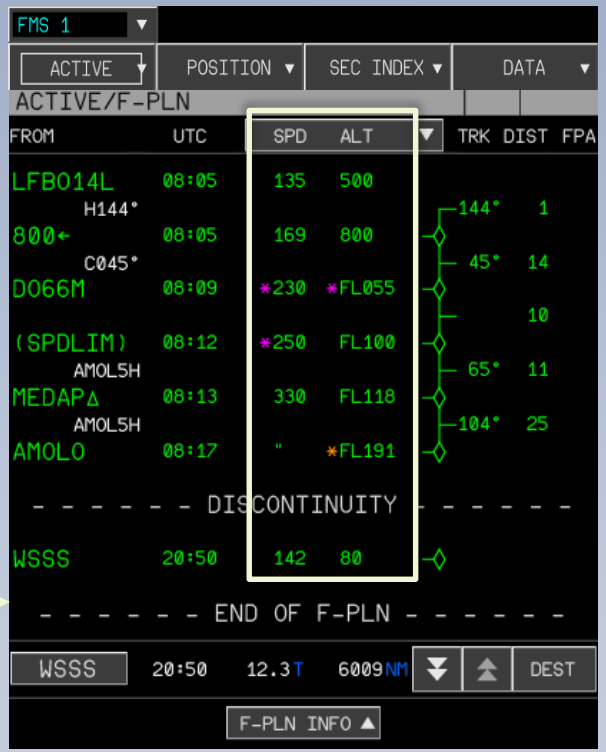
FLIGHT PLAN

BACK



Check the F-PLN with approach charts and ND in PLAN mode





PERFORMANCE

BACK

DESCENT PREPARATION

PF

PM

FUEL AND LOAD

BACK

DESCENT PREPARATION

PF

PM

KCCU

BACK

KCCU shortcuts are dedicated to ACTIVE F-PLN only.

DESCENT PREPARATION

PF

PM

FMS PREPARATION.....CROSSCHECK

BACK

After the PF prepares the FMS, the PM checks all the data entered in the FMS.

The PM should have the same mental picture of the intended arrival and approach procedure, trajectory, and constraints than the PF.

The PM should check with the PF if anything is not clear.

DESCENT PREPARATION

ARRIVAL BRIEFING.....PERFORM

BACK

Structure and minimum items of the Arrival Briefing

PF

PM

Set Distraction Free Environment

PLAN
- MORA/MOCA/MSA for planned trajectory
- STAR
- Type of APP
- MINIMUM
- G/A TRAJECTORY
- Extra-fuel & -time

PLAN
- Guidance for APP
- Landing FLAP setting
- Stop-margin
- Use of Reverse
- Use of Autobrake
- Planned RWY Exit
- Hotspots for taxi-in
- Special operation
- Non-standard operation

Identified THREATS

Identified THREATS

MITIGATIONS

MISCELLANEOUS

Briefing Recommendations i

PLAN

The PM should start to brief the main items of the PLAN. This ensures that both pilots share the same mental image of the flight trajectory.

The PF briefs what she/he considers for landing.

MISCELLANEOUS is intended to consider additional items e.g.:

- Special Operations
- Supplementary Procedures if not yet briefed.

DESCENT PREPARATION

Briefing Recommendations

BACK

Briefing requires **out-of-the-box thinking**, beyond the pure reflection of routine and standard operations.

It should have a **threat-focused** view and **identify and prioritize likely threats** to the intended operation. It should then detail the **actions to mitigate these threats**.

A briefing should be **conversational, interactive** and use open questions that involve all flight crewmembers **to share their experience and expectations**.

It should normally **not be a repetition of the detailed setting and checking of the flight trajectory in the FMS**.

DESCENT INITIATION

BACK

PF

PM

At Top of Descent (T/D):

DESCENT……INITIATE

“THR IDLE, DES FL 220 blue”

Other examples of FMA

“CHECKED”

EFIS OPTIONS……AS RQRD

EFIS OPTIONS……AS RQRD

Early / Late descent

DESCENT INITIATION

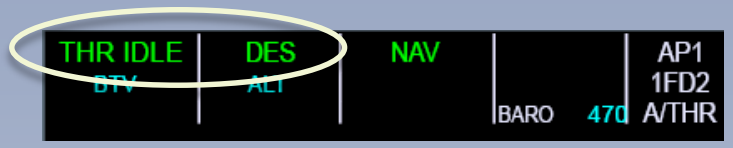
PF

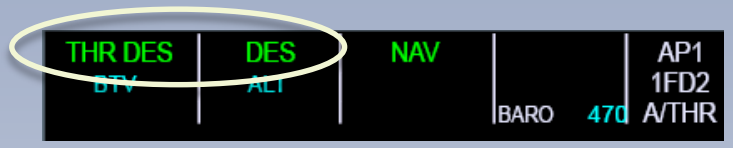
PM

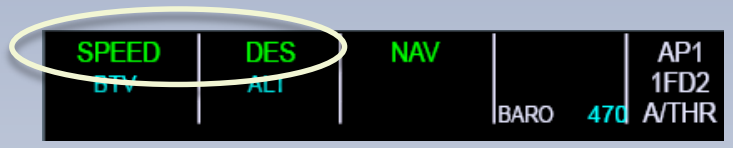
FMA

BACK

•Descent in managed vertical mode:

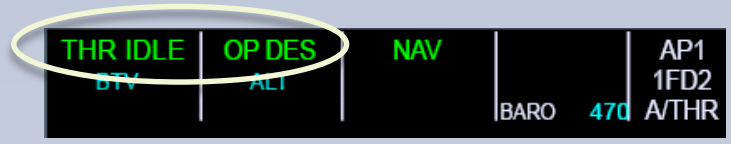






PUSH

•Descent in selected vertical mode:

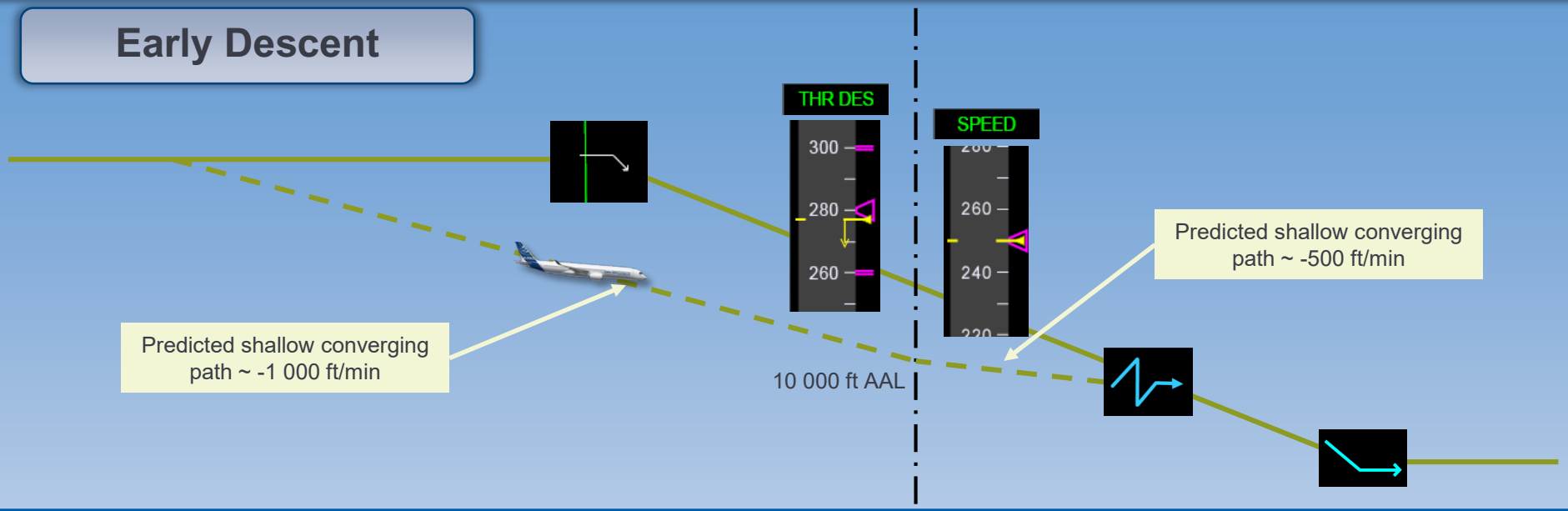


PULL

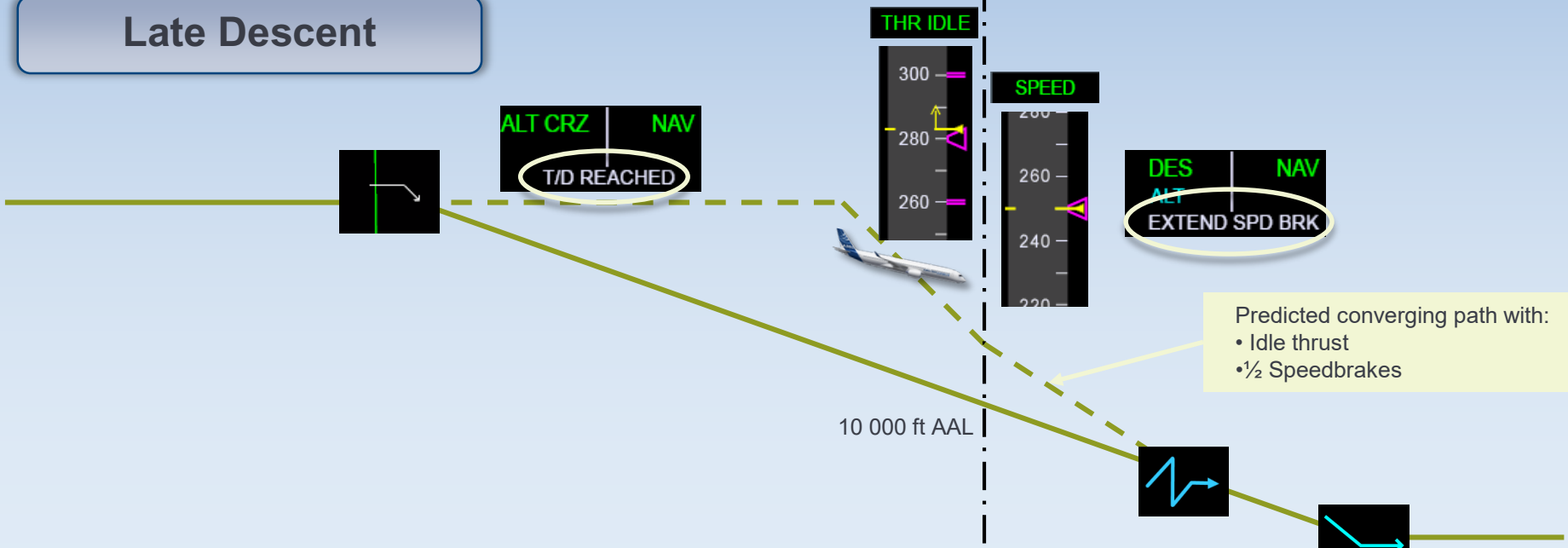
EARLY/LATE DESCENT

BACK

Early Descent



Late Descent



DESCENT MONITORING

BACK

PF

PM

DESCENT.....MONITOR/ADJUST

HANDLING

DESCENT MONITORING

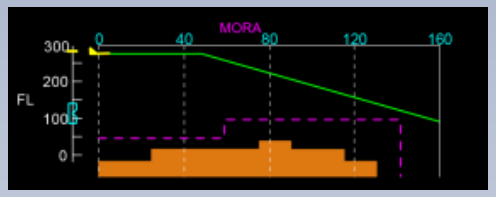
PFD:

ND:

MFD: PERF

VERT DEV +120 FT

VD:



Speed range:

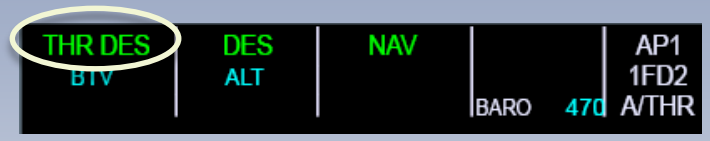
DESCENT MONITORING

PF

PM

SPEEDBRAKES

BACK



In **THR DES**, if the speed brakes are extended, the A/THR will increase thrust to remain on the computed profile.

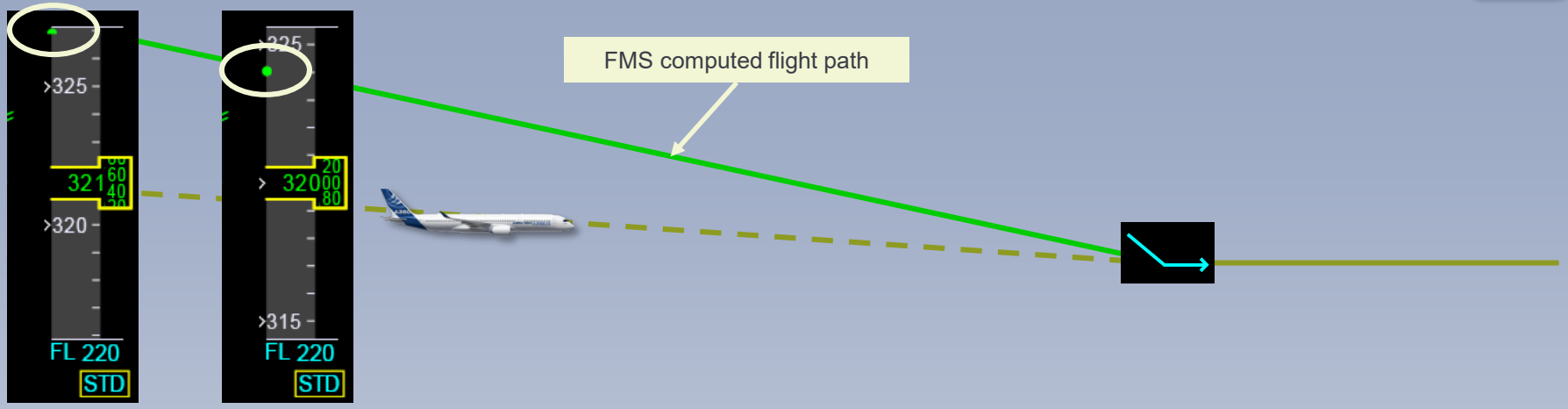
DESCENT MONITORING

PF

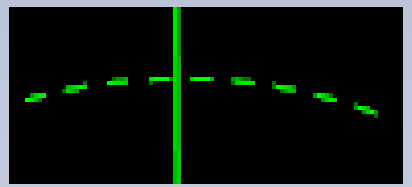
PM

VERTICAL DEVIATION

BACK



ENERGY CIRCLE



In **HDG** or **TRK** mode, displays the distance required to descend, decelerate and configure the aircraft, in order to land at Vapp.

TRANSITION LEVEL

BACK

PF

PM

When the aircraft approaches the transition level, and when cleared for an altitude:

"SET QNH"

BARO REF……SET QNH

BARO REF.....SET QNH

CM1 sets the QNH on the ISIS.

"QNH CROSSCHECKED"

"PASSING ___ FT NOW"

ALTITUDE.....CROSSCHECK

"CHECKED"

10 000 FT AAL

BACK

At 10 000 ft AAL:

PF	PM
	LDG sw.....ON
	SEAT BELTS sw.....ON
CSTR pb on EFIS CP.....ON	CSTR pb on EFIS CP.....ON
LS pb.....AS RQRD	LS pb.....AS RQRD
NAVAIDS.....AS RQRD/CHECK	
If NAV PRIMACY LOST: NAVIGATION ACCURACY.....MONITOR	
"APPROACH C/L"	
	APPROACH CHECKLIST.....COMPLETE
	"APPROACH C/L COMPLETE"

DESCENT 10 000 FT AAL - FLOW

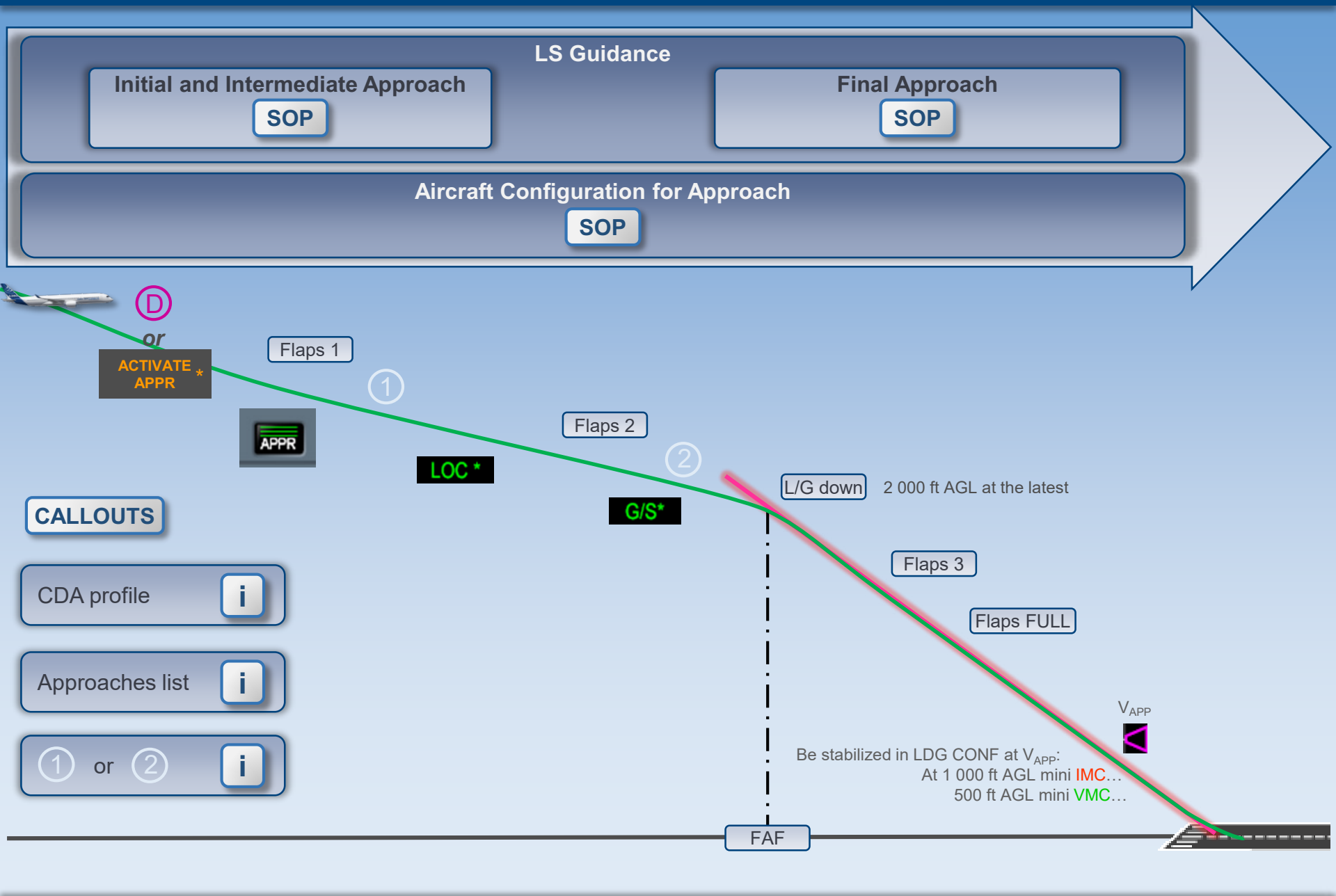
BACK

PF

PM

APPROACHES WITH LS GUIDANCE

AIRBUS



APPROACHES LIST

BACK

Glossary i

Charts Approach type	FMS database Approach type	Guiding function	Deviations	Arming	FMA	Maximum approach capability i
ILS	ILSxx	ILS	Single diamond	APPR	G/S LOC	LAND3 DUAL
GLS	GLSxx	GLS	ILS GLS SLS			LAND 1
RNAV (GNSS) LPV	RNVxx (LPV-SLS)	SLS				APPR 1
RNAV (GNSS) LNAV/VNAV	RNVxx	xLS LS FLS	Double diamonds FLS		F-G/S F-LOC	F-APP
RNAV (GNSS) LNAV	RNVxx					
VOR	VORxx					
NDB	NDBxx					
LOC (GS OUT)	ILSxx & deselect G/S	FLS / LOC or LOC BC	Mixed F-G/S LOC BC LOC		F-G/S LOC	
LOC	LOCxx				F-G/S LOC BC	
LOC BC	BACxx					

APPROACHES LIST

GLOSSARY

BACK

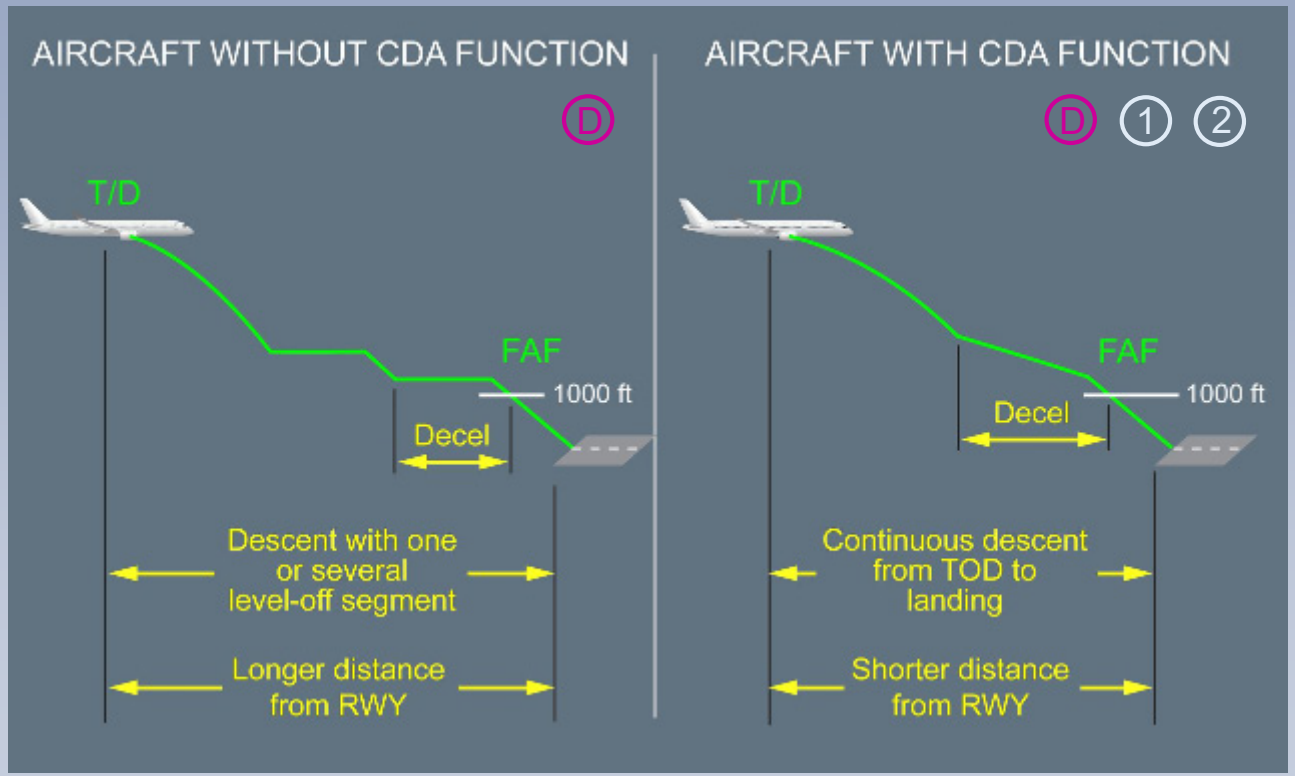
ABAS:	Airborne Based Augmentation System
APV:	Approach Procedure with Vertical guidance
BARO-VNAV:	Barometric Vertical NAVigation = Computed vertical guidance based on barometric altitude
CDFA:	Continuous Descent Final Approach
GBAS:	Ground Based satellite Augmentation System
LNAV:	Lateral NAVigation
LPV:	Localizer Performance with Vertical guidance
PBN:	Performance Based Navigation
RNAV (GNSS):	aRea NAVigation (Global Navigation Satellite System)
RNP APCH:	Required Navigation Performance approach
RNP AR:	Required Navigation Performance with Authorization Required
SBAS:	Satellite Based Augmentation System
VNAV:	Vertical NAVigation

APPROACHES WITH LS GUIDANCE

AIRBUS

CDA Profile

BACK



APPROACHES WITH LS GUIDANCE

FLAP 1 or FLAP 2 Pseudo-Waypoints

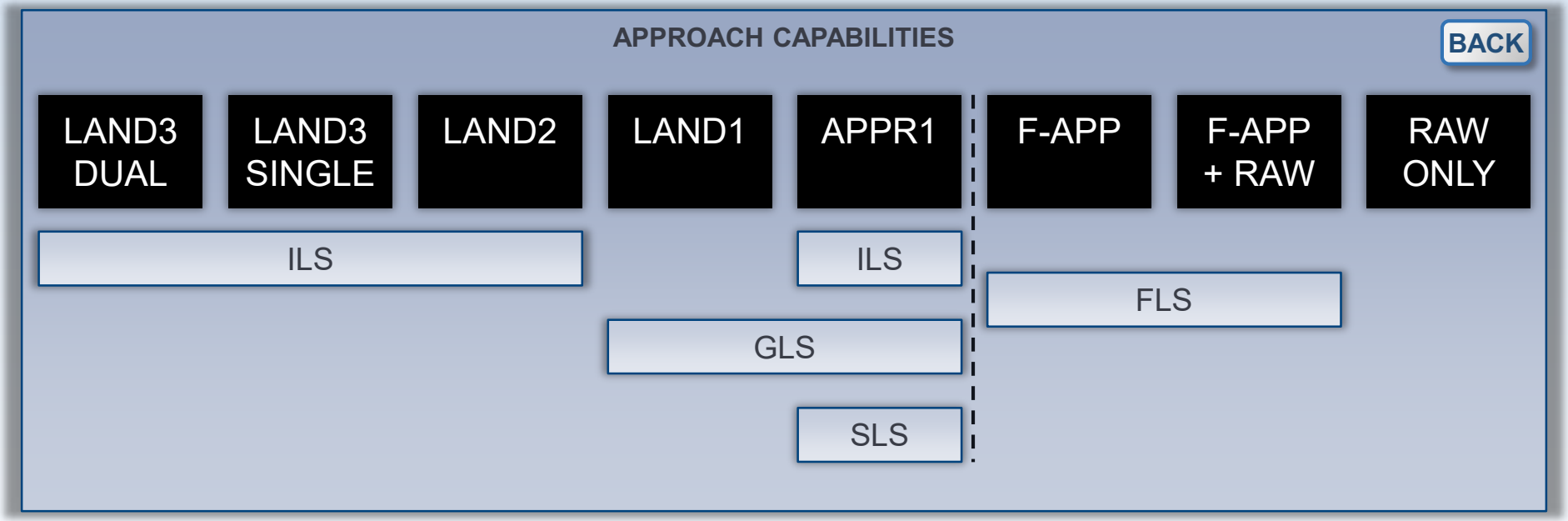
BACK

1. informs the flight crew of the beginning of the segment where the slats/flaps should be at least in movement toward configuration 1.

2. informs the flight crew of the beginning of the segment where the slats/flaps should be at least in movement toward configuration 2.

The flight crew should select the corresponding configuration at the pseudo-waypoint at the latest.

APPROACHES WITH LS GUIDANCE



AIRCRAFT CONFIGURATION FOR APPROACH – 1/3

INITIAL APPROACH

NEXT BACK

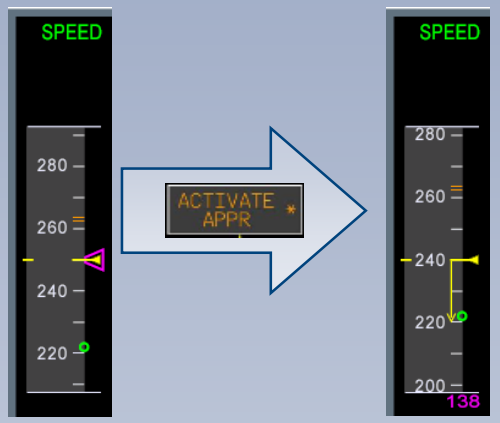
PF	PM
i F-PLN SEQUENCING.....ADJUST	
D or ACTIVATE APPR APPROACH PHASE.....CHECK / ACTIVATE	i NAVIGATION
If AP on: PF action. *If AP off: PM action.*	
i MANAGE SPEED.....CHECK	
FLIGHT PATH.....MONITOR	NAV ACCURACY.....MONITOR i
SPEED BRAKES lever.....AS RQRD	

APPROACH PHASE

BACK

Do not confuse “ **ACTIVATE APPROACH PHASE** ” with “ **ARM APPROACH** “.

Once APPROACH PHASE is activated and speed is managed, deceleration starts. Target speed is V_{APP}.



In managed speed, deceleration stops at the following speeds depending on the configuration:
The A/THR maintains the maneuvering speed of the current configuration.

CONF	SPEED
0	Green Dot
1	S speed
2	F speed
3	F speed
FULL	V_{APP}

F-PLN SEQUENCING

BACK

Ensure correct F-PLN sequencing when radar vectored:

- Monitor the TO waypoint on ND.

A correct F-PLN sequencing ensures:

- Missed Approach route availability in case of go-around
- Correct predictions
- Updated information on Vertical Display.

INITIAL APPROACH

PF

PM

NAV ACCURACY

BACK

On the POSITION/MONITOR MFD page, check that the required navigation accuracy is appropriate to the phase of flight.

INITIAL APPROACH

PF

PM

MANAGED SPEED

BACK

Check that the managed speed is active and monitor the target speed.

Note: The aircraft decelerates automatically at the DECEL pseudo waypoint  *when managed speed is active and* **NAV**, **xLOC*** *or* **xLOC** *mode is engaged.*

If a particular speed is required, use selected speed and adjust the aircraft configuration accordingly.

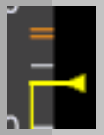
AIRCRAFT CONFIGURATION FOR APPROACH – 2/3
INTERMEDIATE / FINAL APPROACH

PF | **PM**

Early Stabilized or Decelerated Approach (i)

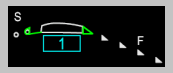
Below V_{FE} next and at (1) at the latest:

“ FLAPS 1 ”



“ SPEED CHECKED ”

FLAPS 1.....SELECT



“ FLAPS 1 ”

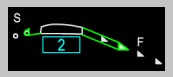
TA pb.....TA ONLY or TA/RA

Below V_{FE} next and at (2) at the latest:

“ FLAPS 2 ”

“ SPEED CHECKED ”

FLAPS 2.....SELECT



“ FLAPS 2 ”

“ GEAR DOWN ”

LANDING GEAR.....SELECT DOWN

“ GEAR DOWN ”

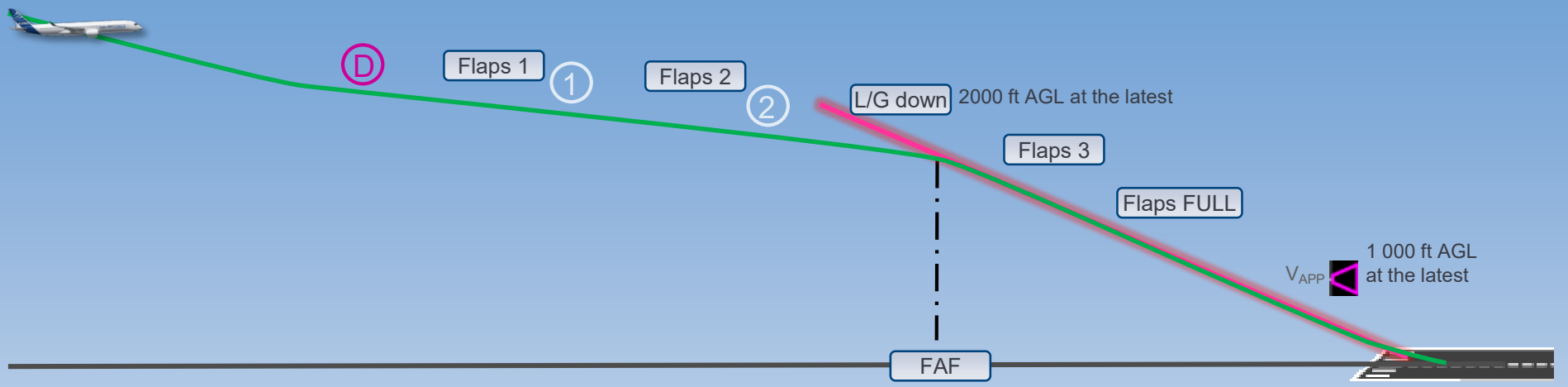
RWY COND / BRAKING ACTION.....CONFIRM
AUTOBRAKE.....CONFIRM
GND SPOILERS.....ARM
EXTERIOR LIGHTS.....SET

AIRCRAFT CONFIGURATION MANAGEMENT

BACK

Decelerated Approach

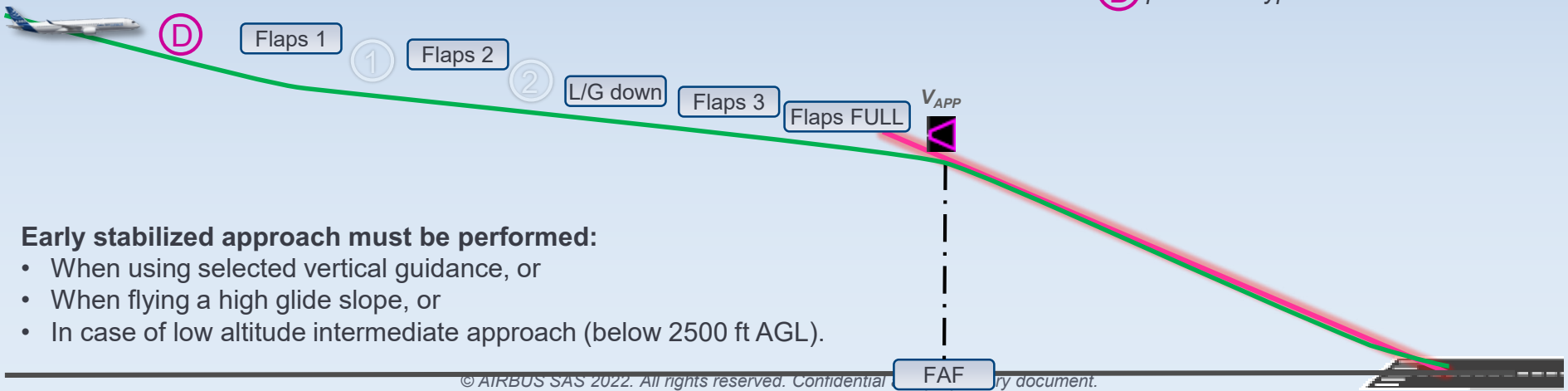
Be stabilized in LDG CONF and V_{APP} at 1 000 ft AGL (500 ft VMC)



Early Stabilized Approach

Be stabilized in LDG CONF and V_{APP} at FAF.

Enter VAPP as speed constraint at FAF in the ACTIVE F-PLN page.
The aircraft will reach the (D) pseudo waypoint sooner.

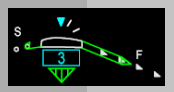


Early stabilized approach must be performed:

- When using selected vertical guidance, or
- When flying a high glide slope, or
- In case of low altitude intermediate approach (below 2500 ft AGL).

AIRCRAFT CONFIGURATION FOR APPROACH – 3/3
INTERMEDIATE / FINAL APPROACH

PREV BACK

PF	PM
	Below V_{FE} next:
" FLAPS 3 "	" SPEED CHECKED "  FLAPS 3.....SELECT " FLAPS 3 "
	 L/G downlock indication on PFD.....CHECK
	Below V_{FE} next:
" FLAPS FULL "	" SPEED CHECKED "  FLAPS FULL.....SELECT " FLAPS FULL"
SLIDING TABLE.....STOW CABIN REPORT.....RECEIVE " LANDING C/L "	A/THR.....CHECK SPEED or OFF SLIDING TABLE.....STOW LANDING MEMO.....CHECK NO BLUE CABIN REPORT.....RECEIVE LANDING CHECKLIST.....PERFORM " LANDING C/L COMPLETE " CABIN CREW.....ADVISE FLIGHT PARAMETERS.....MONITOR

xLS GUIDANCE
INITIAL / INTERMEDIATE APPROACH

BACK

PF **PM**

When cleared for the LS approach and on the intercept trajectory for the final approach course:

APPR pb on AFS CP.....PRESS 

xLOC.....CHECK ARMED

xG/S.....CHECK ARMED

For ILS:

AP1+2.....ON

xLOC CAPTURE.....MONITOR

xG/S CAPTURE.....MONITOR

When **xG/S***:

GO-AROUND ALTITUDE.....SET

If AP on: PF action.
If AP off: PM action.

At Final Approach Fix (FAF):

“ PASSING _____ , _____ FT ”

xLS GUIDANCE
FINAL APPROACH

BACK

PF

PM

FLIGHT PARAMETERS.....MONITOR

APPROACHING MINIMUM

For:
- ILS
- GLS
- RNAV(GNSS) with LPV minima

→ SOP

For:
- VOR
- NDB
- LOC
- LOC G/S OUT
- LOC BC
- RNAV(GNSS) with LNAV/VNAV minima
- RNAV(GNSS) with LNAV minima

→ SOP

FINAL APPROACH – APPROACHING MINIMUM

BACK

PF | ILS, GLS, RNAV(GNSS) with LPV minima | **PM**

100 ft above minimum:

“ ONE HUNDRED ABOVE ”

if no auto-callout:

ANNOUNCE “ ONE HUNDRED ABOVE ”

“ CHECKED ”

At minimum:

“ MINIMUM ”

if no auto-callout: **ANNOUNCE “ MINIMUM ”**

*If the flight crew **does not obtain** appropriate visual references:*

“ GO-AROUND – FLAPS "

*If the flight crew **obtains** appropriate visual references:*

“ CONTINUE "

AP.....OFF

LS GUIDANCE
FINAL APPROACH – APPROACHING MINIMUM

BACK

PF | VOR, NDB, LOC, LOC G/S OUT, ... | **PM**

100 ft above minimum:

“ ONE HUNDRED ABOVE ”

if no auto-callout:

ANNOUNCE “ ONE HUNDRED ABOVE ”

“ CHECKED ”

At minimum:

“ MINIMUM ”

if no auto-callout: **ANNOUNCE “ MINIMUM ”**

*If the flight crew **does not obtain** appropriate visual references:*

“ GO-AROUND – FLAPS "

*If the flight crew **obtains** appropriate visual references:*

“ CONTINUE "

AP.....OFF

“ FD OFF ”

“ BIRD ON ”

“ SET RUNWAY TRACK ”

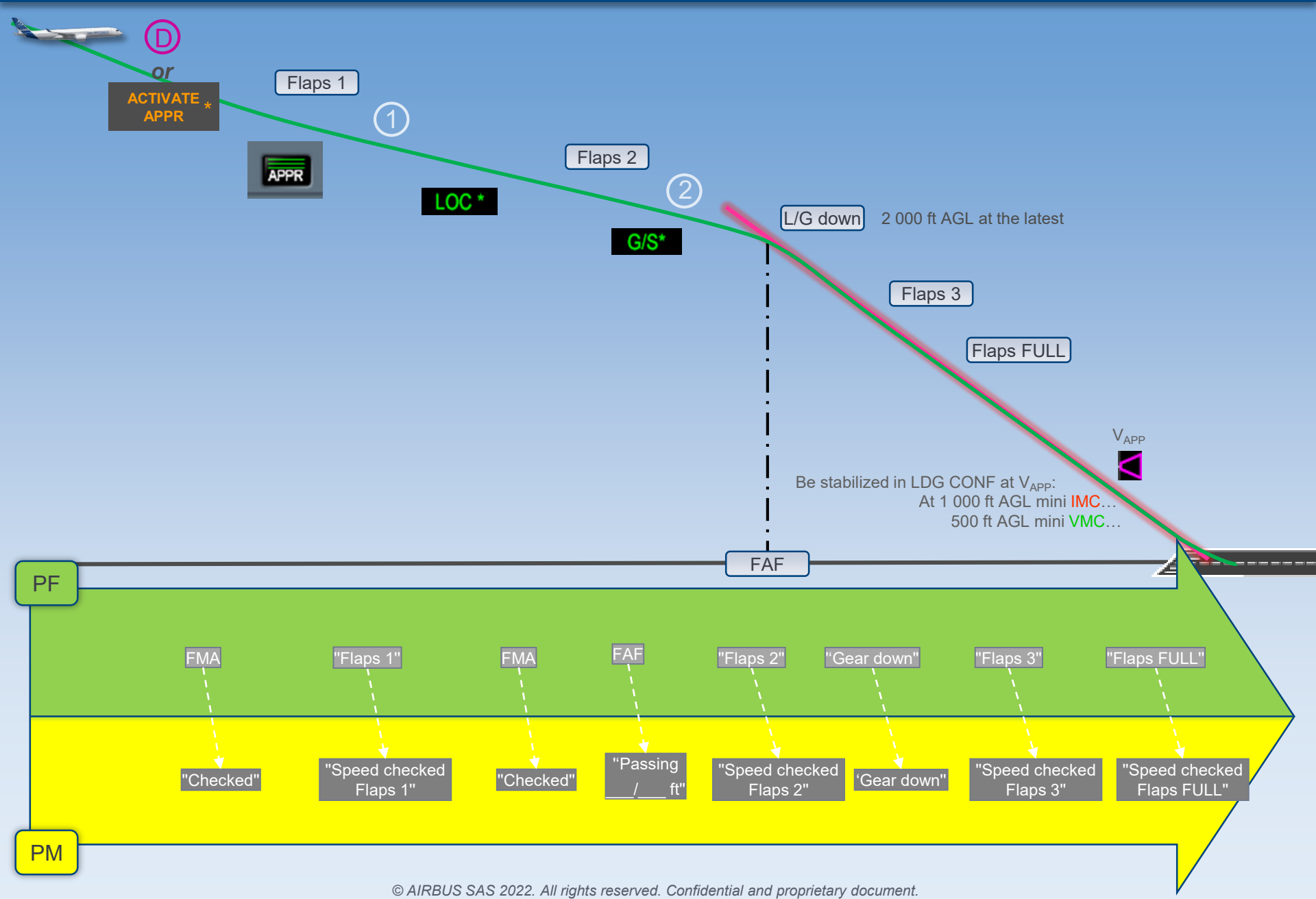
FD.....AS RQRD

TRK/FPA.....CHECK / SET

RWY TRACK.....CHECK / SET

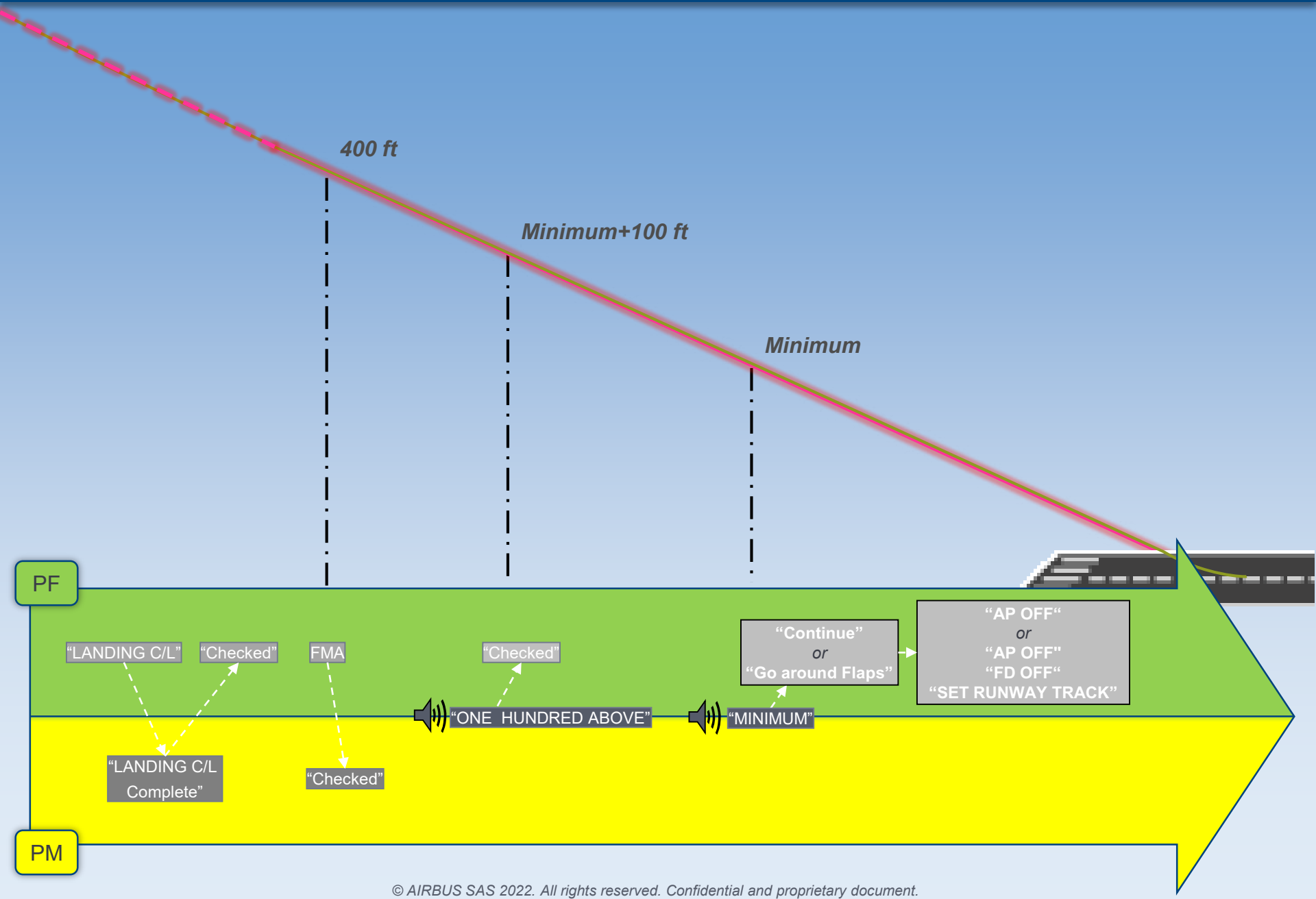
LS APPROACH – CALLOUTS 1/2

NEXT BACK



LS APPROACH – CALLOUTS 2/2

PREV BACK



APPROACH WITH FPA GUIDANCE

Early Stabilized Approach

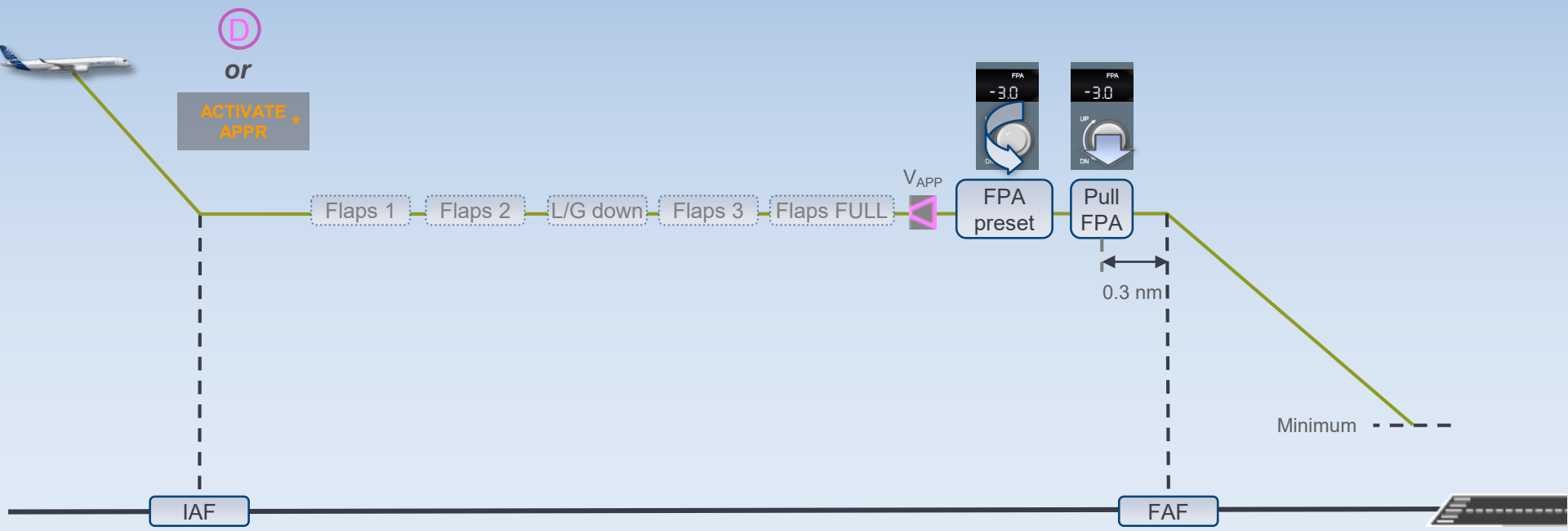
Approach Types using FPA

When cleared for approach

SOP

Before FAF

SOP



Approach With FPA Guidance

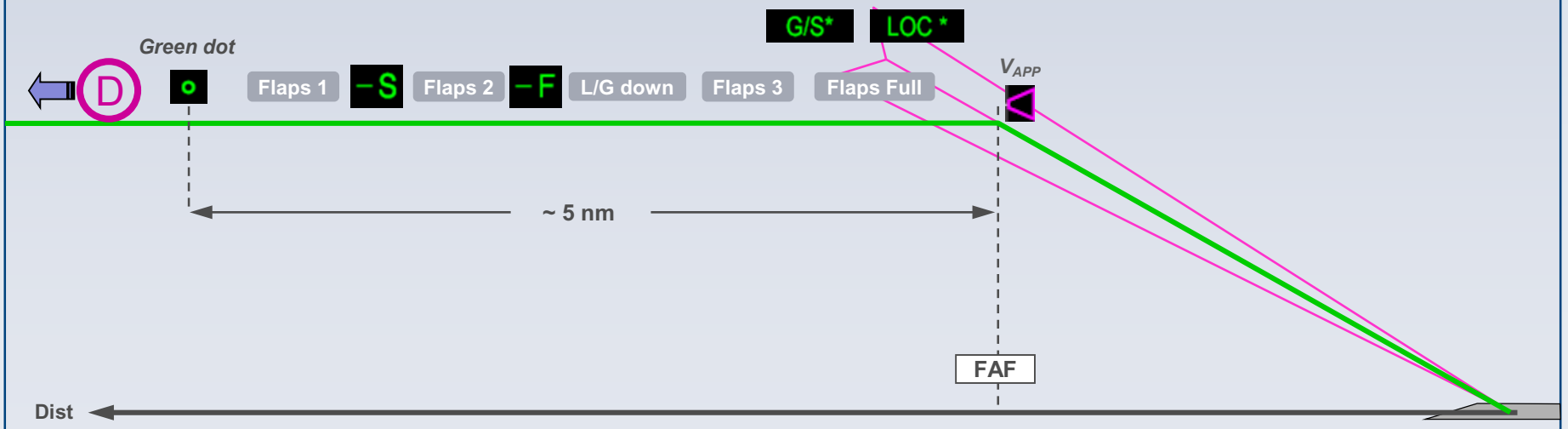
Early Stabilized Approach

The technique refers to an approach where the aircraft reaches the FAF in the landing configuration at VAPP.

To get a valuable deceleration pseudo waypoint and to ensure a timely deceleration, the flight crew should enter VAPP as a speed constraint at the FAF.

Be stabilized with LANDING CONF and V_{APP} at FAF

- **Enter V_{APP} speed constraint at FAF**
- **This will displace the (D) upwards**



APPROACH TYPES USING FPA

BACK

Charts Approach type	FMS database Approach type	Flight Path & Deviations Monitoring	Arming	Guidance & FMA
LOC	LOCxx	 		FPA -3.0 ° LOC
LOC (GS OUT)	ILSxx *and deselect GS*			
LOC BC	LOC BCxx			FPA -3.0 ° LOC B/C
VOR or VOR DME	VORxx	 		FPA -3.0 ° NAV
	Not in Database			FPA -3.0 ° TRACK
NDB or NDB DME	NDBxx	 		FPA -3.0 ° NAV
	Not in Database			FPA -3.0 ° TRACK
RNAV (GNSS) LNAV	RNAVxx	 		FPA -3.0 ° NAV

WHEN CLEARED FOR APPROACH

BACK

PF

PM

When cleared for the approach and on intercept trajectory for the final approach course:

LATERAL GUIDANCE MODE.....SET FOR APPR

For LOC, ILS G/S OUT and LOC B/C approaches:

LOC pb.....PRESS

LOC(LOC B/C).....CHECK ARMED

LATERAL PATH.....INTERCEPT

TRK/FPA pb.....SELECT

BEFORE FAF

BACK

PF

PM

FPA for final approach.....SET

At 0.3 nm from FAF:

FPA knob.....PULL

FPA mode.....CHECK ENGAGED

POSITION/FLIGHT PATH.....MONITOR / ADJUST

GO-AROUND ALTITUDE.....SET

GO-AROUND

AIRBUS

DECISION i

GO-AROUND INITIATION SOP

THRUST REDUCTION SOP

ACCELERATION SOP FLOW

2nd APPROACH i

DIVERSION i

CALLOUTS

Discontinued Approach i

FMS switches to CLB phase:

Target Spd: 250 kt

FLAPS 0

FLAPS 1

THR levers CLB

GA ACCELERATION ALTITUDE

L/G UP

TOGA then FLX/MCT
Follow FDs
FLAPS retract 1 step

GA THRUST REDUCTION ALTITUDE

HANDLING

SPATIAL DESORIENTATION i

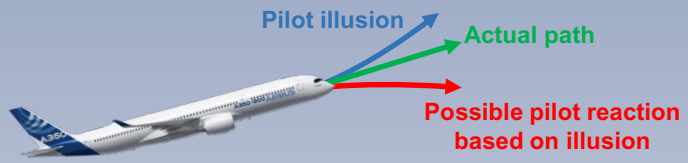
REJECTED LANDING i

GO-AROUND AND SPATIAL DESORIENTATION

BACK

If the aircraft is light, a high acceleration is expected when performing a go-around.

This can lead to spatial disorientation:



To avoid inappropriate commands, after selecting TOGA:

- PF follows the FD bars
- PF & PM monitor flight parameters on the PFD
- PM calls for deviations:
  - "**PITCH**" if pitch is below 10° or above 20°
  - "**BANK**" if bank is above 7°
  - "**SINK RATE**" if there is no climb rate.

REJECTED LANDING

BACK

A rejected landing is a go-around maneuver initiated below the minima.

For a rejected landing:

•Set and keep TOGA

•Do not retract FLAPS immediately

•If the aircraft is on the runway when thrust is applied, a CONFIG warning will be generated if the FLAPS are in CONF FULL

•Retract flaps one step when positive climb is achieved

•Retract the landing gear when a positive rate of climb is established with no risk of further touch down

•FLX/MCT detent (Soft Go-Around) can be set

•Climb out is standard.

In any case, if reverse thrust has been applied, a full stop landing **must** be completed.

GO-AROUND

AIRBUS

DECISION

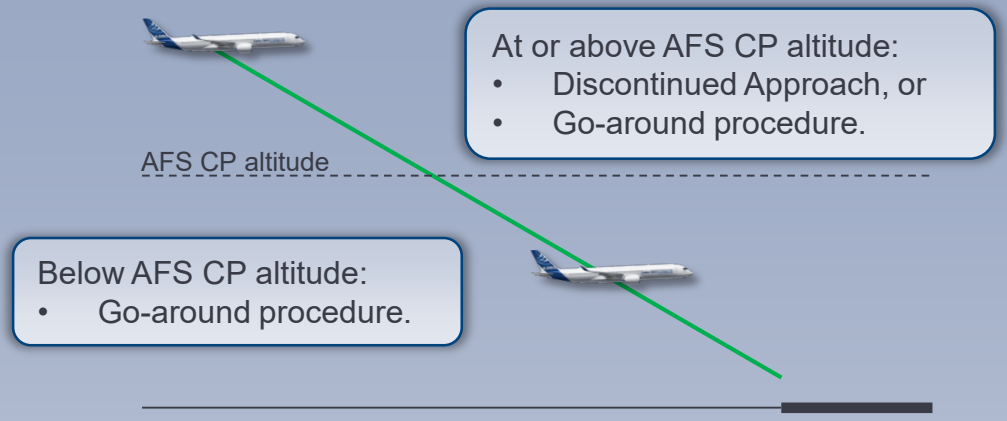
BACK

The flight crew must initiate a go-around
if the approach is not stabilized and maintained (in speed, altitude or flight path)
below **1 000 ft** (IMC) or **500 ft** (VMC).

DISCONTINUED APPROACH

BACK

At or above the AFS CP altitude, the flight crew can use the discontinued approach technique to stop the approach.



The discontinued approach technique is:

- Announce **" CANCEL APPROACH "**
- Disarm the APPR(LOC) AP/FD modes (APPR) (LOC)
- Select lateral mode as required (NAV or HDG)
- Select vertical mode as required (Level off or adjust V/S)
- Select SPEED and adjust
- Revise F-PLN as required.

Note:

- *The FMS does not automatically string the previous flown approach in the active F-PLN when the aircraft overflies the last waypoint.*
- *Because the thrust levers are not set to TOGA detent, the FMS remains in approach phase.*

GO-AROUND INITIATION

BACK

PF	PM

GOLDEN RULE #1 — **Fly, Navigate, Communicate**
In that order, with the appropriate tasksharing.

GOLDEN RULE #4 — **Take actions if things do not go as expected.**

Simultaneously:

THRUST levers.....TOGA THEN FLX/MCT

ROTATION.....PERFORM

12.5° with two engines, 10° with one engine out

" GO-AROUND, FLAPS "

FLIGHT PARAMETERS.....MONITOR

FLAPS.....RETRACT ONE STEP

" FLAPS x "

" MAN GA SOFT, SRS, NAV, A/THR blue "

" CHECKED "

When Vertical Speed is positive :

" POSITIVE CLIMB "

" GEAR UP "

LANDING GEAR.....UP

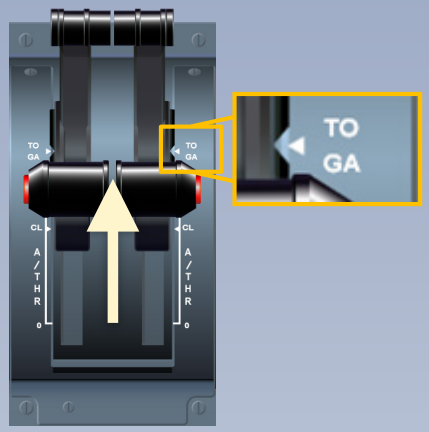
" GEAR UP "

NAV or HDG.....AS RQRD

GO AROUND ALTITUDE.....CHECK

INITIATING A GO-AROUND

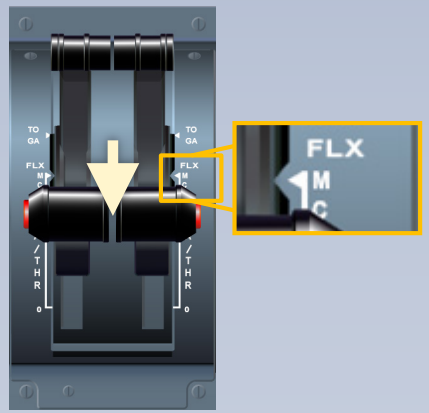
To initiate a go-around, the PF **must** set the THR levers to TOGA detent (full forward mechanical stop) without delay, then FLX/MCT.
When going around with one engine is inoperative, maintain TOGA thrust (due to Soft Go-Around function not available with one engine inoperative).



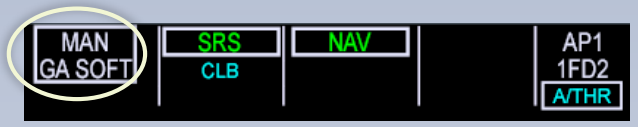
First: TOGA

The TOGA detent:

- Activates the go-around phase of the FMS (**SRS** and **NAV** AP/FD modes)
- Activates the go-around flight plan
- Adjusts the target speed (V_{APP} or current speed, whichever is higher).



Then: FLX/MCT



MAN GA SOFT must be displayed.

If, when reading the first column of the FMA, you do not have MAN GA SOFT or MAN TOGA, immediately set the thrust levers to TOGA detent.

At any time, if needed, the PF can set the THR levers back to TOGA.

THRUST REDUCTION

BACK

PF

PM

At GA THRUST REDUCTION ALTITUDE, LVR CLB flashes on the FMA:

THRUST LEVERS.....CL

" THR CLB, A/THR "

" CHECKED "

HIGH ENERGY GO-AROUND

The PF must be ready to set the THR levers to the CL detent as soon as LVR CLB flashes on the FMA, especially in the following cases:

- Go-around near or above the GA THR RED ALT:
When performing a go-around near or above the GA thrust reduction altitude, there is a risk of overspeed (VLE, VFE, VMO).

- Go-around near the MISSED APPROACH ALTITUDE:
When performing a go-around near the MISSED APPROACH ALTITUDE set on the AFS CP, there is a risk of altitude excursion as well as overspeed.

ACCELERATION

BACK

PF | **PM**

At GA ACCELERATION ALTITUDE:
The speed target increases to initial CLB speed.

“ CLB ”

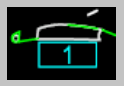
“ CHECKED ”

At F speed <u>with</u> positive speed trend:

“ FLAPS 1 ”

“ SPEED CHECKED ”

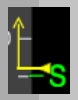
FLAPS 1.....SELECT



“ FLAPS 1 ”

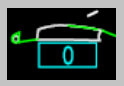
At S speed <u>with</u> positive speed trend:

“ FLAPS 0 ”



“ SPEED CHECKED ”

FLAPS 0.....SELECT



“ FLAPS 0 ”

GND SPOILERS.....DISARM

L/G.....CHECK UP

NOSE LIGHTS.....OFF

ACCELERATION - FLOW

BACK

SECOND APPROACH

BACK

PF

PM

If the flight crew decides to fly a second approach:

APPROACH PHASE.....ACTIVATE

The flight crew activates the APPROACH phase on the PERF page of the MFD.

The FMS keeps the previous approach in the ACTIVE F-PLN.

DIVERSION

BACK

PF

PM

If the flight crew decides to fly to an alternate destination
and once clearance is obtained and flight path is established:

FMS.....UPDATE i

At transition altitude:

" SET STANDARD "

BARO REF.....PUSH STANDARD

BARO REF.....PUSH STANDARD

CM1 sets STD on the ISIS.

"STANDARD CROSSCHECKED "

"PASSING FL ___ NOW "

FLIGHT LEVEL.....CHECK

" CHECKED "

DIVERSION

PF

PM

FMS UPDATE

BACK

•If the ALTERNATE was prepared:

Lateral Revision.....ENABLE ALTN

The lateral mode reverts to HDG (if previously in NAV).

•If the SEC F-PLN was prepared to a diversion airfield:

SEC F-PLN.....SWAP TO ACTIVE

•If no ALTERNATE was prepared:

SPD + OP CLB mode.....SELECT

When cleared to a waypoint:

DIRECT TO.....PERFORM

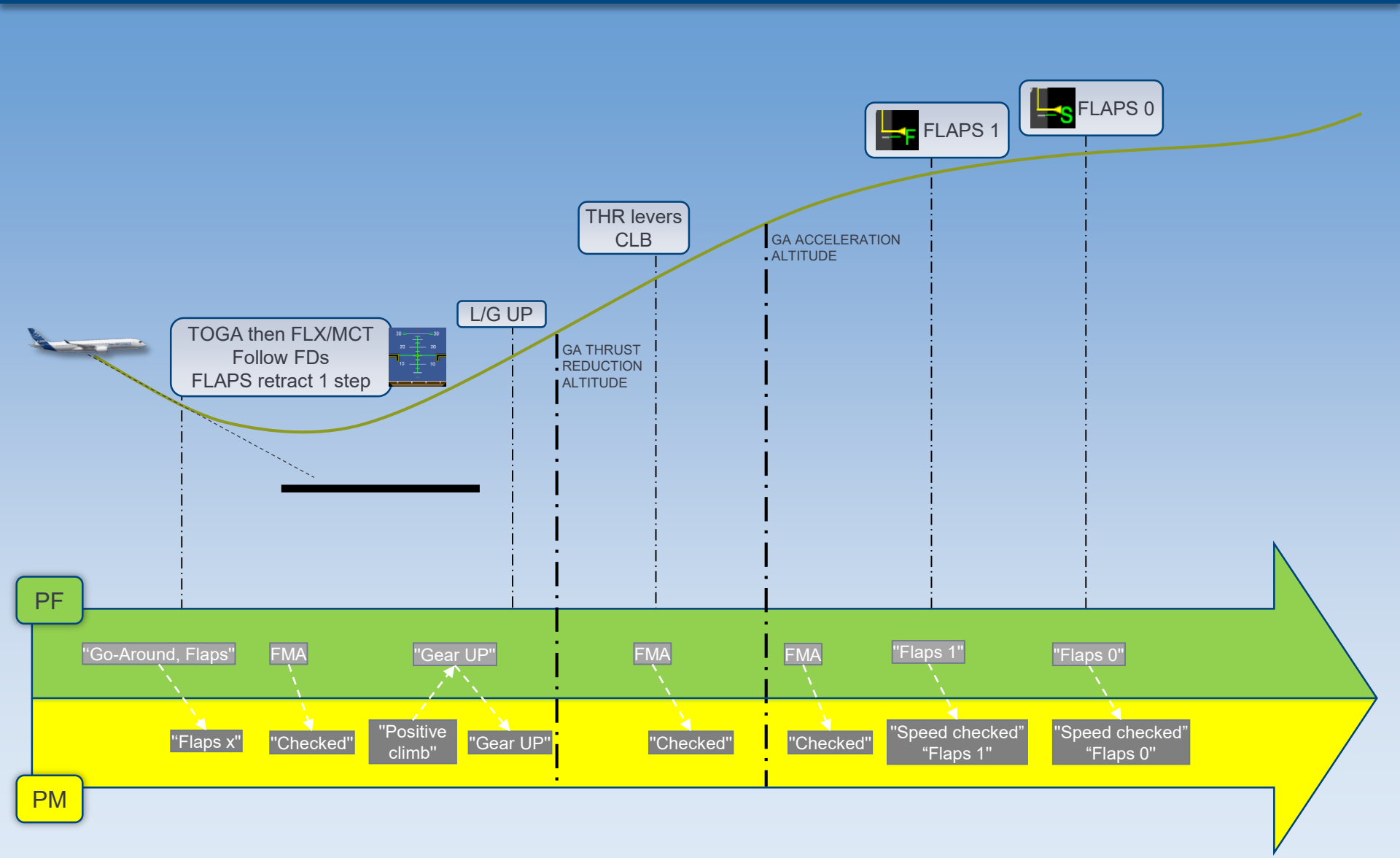
NEW DEST.....INSERT

CRZ FL.....UPDATE

F-PLN.....FINALIZE

CALLOUTS

BACK



LANDING

The approach must be stabilized at:

- 1 000 ft in IMC
- 500 ft in VMC

	FLARE	ROLLOUT
MANUAL	SOP	SOP
AUTOLAND	SOP	SOP

CALLOUTS

1 000 ft

500 ft

Flare Retard | REV MAX | REV IDLE | REV STOW

Crosswind i

Max tailwind for landing with decelerated approach: **10 kt**
Max tailwind for landing with early stabilized approach: **15 kt**

Gnd Spoilers and Autobrake i

CROSSWIND

BACK

The flare technique is conventional.

Use the rudder to align the aircraft with the runway heading during the flare.

For information about crosswind limitations,
refer to: FCOM / Runway condition assessment matrix for landing.

FLARE

BACK

PF

PM

The flare technique is conventional.

Around 40 ft RA:

FLARE.....PERFORM

THRUST levers.....IDLE

ATTITUDE.....MONITOR

At 20 ft:

“ RETARD ”

The automatic callout is a reminder for the PF to retard thrust levers to IDLE.

GROUND CLEARANCE

Pitch more than 7.5° : Rely on the autocallout “**PITCH – PITCH**”
If the bank angle reaches 6.5°, the PM should call out “**BANK – BANK**”

ROLLOUT

BACK

PF

PM

At touchdown:

DEROTATION.....INITIATE

All REVERSER levers.....REV MAX or REV IDLE

DIRECTIONAL CONTROL.....ENSURE

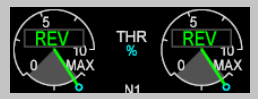
Use rudder pedals to keep the aircraft on the runway centerline.

If A/BRK is selected and the runway state is worse than expected:

PEDAL BRAKING.....APPLY IMMEDIATELY

“ SPOILERS ”

“ REVERSE GREEN ”



“ BTV ”

“ DECEL ”

“DECEL” callout means that the deceleration is felt by the crew and confirmed by the speed trend on the PFD. If no deceleration, call “NO DECEL”.

At 70 kt:

“ SEVENTY KNOTS ”

“ CHECK ”

All REVERSER levers.....IDLE

At taxi speed:

All REVERSER levers.....STOW

AUTO BRK.....DISARM

At taxi speed, use the steering handwheel.

AUTOLAND - FLARE

BACK

PF

PM

At any time, if AUTOLAND light comes on, take over.

Between 50 ft and 40 ft RA:

“ FLARE ”

FLARE.....MONITOR

If FLARE not displayed on FMA, take over.

Around 30 ft RA:

THR IDLE ON FMA.....CHECK

At “ RETARD ” autocallout (around 10ft RA):

“ RETARD ”

THRUST LEVERS.....IDLE

LATERAL GUIDANCE.....MONITOR

AUTOLAND - ROLLOUT

BACK

PF	PM
At touchdown:	
	 **“ ROLLOUT ”**
ALL REVERSER levers....REV MAX or REV IDLE	**“ SPOILERS ”**
	“ REVERSE GREEN ”
DIRECTIONAL CONTROL.....MONITOR	**“ BTV ”**
	“ DECEL ”
At 70 kt:	
All REVERSER levers.....IDLE	**“ SEVENTY KNOTS ”**
At taxi speed:	
All REVERSER levers.....STOW	
AUTO BRK.....DISARM	
If Auto Rollout: *when vacating the runway:*	
AP.....OFF	

GROUND SPOILERS AND AUTOBRAKE

BACK

On ground, the ground spoilers deploy:

- If armed, as soon as both THR LVRs are on IDLE, or
- If not armed, as soon as one REV is selected and the other THR LVR is on IDLE.

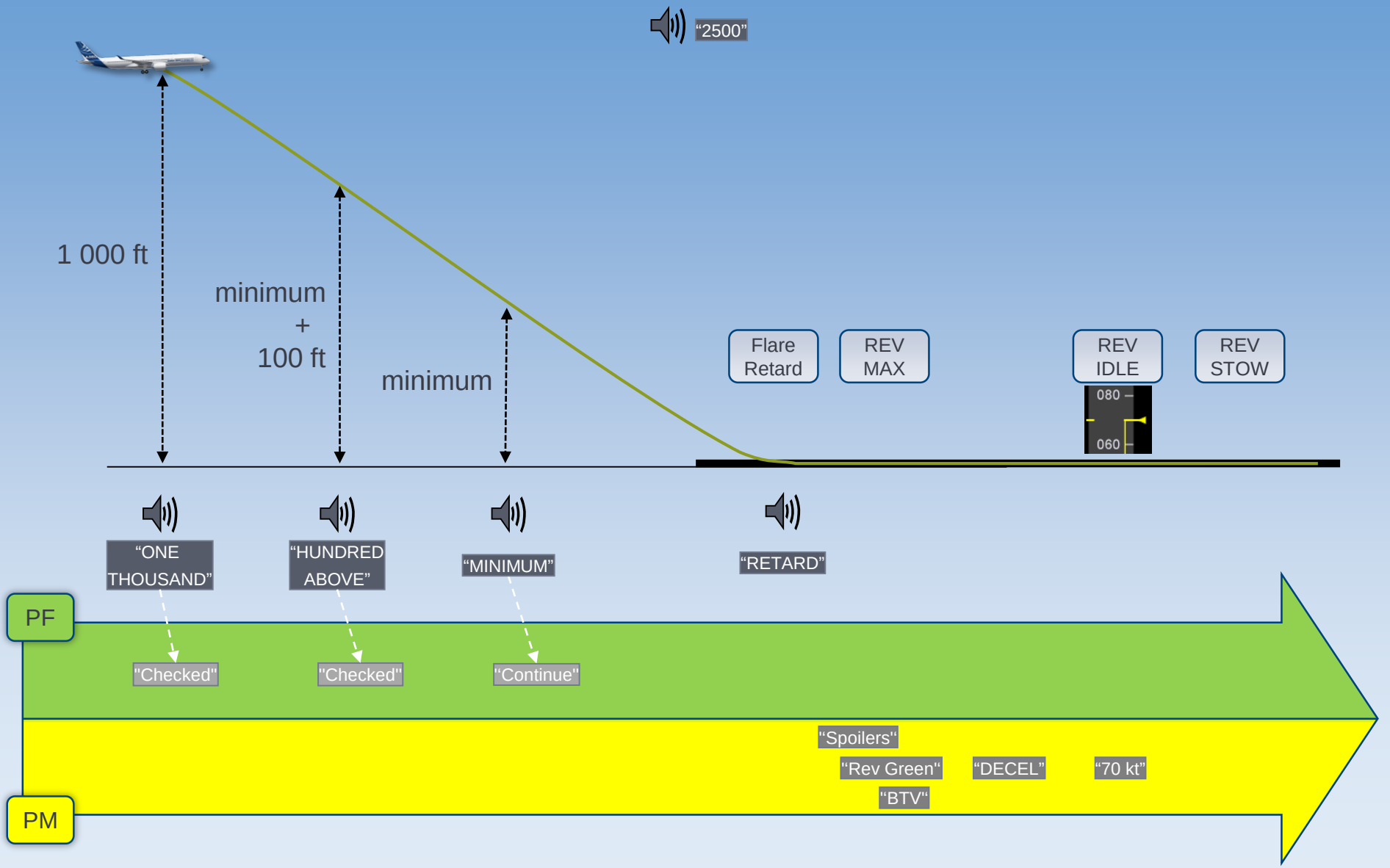
The autobrake is activated:

- If the ground spoilers are deployed, and
- 5 seconds after touchdown or when the nose wheel is on the ground, whichever occurs first.

CALLOUTS

BACK

Radio-altitude callouts start at 2500 ft RA.



AFTER LANDING / PARKING / SECURING

AIRBUS

AFTER LANDING

SOP FLOW

PARKING

SOP FLOW

SECURING THE AIRCRAFT

SOP FLOW

AFTER LANDING

BACK

PF

PM

When the runway is vacated:

GND SPLRS.....DISARM

FLAPS.....RETRACT

APU.....START

EXTERIOR LIGHTS.....SET

ANTI ICE.....AS RQRD

ND RANGE sel.....ZOOM / AS APPROPRIATE

TAXI pb.....AS RQRD

WX pb.....CHECK OFF

ND RANGE sel.....ZOOM / AS APPROPRIATE

TAXI pb.....AS RQRD

WX pb.....CHECK OFF

BRK TEMPERATURE.....MONITOR

BRAKE FAN pb.....AS RQRD

AFTER LANDING

PF

PM

FLAPS AND SLATS

BACK

Approach made in icing conditions
OR
Runway contaminated with slush or snow

Do not retract flaps and slats before ground inspection.

BRAKE TEMPERATURE

BACK

To avoid brake oxidation, do not use the BRK FANS until at least 5 minutes after landing.

If needed, start the BRK FANS before reaching the gate (carbon dust contamination).
Even if taxi time is less than 5 minutes.

If brakes temperature exceeds 300°C:

BRAKES HOT

Use the BRK FANS without oxidation consideration.

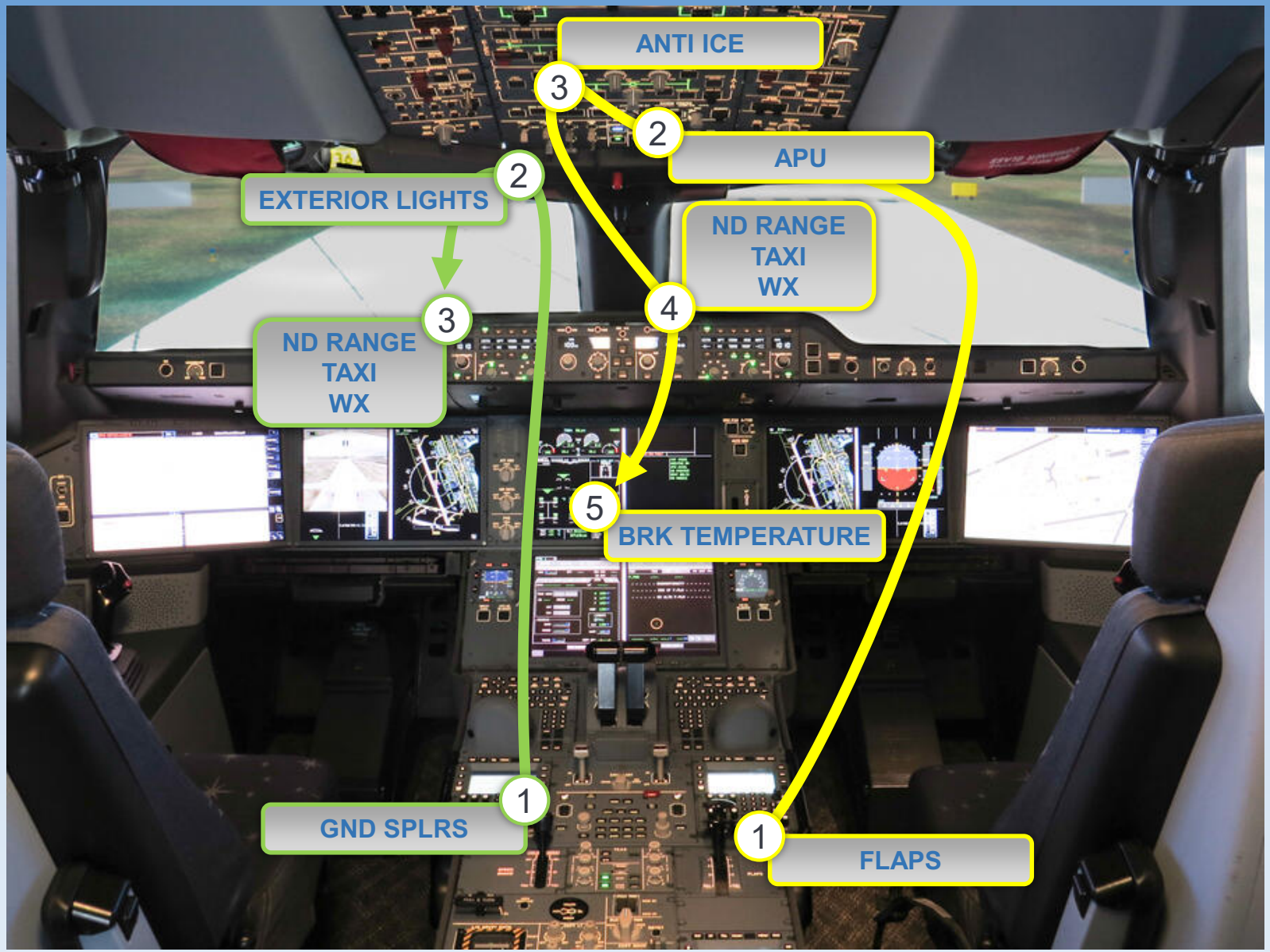
For brakes temperatures requiring maintenance actions, refer to *FCOM > Procedures > Supplementary Procedures > 32 > Brakes temperatures requiring maintenance action*.

AFTER LANDING – FLOW

BACK

PF

PM



PARKING 1/3

NEXT

BACK

PF

ACCU PRESS.....CHECK

PARK BRK handle.....ON

PARK BRK indication.....CHECK DISPLAYED

ENG 1, 2 MASTER levers.....OFF

WING sw.....OFF

BEACON sw.....OFF

SLIDES.....CHECK DISARMED

SEAT BELTS sw.....OFF

" PARKING C/L "

PM

ANTI ICE.....OFF

APU BLEED pb.....ON

FUEL PUMPS.....OFF

PARKING CHECKLIST.....COMPLETE

" PARKING C/L COMPLETE "

PARKING 2/3

PREV NEXT BACK

PF

GROUND CONTACT.....ESTABLISH MECH

HUD (if installed).....STOW

PARK BRK handle.....AS RQRD i

PM

HUD (if installed).....STOW

XPDR.....STBY

IRS PERFORMANCE.....CHECK i

FUEL QUANTITY.....CHECK

BRK FAN pb (if installed).....AS RQRD

PARKING 3/3

PREV BACK

CM1

CM2

DISPCH pb.....PRESS

LOGBOOK.....COMPLETE
Complete the logbook according to the active dispatch messages.

If icing conditions with freezing fog:
TAXI-IN TIME.....RECORD

EFB: **CLEAR/CLOSE FLIGHT button.....CLICK**

PARKING 1/3

PF

PM

PARK BRK SET

BACK

If brakes temperature is above 500°C (350°C with BRK FANS ON), do not set PRK BRK, except if required for operational reasons.

Advise ground staff that brakes are hot.

MECH

PARKING 1/3

PF

PM

APU BLEED

BACK

Set the APU BLEED pb to ON, before engine shutdown, to prevent engine exhaust fumes from entering the air conditioning.

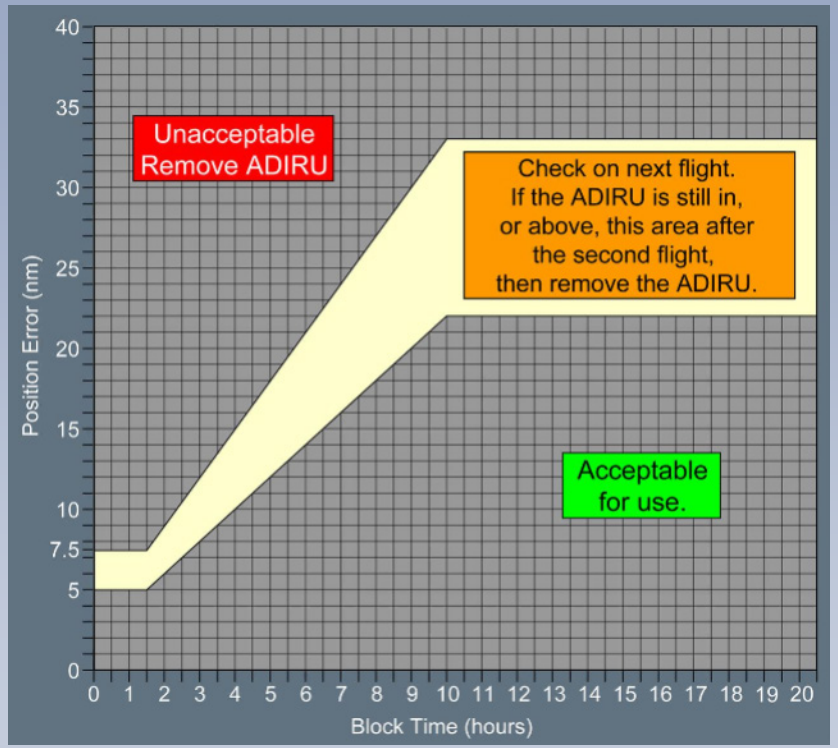
PARKING 2/3

PF

PM

IRS PERFORMANCE

BACK



PARKING 2/3

PF

PM

PARK BRK

BACK

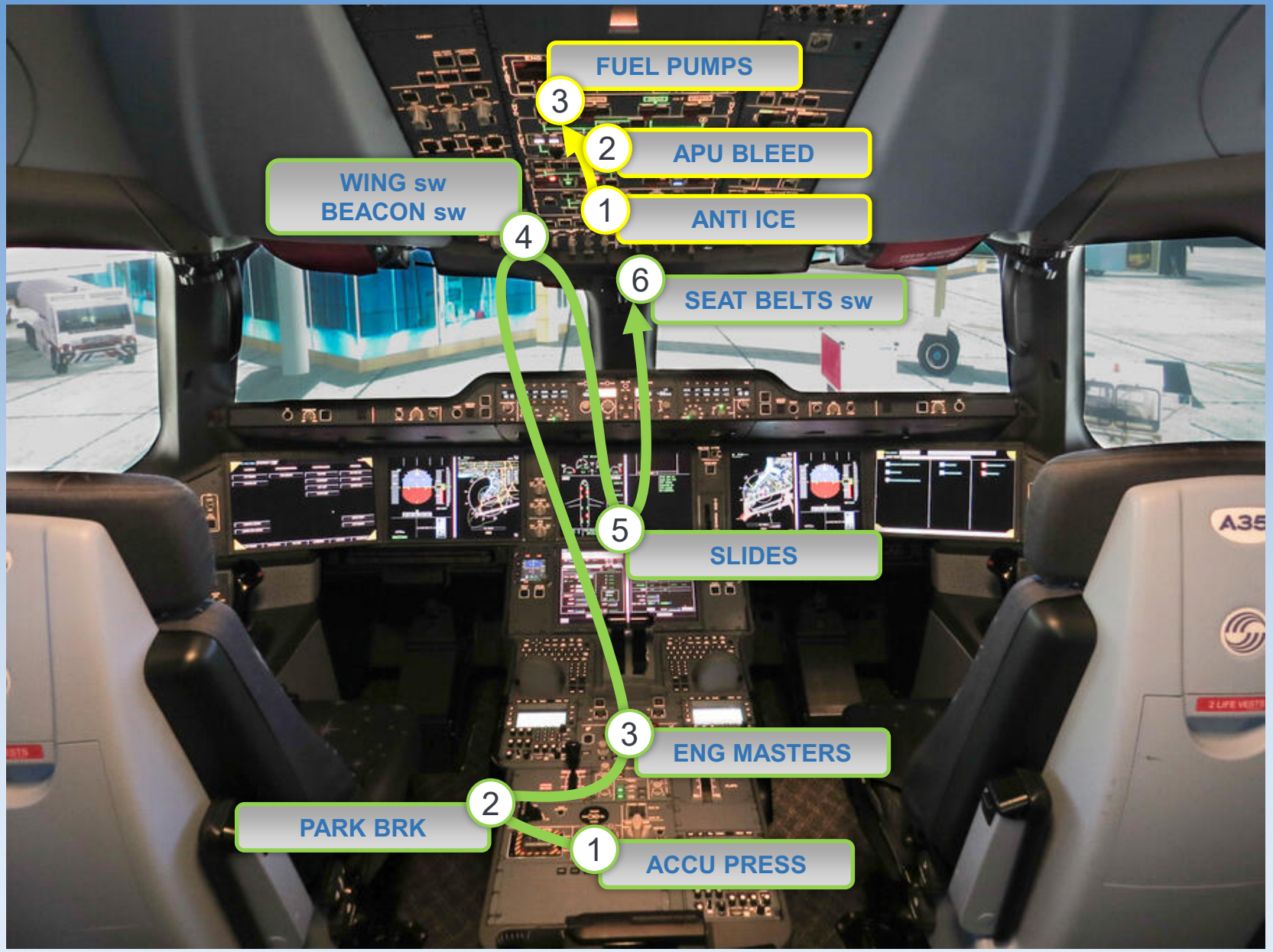
If one brake temperature is above 300°C (150°C with BRK FANS ON) and if operational conditions permits (no slippery or slopping tarmac), release the PARK BRK after chocks are in place.

PARKING – FLOW

BACK

PF

PM



SECURING THE AIRCRAFT

BACK

CM1

PARK BRK handle.....ON

PARK BRK indication.....CHECK DISPLAYED

All IR MODE selectors.....OFF

" SECURING THE AIRCRAFT C/L "

CM2

OXYGEN CREW SUPPLY pb-sw.....OFF

EXTERIOR LIGHTS.....OFF

APU BLEED pb-sw.....OFF

EXT pb.....AS RQRD

APU MASTER SW pb-sw.....OFF

EMER EXIT LT sw.....OFF

SIGNS sw.....OFF

EFB LAPTOP.....OFF

SECURING THE A/C CHECKLIST.....COMPLETE

" SECURING THE AIRCAFT C/L COMPLETE "

ALL BAT pb-sw (2, EMER 2, EMER 1, 1).....OFF

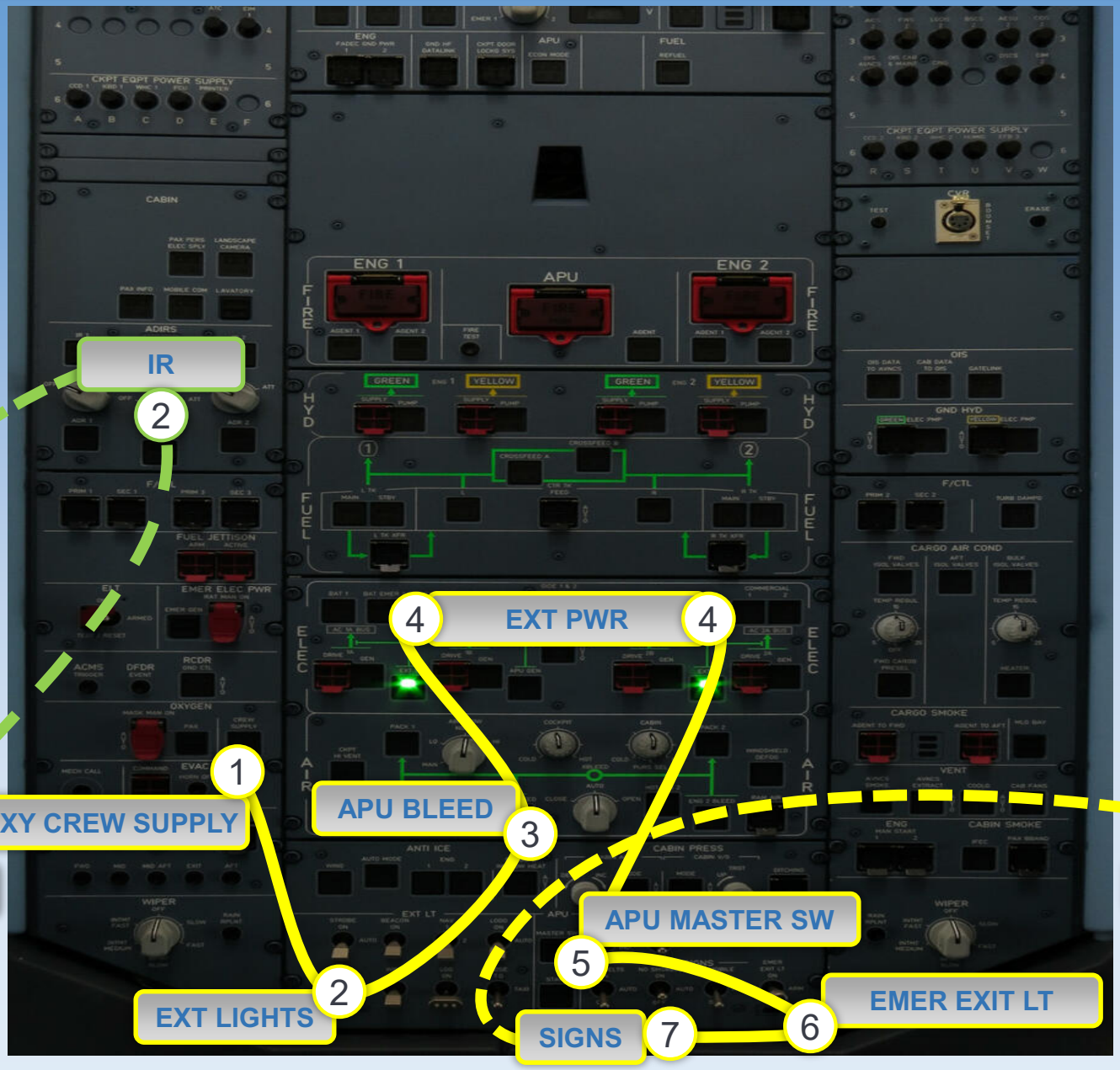
GND SVCE CTL sw.....AS RQRD

SECURING THE AIRCRAFT – FLOW

BACK

CM1

CM2



AP/FD AND A/THR ENGAGEMENT/DISENGAGEMENT

AP/FD

ENGAGEMENT and DISENGAGEMENT

A/THR

ENGAGEMENT and DISENGAGEMENT

AP/FD – 1/2

ENGAGEMENT

NEXT BACK

Manual flight without FD

AP OFF / FD OFF

1 Set FD ON

2 Use AFS CP to adjust FMA for the intended flight path

Manual flight with FD

AP OFF / FD ON

3 Set AP ON

Autoflight with AP/FD

AP ON / FD ON

EXPECTED FMA

Never engage AP without expected FMA.

BEFORE SETTING AP ON

BACK

If large orders are required to achieve the intended flight path, center the FD bars before setting AP ON.

AP/FD – 2/2
DISENGAGEMENT

PREV BACK

Autoflight with AP/FD

AP ON / FD ON

1 Press the AP INSTINCTIVE DISC pb to disconnect AP

CAVALERY CHARGE

AT AP DISCONNECTION

Press a second time on the AP INSTINCTIVE DISC pb to cancel the aural and visual indications.

Manual flight with FD

AP OFF / FD ON

2 Set FD OFF

Manual flight without FD

AP OFF / FD OFF

A/THR – 1/2

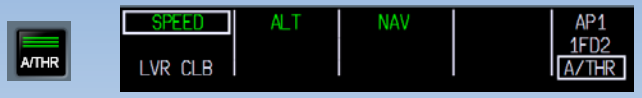
ENGAGEMENT

NEXT BACK

Flight with manual thrust

A/THR OFF

1 Press the A/THR pb



2 Move the THR levers to the CL detent

Flight with A/THR

A/THR ON

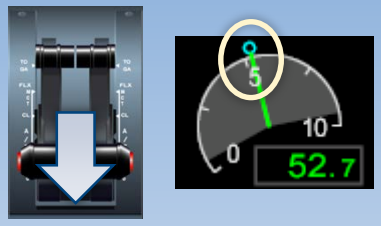
A/THR – 2/2

DISENGAGEMENT

PREV BACK

Flight with A/THR

1 Move thrust levers to match current thrust



2 Press A/THR INSTINCTIVE DISC pb to disconnect the A/THR

Flight with manual thrust

A/THR – 1/2

DISENGAGEMENT

A/THR INSTINCTIVE DISCONNECT PUSHBUTTON

BACK

Caution: Holding the A/THR INSTINCTIVE DISC pb for 15 s or more will disconnect the A/THR for the remainder of the flight. All A/THR modes, including **A.FLOOR** protection will be lost. The A/THR will be recovered at the next aircraft power-up.

BRAKE TO VACATE (BTV)

AIRBUS

The use of BTV is prohibited if any reverse is inoperative or in case of failure affecting landing distance.

Descent Preparation

BTV ARMING

SOP

Reconfiguration during approach

i

Landing on Dry or Wet Runway

i

Landing on Contam. Runway

i

T/D

BTV CONFIGURATION

BACK

PF

PM

i **RWY COND/BRAKING ACTION.....SELECT**

RUNWAY SHIFT (if required).....ENTER

ND MODE.....PLAN

ND RANGE.....ZOOM

i **RUNWAY.....CHECK**

i **RUNWAY EXIT.....SELECT**

BTV.....ARM

A/BRK

or

Arm BTV while the ND setting is PLAN/ZOOM.
Otherwise, BRK MED will be armed.

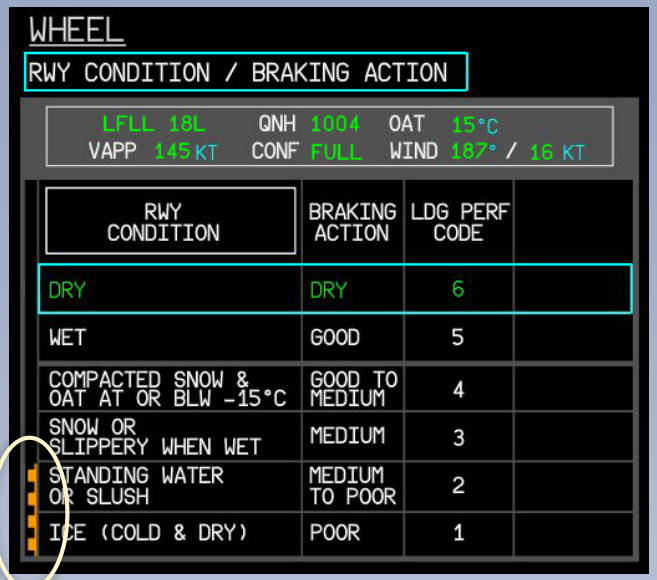
ANF LDA vs. CHARTS LDA.....CROSSCHECK

Do not use BTV if the difference exceed 35 m (115 ft).

BTV CONFIGURATION

RWY COND/BRAKING ACTION

BACK



Too Short selection →

BTV CONTAM targets a constant deceleration rate, from touchdown until the aircraft ground speed is approx. 10 kt, regardless of the position of the aircraft compared to the selected exit.

The aircraft may exceed the targeted runway exit.

This amber symbol indicates that, for the corresponding runway condition/braking action, the landing runway is too short.

BTV CONFIGURATION

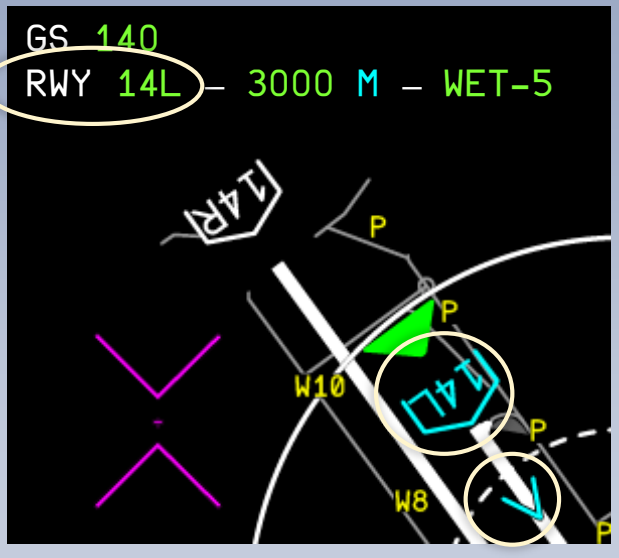
PF

PM

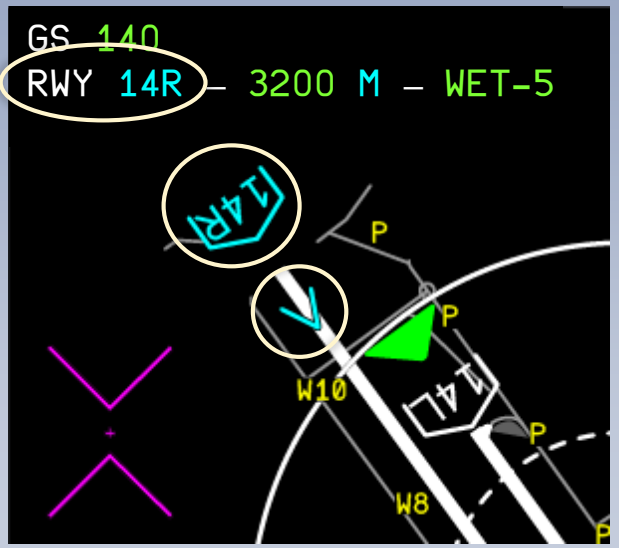
CHECK SELECTED RUNWAY

BACK

The FMS runway (▲) is automatically selected (No crew action).



Runway 14R is manually selected by the flight crew.



BTV CONFIGURATION

SET BTV EXIT

BACK

1 - Click on an exit that is beyond the ROW line

2 - The MENU opens

3 – Click on SET BTV EXIT.

If the runway is DRY, the flight crew can anticipate a change of the runway condition, and select an exit beyond the WET line.

RECONFIGURATION DURING APPROACH

BACK

BTV is armed.

To revert to manual braking:

Press 1 time

To revert to BRK MED:

BRK MED

Press 2 times

If BTV settings must be changed:

Automatic reversion to BRK MED:

BRK MED

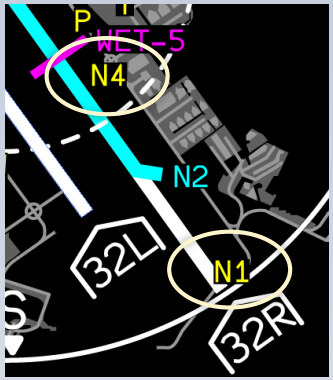
RECONFIGURATION DURING APPROACH

CHANGE BTV SETTINGS

BACK

Exit change

1 – Click on another exit



2 – Click on SET BTV EXIT.

Note: When BTV is armed, the Runway END label is not displayed. The flight crew must disarm BTV in order to set the runway end as the BTV exit.

Runway change

1 – Disarm BTV

2 – Set LDG RWY

3 – Set BTV EXIT

4 – Arm BTV.

Runway condition change

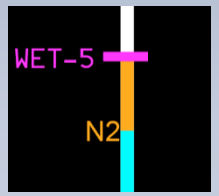
1 – Select another RWY COND

2 – Check that the exit is still accessible.

If the exit will be missed, amber indications appear:

- On the ND

- On the ANF.



RECONFIGURATION DURING APPROACH

Runway Condition change from Dry or Wet to Contaminated

BACK

- *If the flight crew performed an in-flight landing PERF assessment for the current runway condition, and checked that the landing performance complies with the LDA, the flight crew must:*
  - *Select the appropriate runway condition (LDG PERF CODE at or below 4)*
  - *Check that* **BTV CONTAM** *is displayed on the FMA*
  - *Check if the exit will be missed, and set a new exit*
  - *On ground, select max reverse without delay.*

- *If the flight crew did not perform an in-flight landing PERF assessment, or if the landing performance does not comply with the LDA,* ***the flight crew must perform a go-around****.*

RECONFIGURATION DURING APPROACH

AUTOMATIC REVERSION TO BRK MED

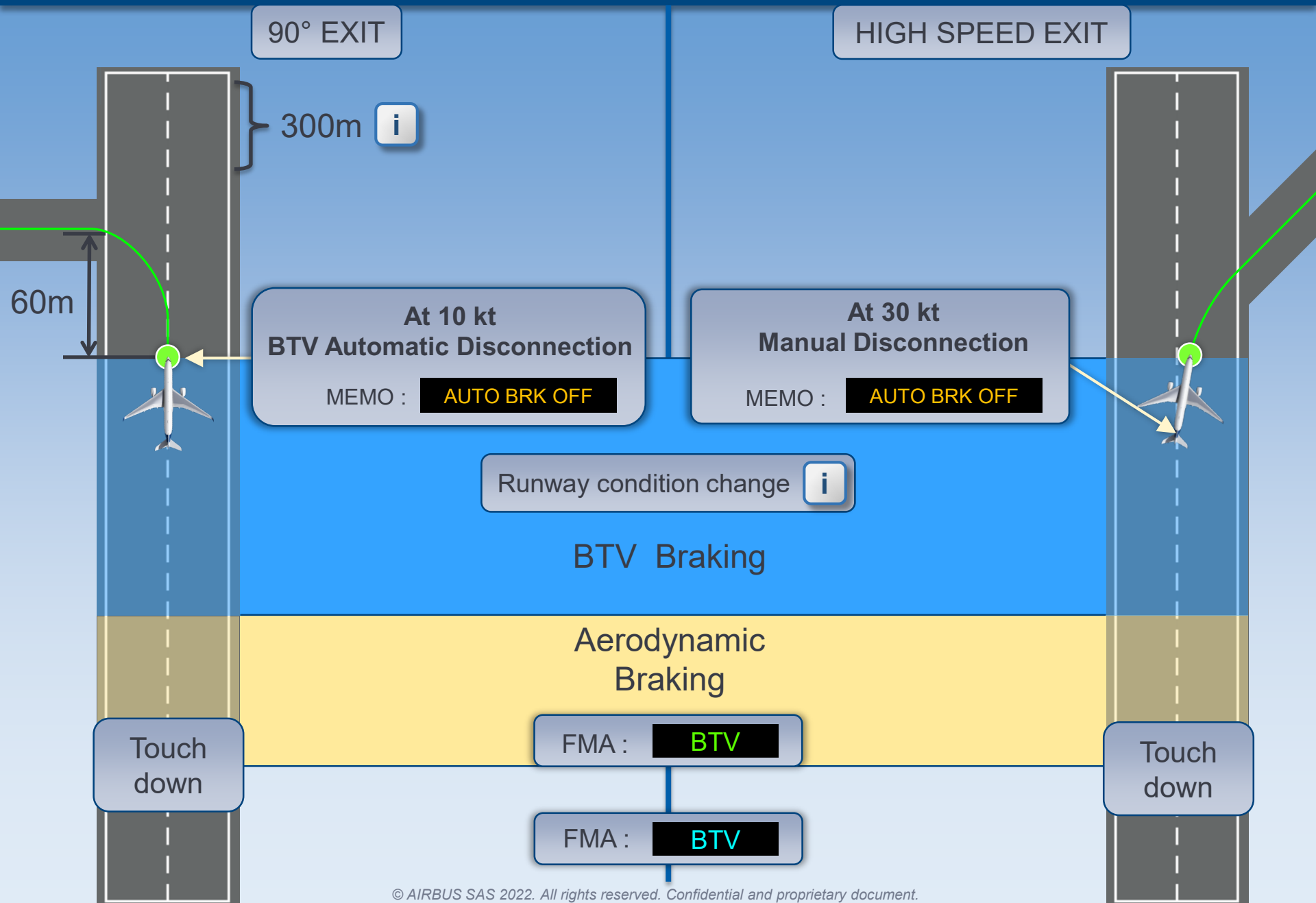
BACK

BTV automatically reverts to BRK MED if one of the following occurs:

- The flight crew lands on a runway that is not the selected runway (e.g. sidestep)
- There is a failure or a combination of failures that affects the landing distance (BTV appears in the ECAM INOP SYS).

LANDING ON DRY OR WET RUNWAY

BACK

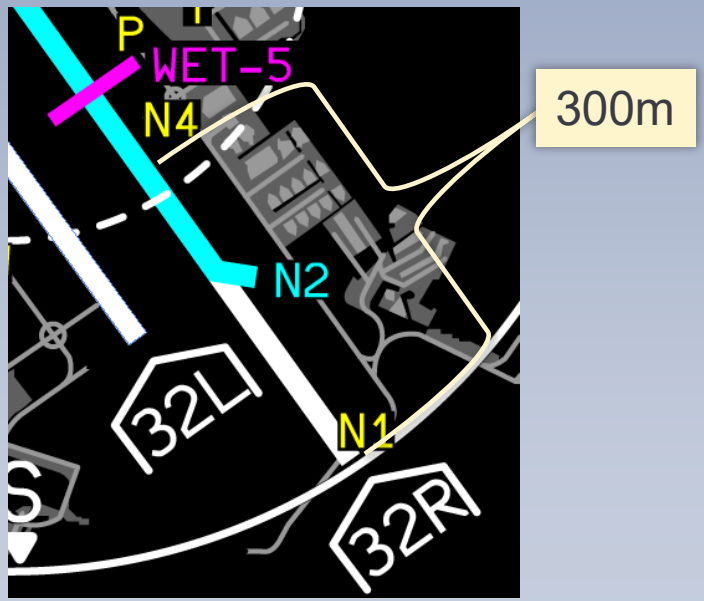


LANDING ON DRY OR WET RUNWAY

LAST 300 M OF THE RUNWAY

BACK

If the selected exit is within the 300 last meters of the runway,
BTV will release the aircraft at 10 kt 300 m before the runway end.



LANDING ON DRY OR WET RUNWAY

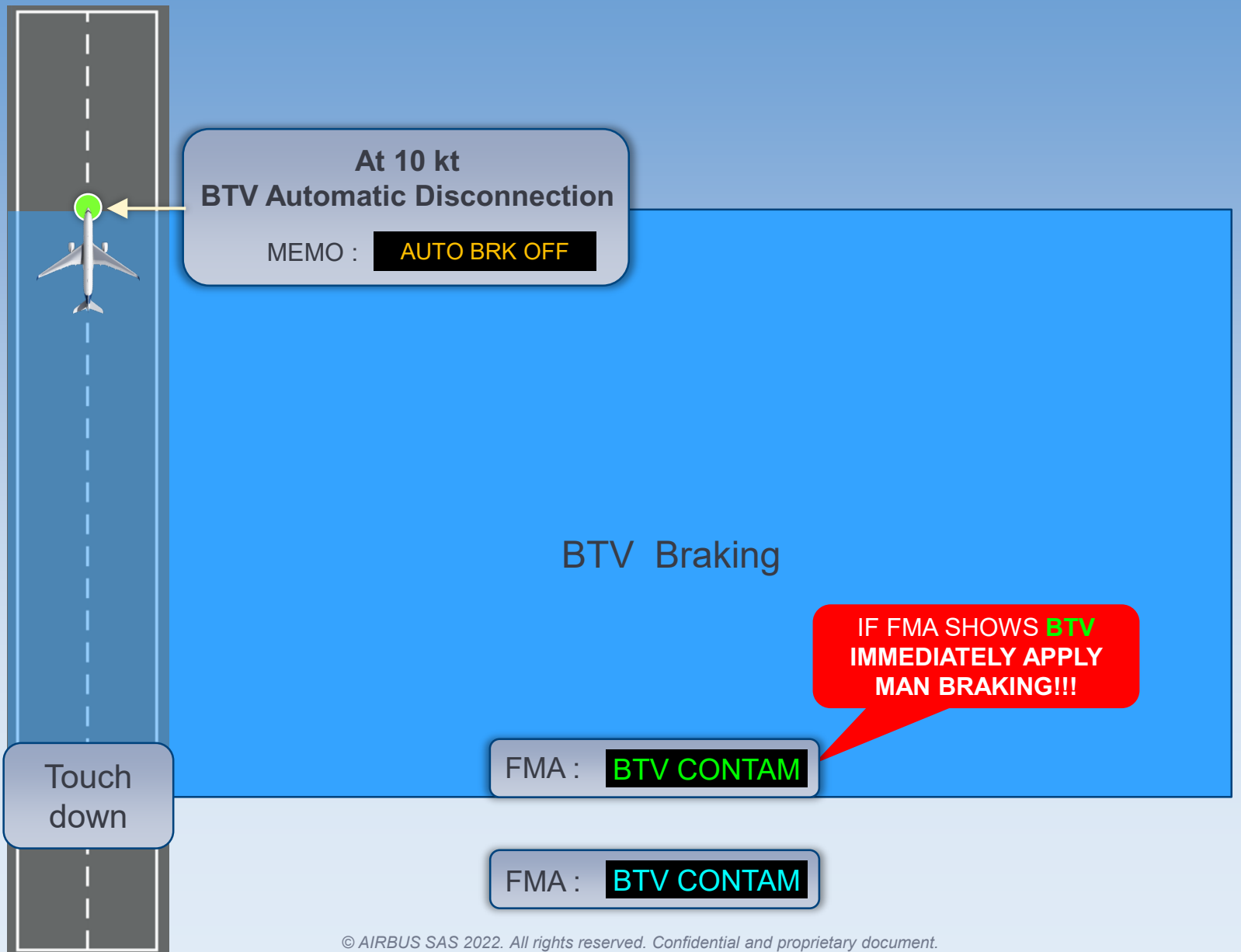
In case the runway is more slippery than expected…

BACK

In case the runway is more slippery than expected the BTV function increases the braking action and, 5 seconds after the missed exit situation is confirmed, displays the **EXIT MISSED** *message on the FMA.*

LANDING ON CONTANIMATED RUNWAY

BACK



CIRCLING

Approach Preparation:
- Standard APPR preparation
- Minimum for circling (CAT C)
- Early stabilized approach
- Preparation of SEC F-PLN (landing runway)

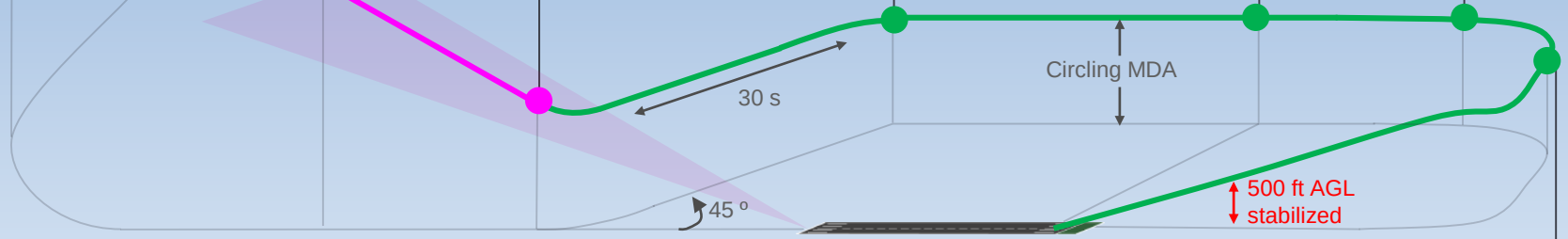
Before FAF:
- Flaps 3
- L/G down

100 ft above MDA with visual references:
- Press ALT
- BIRD ON
- Turn 45°
- When wings level:
  Start chrono for 30 s

Downwind:
- Set downwind track
- Maintain visual (lateral distance, TRK)
- Swap SEC F-PLN

Abeam:
- Start chrono
- 3 sec/100 ft

Base turn:
- Set runway track
- Initial bank 25°
- Maintain altitude



Threshold identified:
- Set landing conf
- Landing C/L
- Disconnect AP and FD at the latest before starting final descent

NAVIGATION

During circling, remember that the missed approach procedure is the one from the instrument approach.

Once you have swapped the SEC F-PLN, you can swap ACTIVE F-PLN to recover the missed approach procedure in the FMS.

FLIGHT CONTROL LAWS

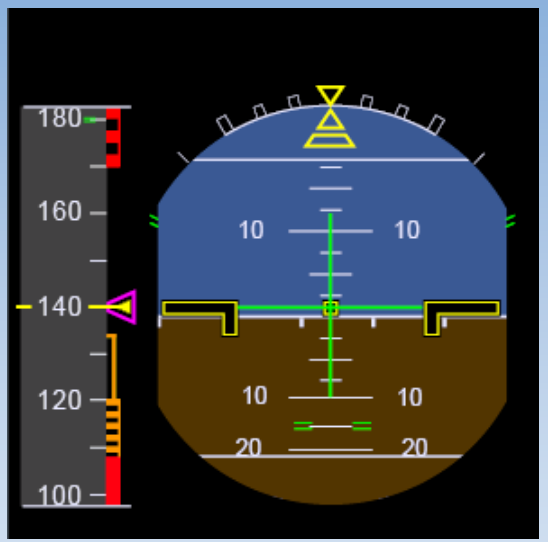
AIRBUS

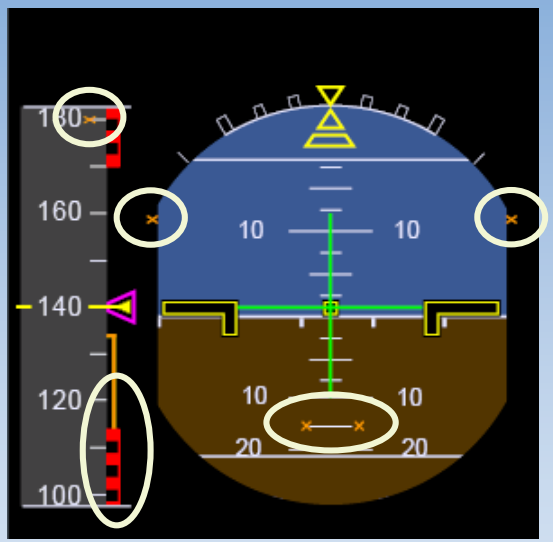
NORMAL LAW

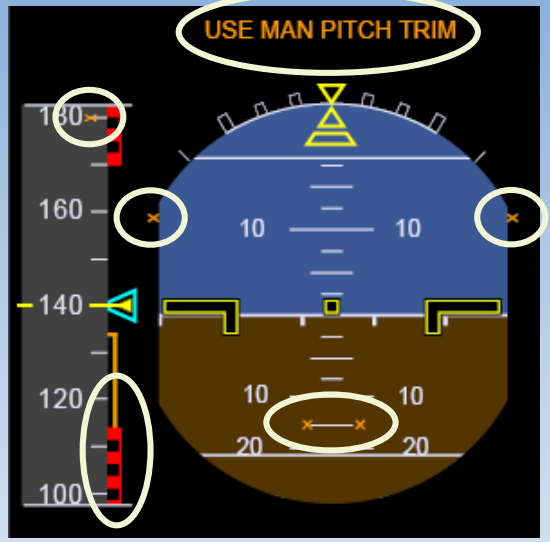
ALTERNATE LAW

DIRECT LAW

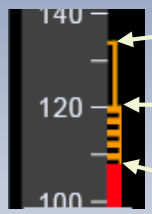
Operational Recommendation







HIGH AOA PROTECTION

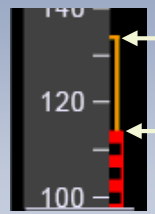


V_{LS}

$V\alpha_{PROT}$

$V\alpha_{MAX}$

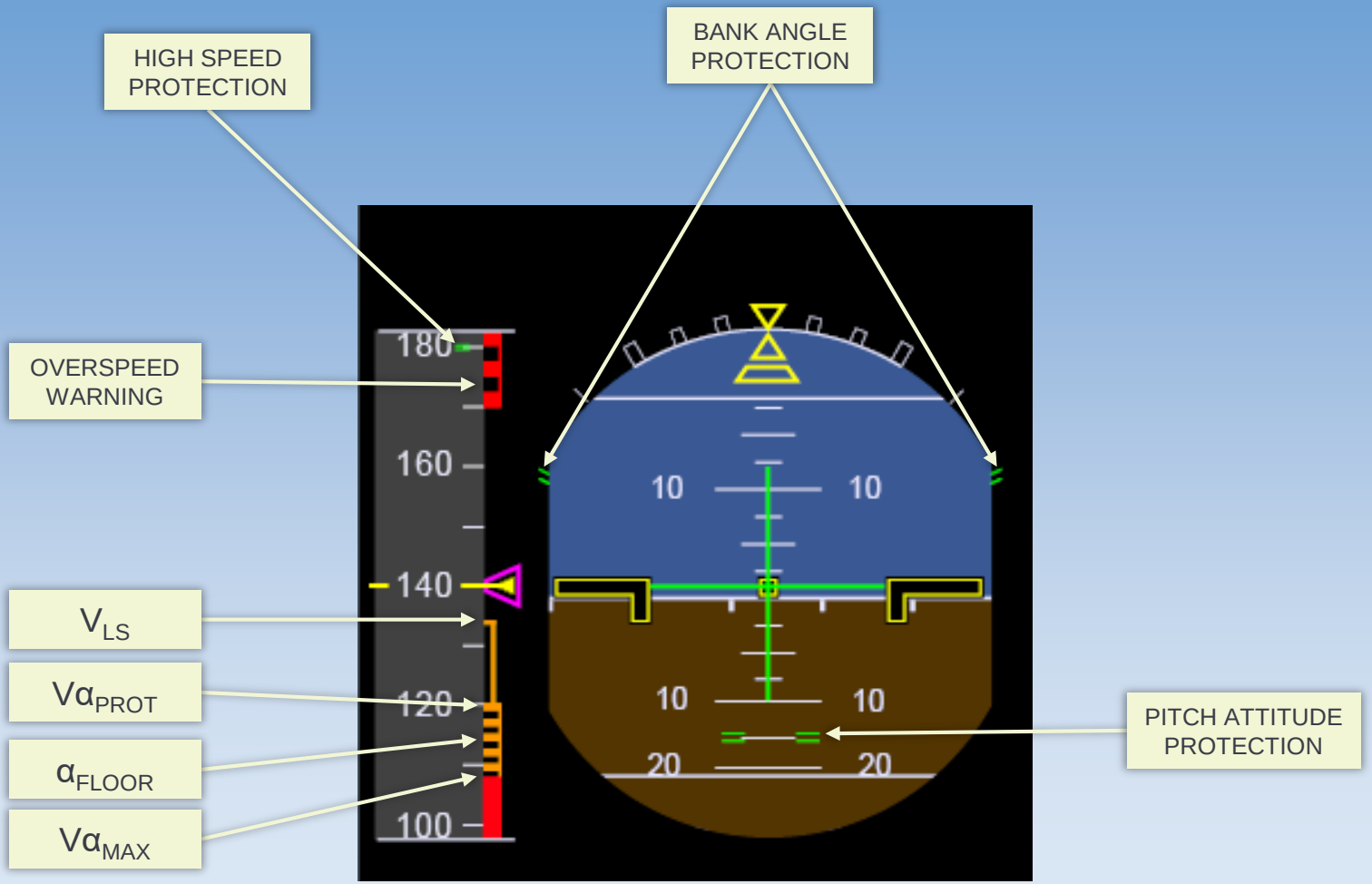
V STALL WARNING



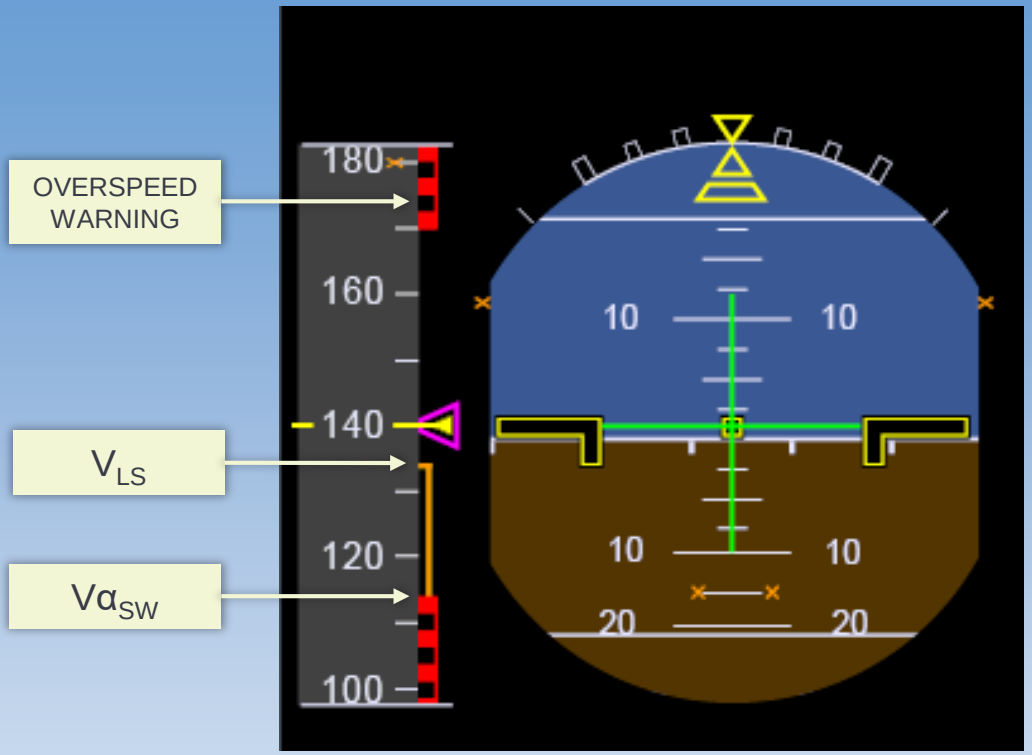
V_{LS}

$V\alpha_{SW}$

NORMAL LAW

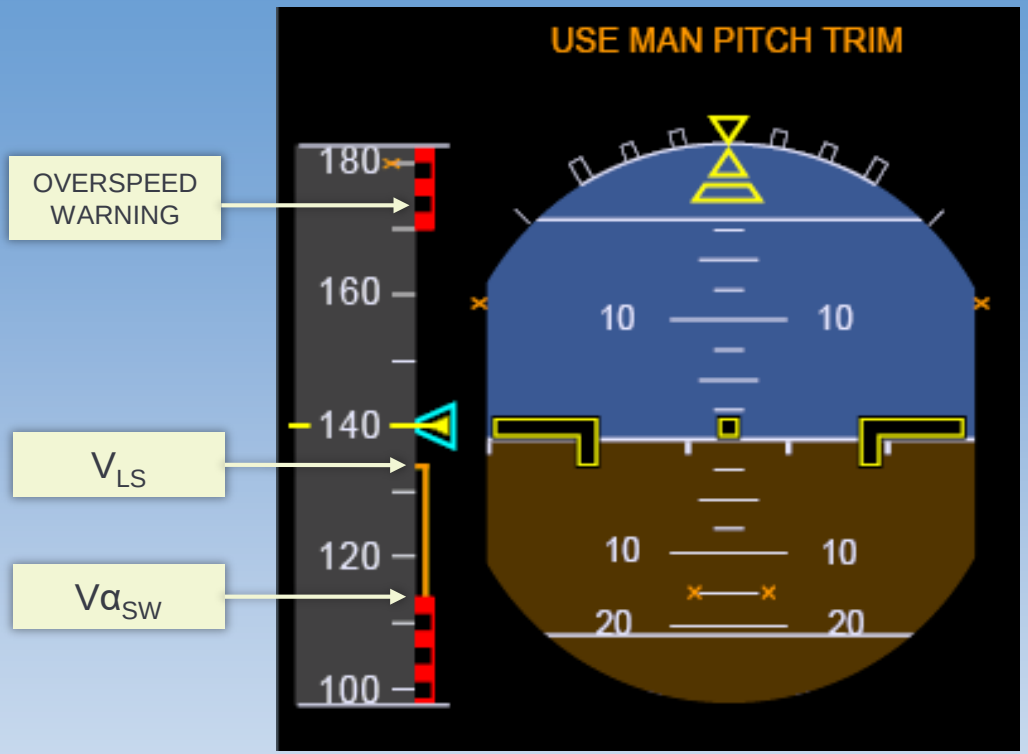


ALTERNATE LAW



- **Most protections are lost** (except Load Factor protection)
- **OVERSPEED** warning remains available  
- **STALL** warning remains available  " STALL, STALL , STALL "
- **Handling characteristics remain the same :** Pitch, roll and yaw controls are similar to normal law
- Auto trim remains available
- AP, FD and A/THR remain available.

DIRECT LAW



- **<u>All</u> protections are lost**
- **OVERSPEED** and **STALL** warnings remain available
- Deflection of the flight control surfaces is **directly proportional** to the sidestick deflection
- Yaw damper remains available
- Auto trim is lost **USE MAN PITCH TRIM**

- AP, FD are lost. A/THR may be lost.

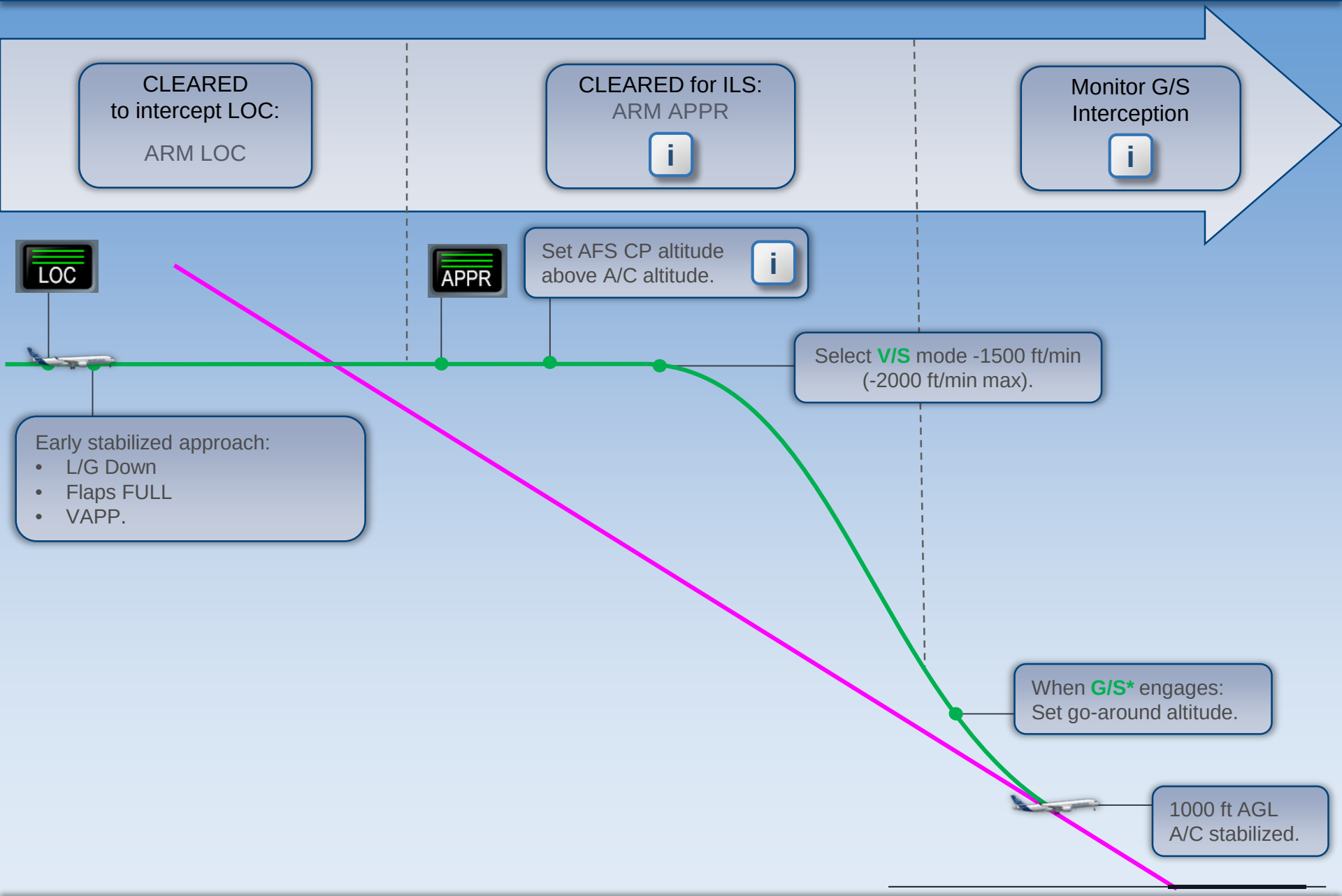
OPERATIONAL RECOMMENDATION

BACK

In **ALTERNATE LAW** or **DIRECT LAW,** to significantly reduce the possibility of a stall warning in turbulences, descend to approximately 4 000 ft below the REC MAX flight level.

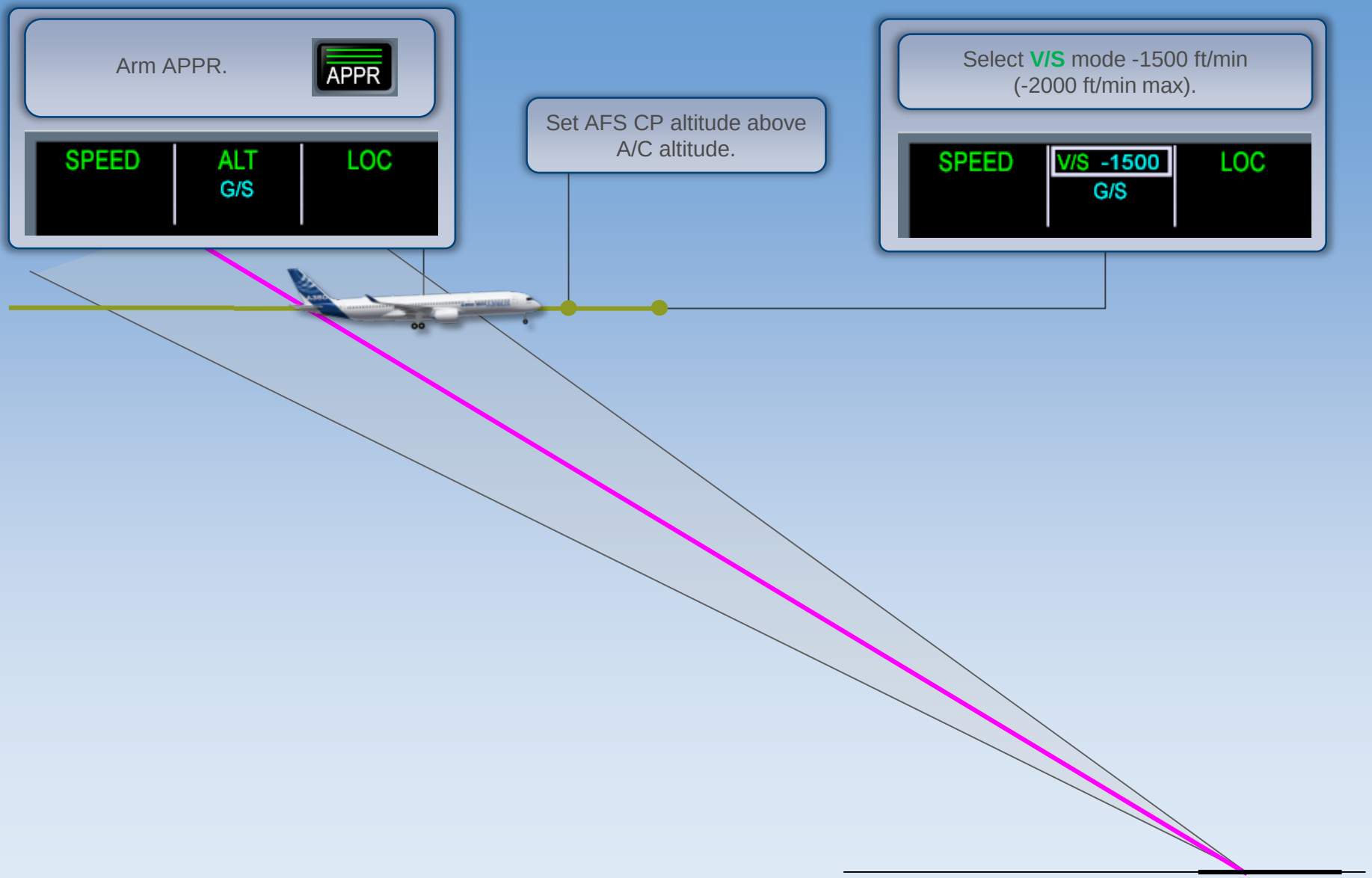
G/S INTERCEPTION FROM ABOVE

AIRBUS



CLEARED FOR ILS

BACK



SETTING AFS CP ALTITUDE

BACK

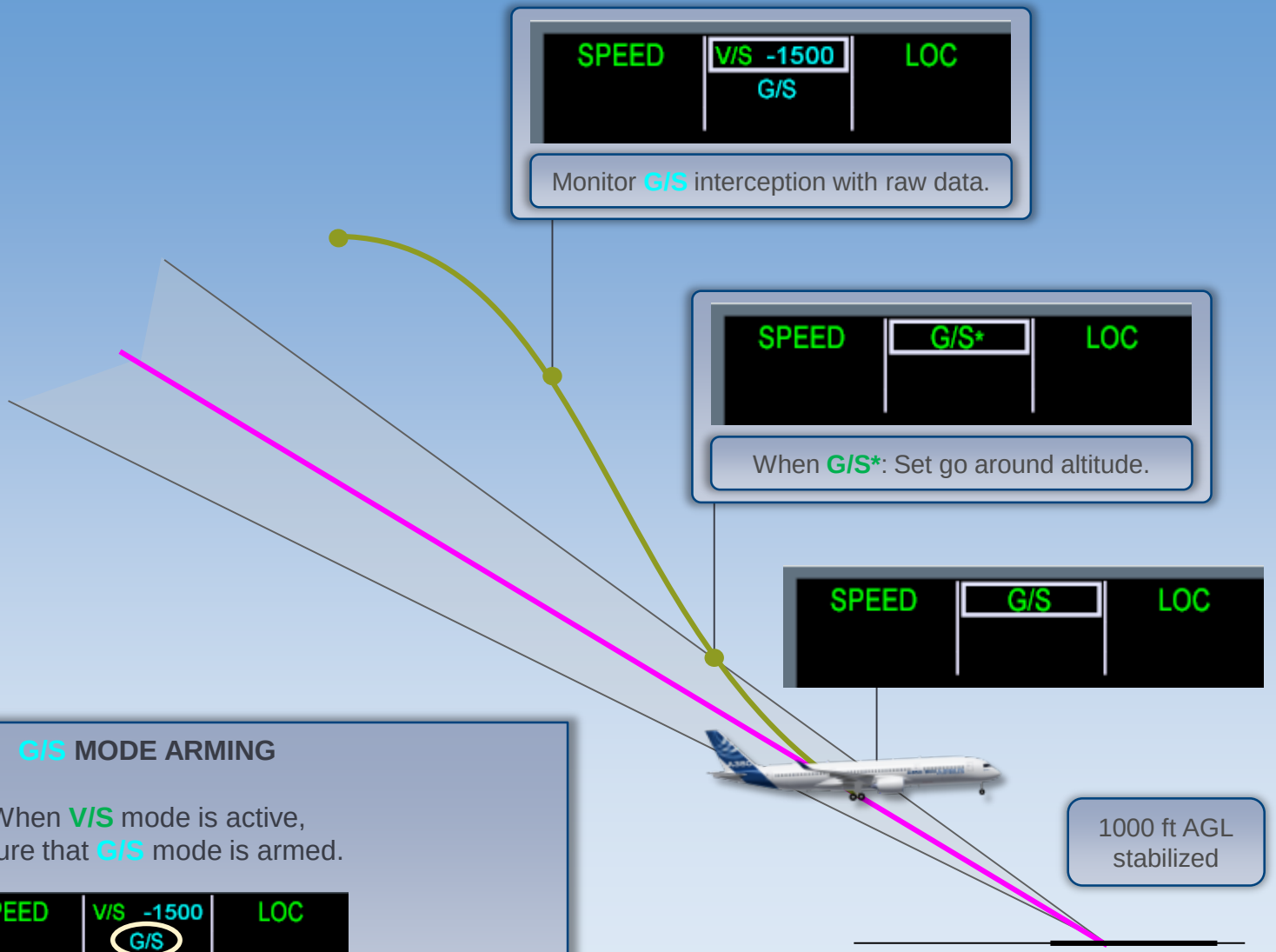
If the AFS CP altitude is below A/C altitude,

arming APPR then selecting **V/S** mode can lead to **ALT*** engagement.

Set an AFS CP altitude <u>above</u> the A/C altitude to be sure **V/S** mode remains active.

MONITOR G/S INTERCEPTION

BACK



G/S MODE ARMING

AIRCRAFT

When **V/S** mode is active,
ensure that **G/S** mode is armed.

Otherwise, if you keep going with the **V/S** mode only,
nothing will stop the descent.

GROUND SPEED MINI FUNCTION

Main principle of the ground speed mini function

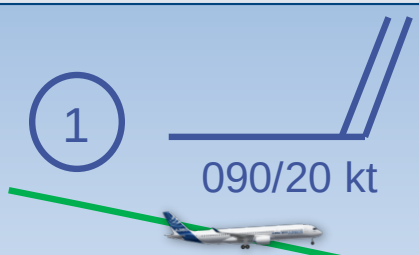
Tower wind: 090/20 kt

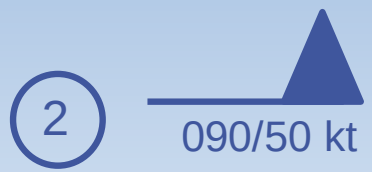
VAPP = VREF (143 kt) + 1/3 Tower headwind (7 kt) = 150 kt

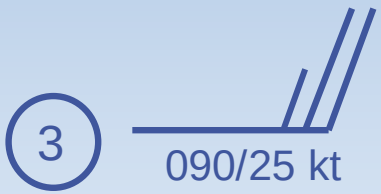
Current headwind: 20 kt

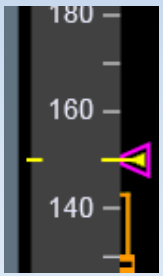
Headwind increases to: 50 kt

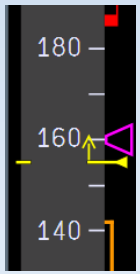
Headwind decreases to: 25 kt

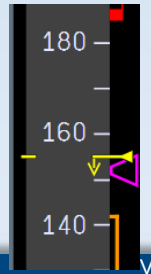












MAIN PRINCIPLE OF THE GROUND SPEED MINI FUNCTION

BACK

GS mini function prevents the A/C energy from dropping below a minimum level during final approach.
When active, the IAS target varies to maintain the computed Ground Speed mini.

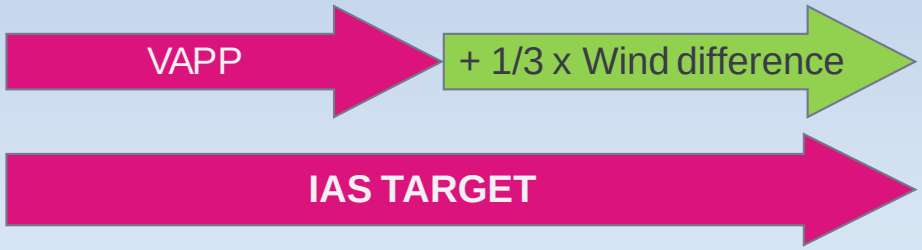
GS mini = VAPP – Tower Headwind

Ground speed mini is available in **managed** speed mode only.
It is active when the aircraft is in landing configuration, as defined in the APPR panel of the FMS PERF page.

IAS target computation

IAS TARGET = max [VAPP, VAPP + 1/3 x Wind Difference]

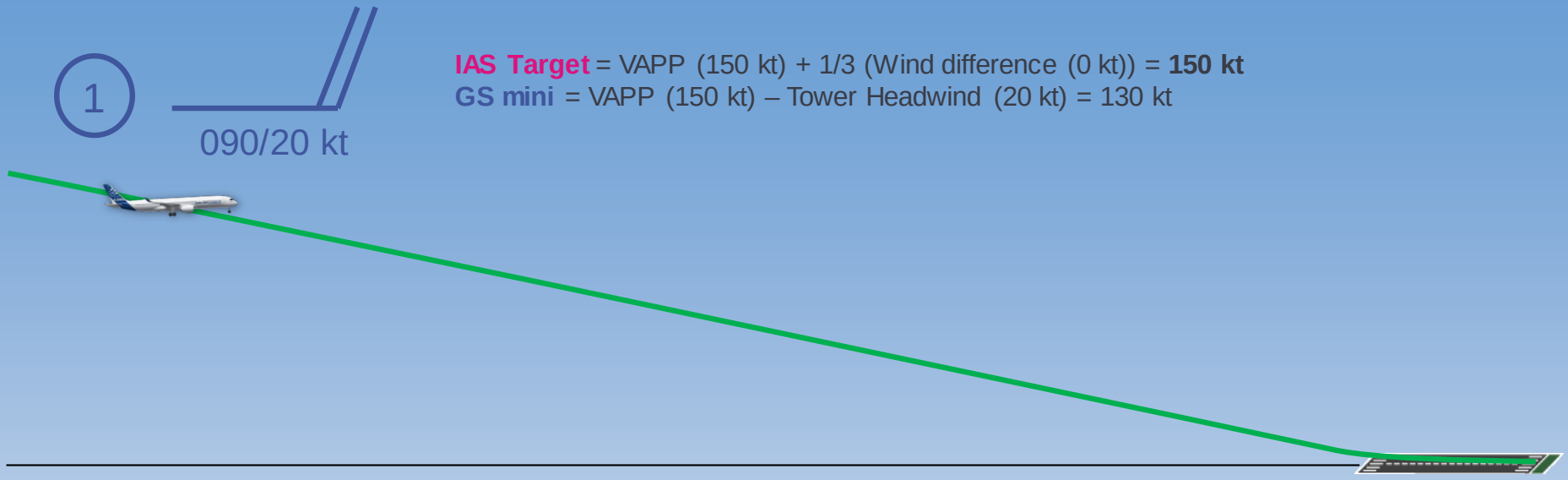
= 1/3 x (Current Headwind – Tower Headwind)



Minimum value of IAS target is VAPP

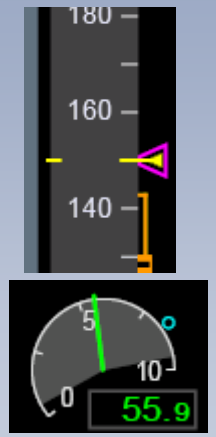
CURRENT HEADWIND 20 KT

BACK

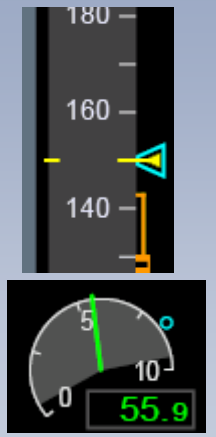


IAS Target = VAPP (150 kt) + 1/3 (Wind difference (0 kt)) = **150 kt**
GS mini = VAPP (150 kt) – Tower Headwind (20 kt) = 130 kt

MANAGED SPEED
Ground speed mini function active

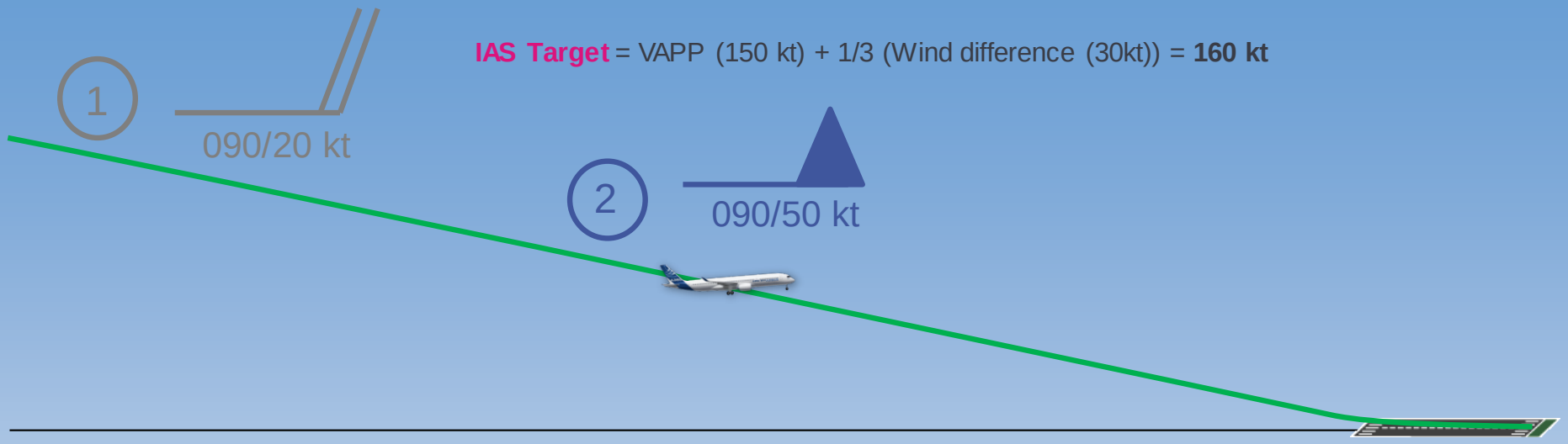


SELECTED SPEED
Ground speed mini function **not** active



HEADWIND INCREASES TO 50 KT

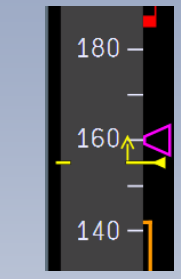
BACK



IAS Target = VAPP (150 kt) + 1/3 (Wind difference (30kt)) = **160 kt**

MANAGED SPEED

Ground speed mini function active

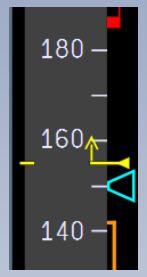


- IAS target increases
- Current speed increases
  Speed trend is going up

- THR will be slightly increased

SELECTED SPEED

Ground speed mini function **not** active



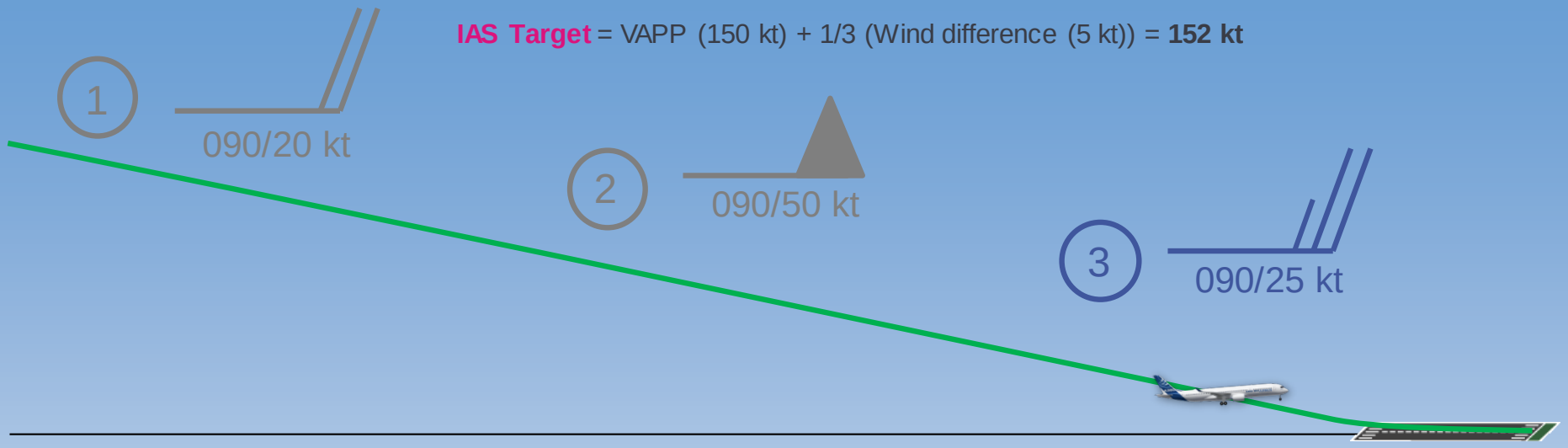
- Speed target **remains unchanged**
- Current speed increases
  Speed trend is going up

- **THR may be reduced to IDLE** in order to maintain the speed target

HEADWIND DECREASES TO 25 KT

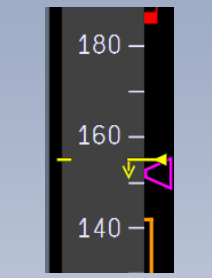
BACK

IAS Target = VAPP (150 kt) + 1/3 (Wind difference (5 kt)) = **152 kt**



MANAGED SPEED

Ground speed mini function active

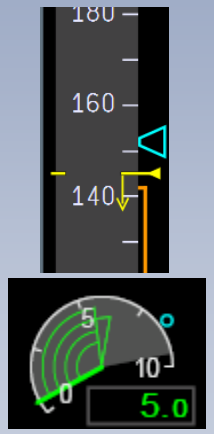


- IAS target decreases
- Current speed drops from a higher SPD
  SPD Trend goes down
- THR will be slightly decreased

A/C ENERGY REMAINS HIGH

SELECTED SPEED

Ground speed mini function **not** active



- Speed target **remains unchanged**
- Current SPEED drops
  SPD trend goes down
- THR is initially low (close to IDLE) and **increases slowly**

A/C ENERGY IS LOW

HEAD-UP DISPLAY (HUD)

AIRBUS

Transition to HUD operations

HUD Reminder

TAXI

Normal Display

Declutter Display

TAKEOFF

Normal Display

APPROACH

Displays

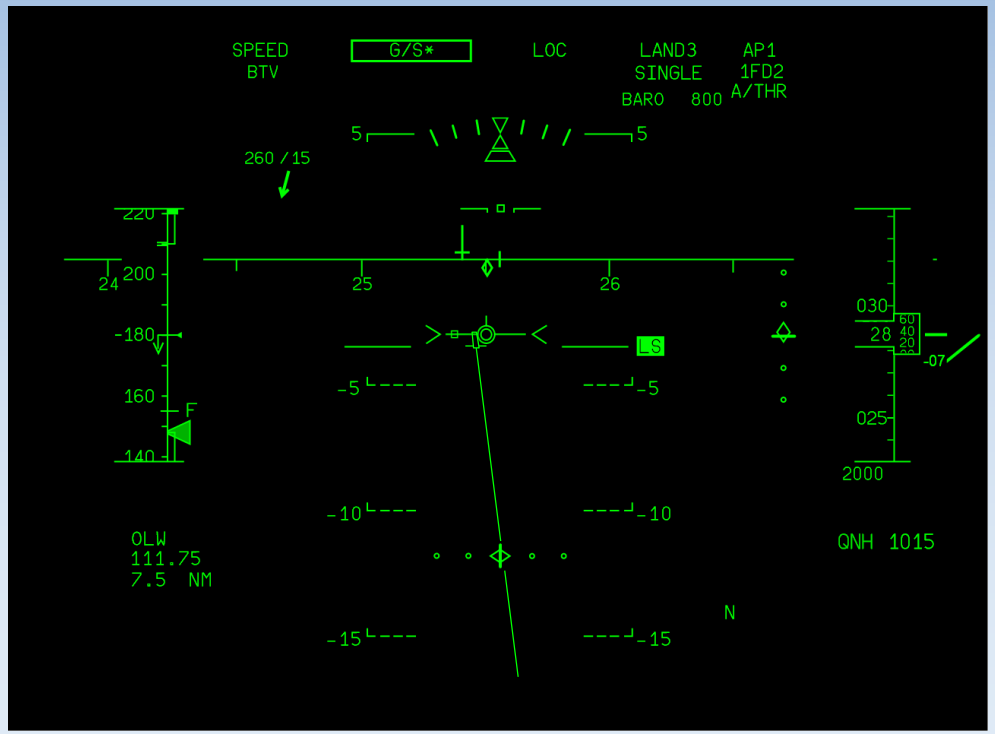
Final

ROLLOUT

Normal Display

Declutter and Crosswind

Flags and Messages



TRANSITION TO HUD OPERATIONS

BACK

Operational benefits:

- Taxi: Ground speed energy state
- Takeoff: Reduced minima takeoff
- Approach: Seamless IMC/VMC transition, energy state, accuracy in manual flight
- Visual or circling approach
- Landing and deceleration: Touch down zone accuracy, deceleration state
- Low Visibility Operations.

Risks in using HUD:

- **Cognitive tunnelling**
- Cluttering and brightness tuning
- Long habituation to display focused to infinity.

Basic use:

- The pilot should rely on **usual head-down for navigation and system monitoring**
- **Correct use of brightness** (especially on ground at night)
- **Seating position** is paramount to get HUD symbols represented to pilot's field of view.

HUD Reminder

BACK

The flight crew can use the HUD during all the flight phases.

However, in the following cases the flight crew must revert to the PFD and the ND:

- **TCAS Resolution Advisories (RA), and**
- **Unusual attitude recoveries.**

In such cases, a specific message appears on the HUD to inform the flight crew that it is necessary to revert to the PFD and the ND.

In addition, it is also recommended that the flight crew uses the PFD and the ND for the following maneuvers:

- **Controlled Flight Into Terrain (CFIT) avoidance**
- **Windshear recovery, and**
- **Non-Precision Approaches with the RAW ONLY capability.**

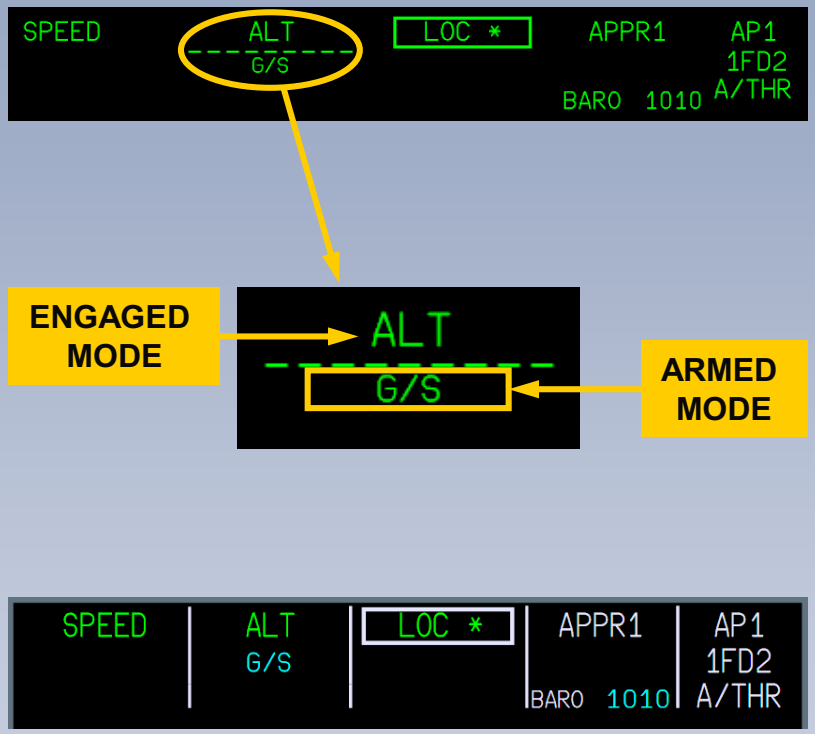
Flight Mode Annunciator i

Energy Chevrons i

Speed Delta i

FLIGHT MODE ANNUNCIATOR

BACK

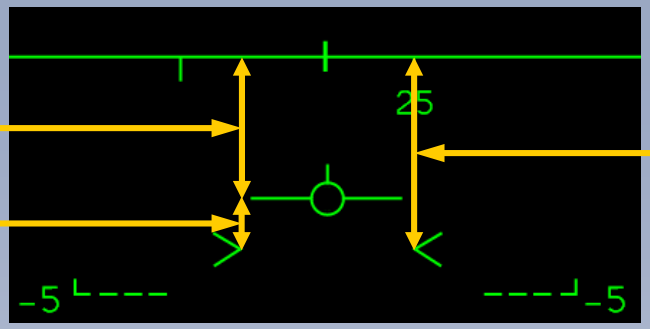


ENERGY CHEVRONS

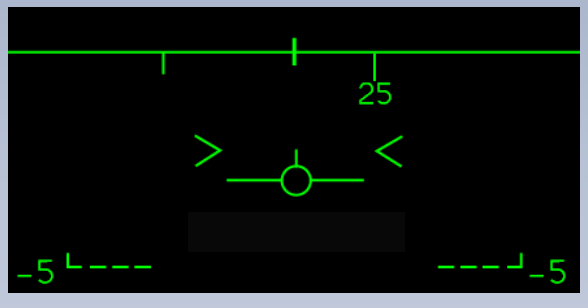
BACK

FLIGHT PATH ANGLE

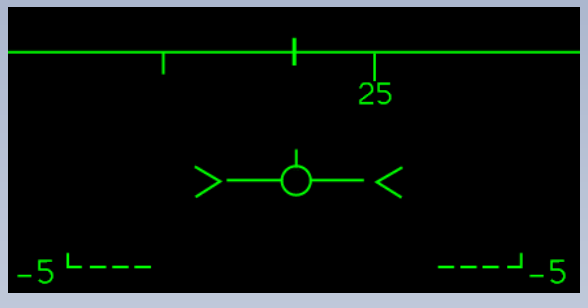
ACCELERATION / DECELERATION



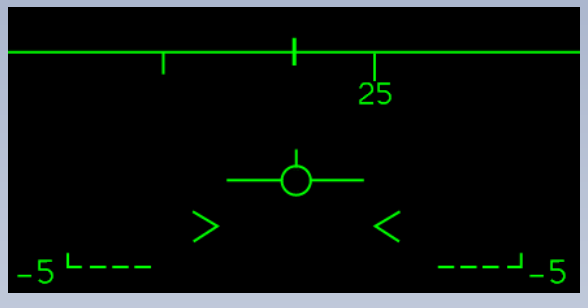
TOTAL FPA: AIRCRAFT ENERGY



CHEVRONS ABOVE BIRD: THE AIRCRAFT ACCELERATES.



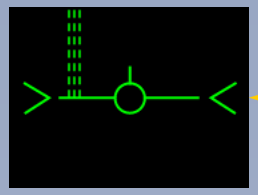
CHEVRONS ALIGNED WITH BIRD: THE AIRCRAFT IS AT ACONSTANT SPEED AND THRUST.



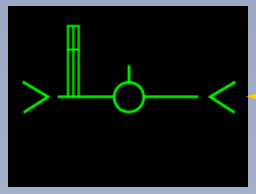
CHEVRONS BELOW BIRD: THE AIRCRAFT DECELERATES.

SPEED DELTA

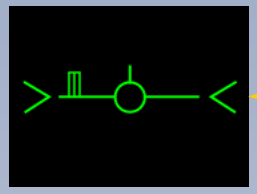
BACK



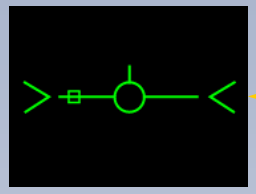
AIRCRAFT FASTER THAN TARGET SPEED BY MORE THAN 20 KT



AIRCRAFT FASTER THAN TARGET SPEED BY MORE THAN 10 KT BUT LESS THAN 20 KT

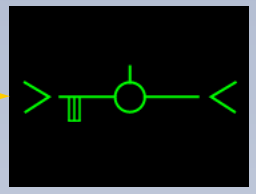


AIRCRAFT FASTER THAN TARGET SPEED BY LESS THAN 10 KT

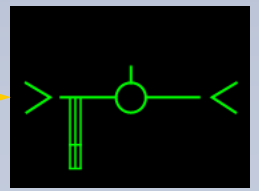


AIRCRAFT ON TARGET SPEED

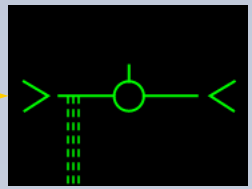
AIRCRAFT SLOWER THAN TARGET SPEED BY LESS THAN 10 KT



AIRCRAFT SLOWER THAN TARGET SPEED BY MORE THAN 10 KT BUT LESS THAN 20 KT

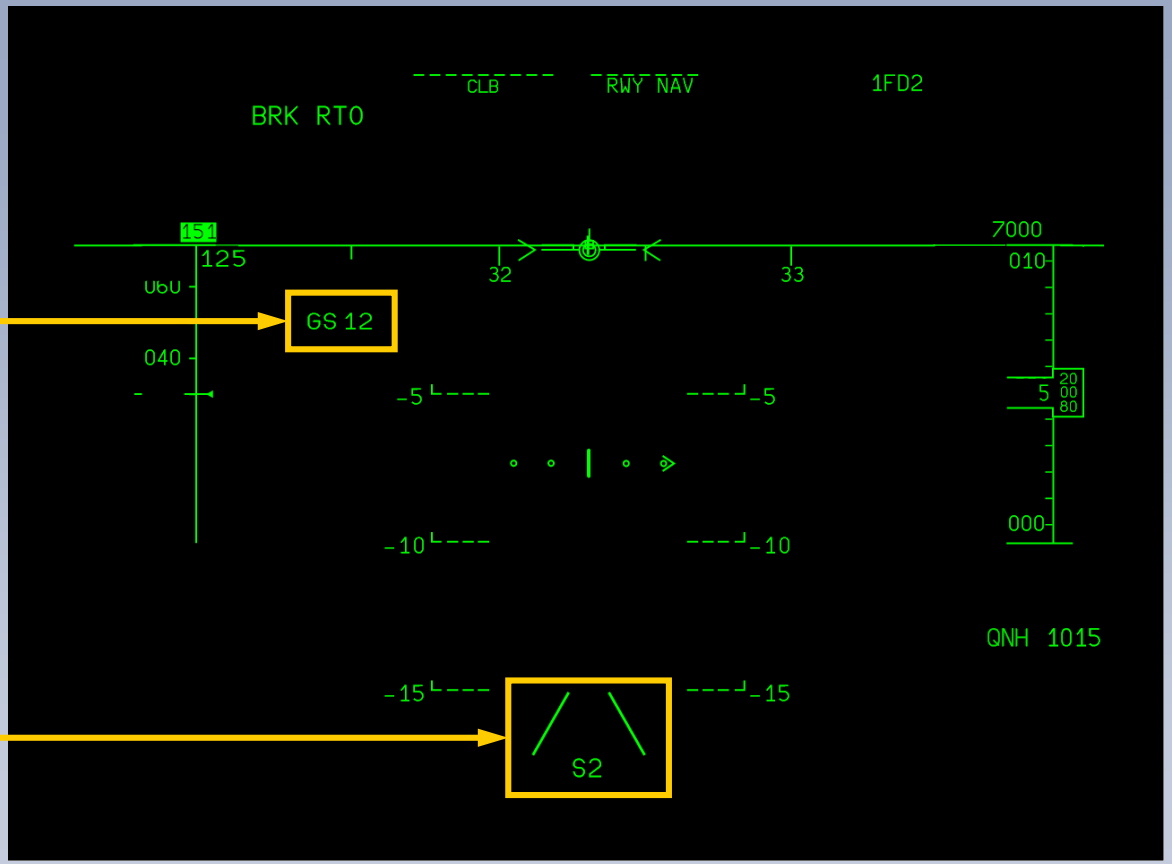


AIRCRAFT SLOWER THAN TARGET SPEED BY MORE THAN 20 KT



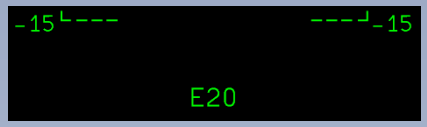
TAXI – NORMAL DISPLAY

BACK



GROUND SPEED

CURRENT TAXIWAY



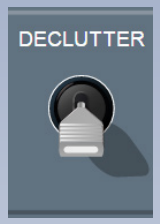
CURRENT PARKING STAND

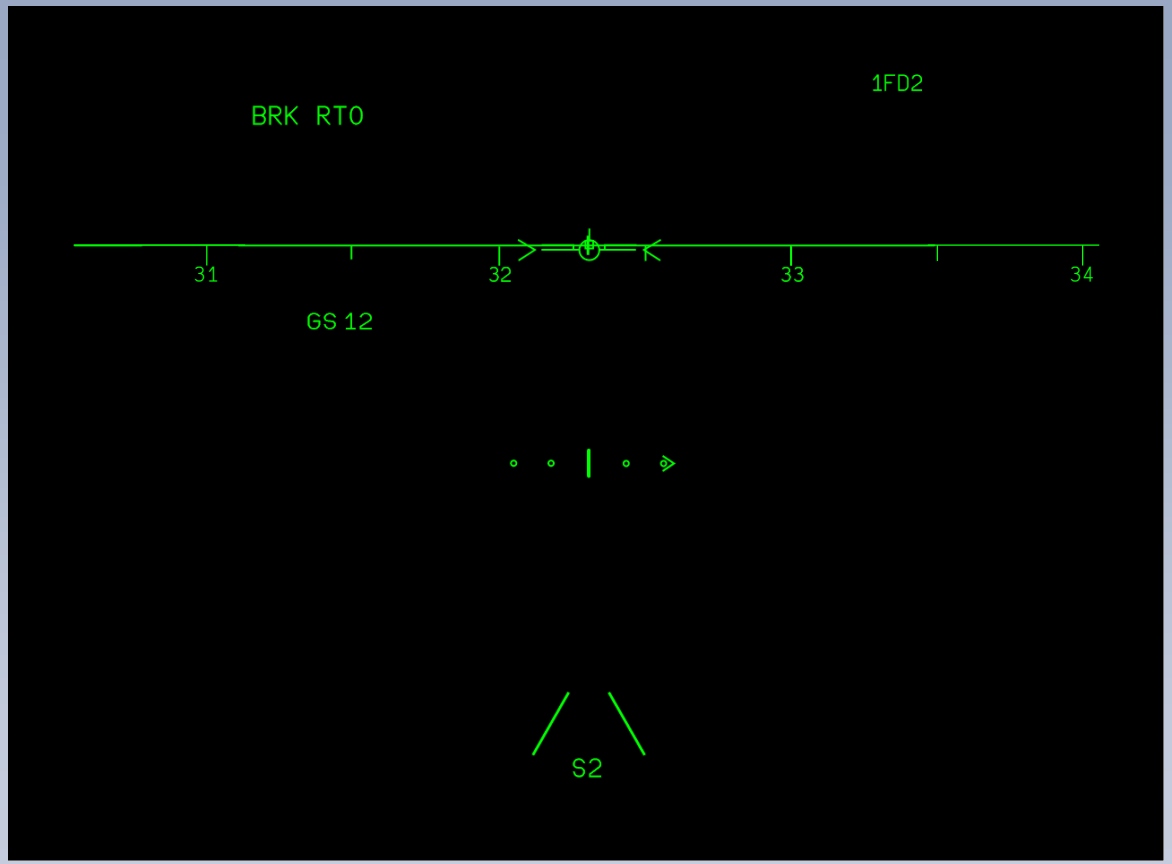
CURRENT RUNWAY

TAXI – DECLUTTER DISPLAY

BACK

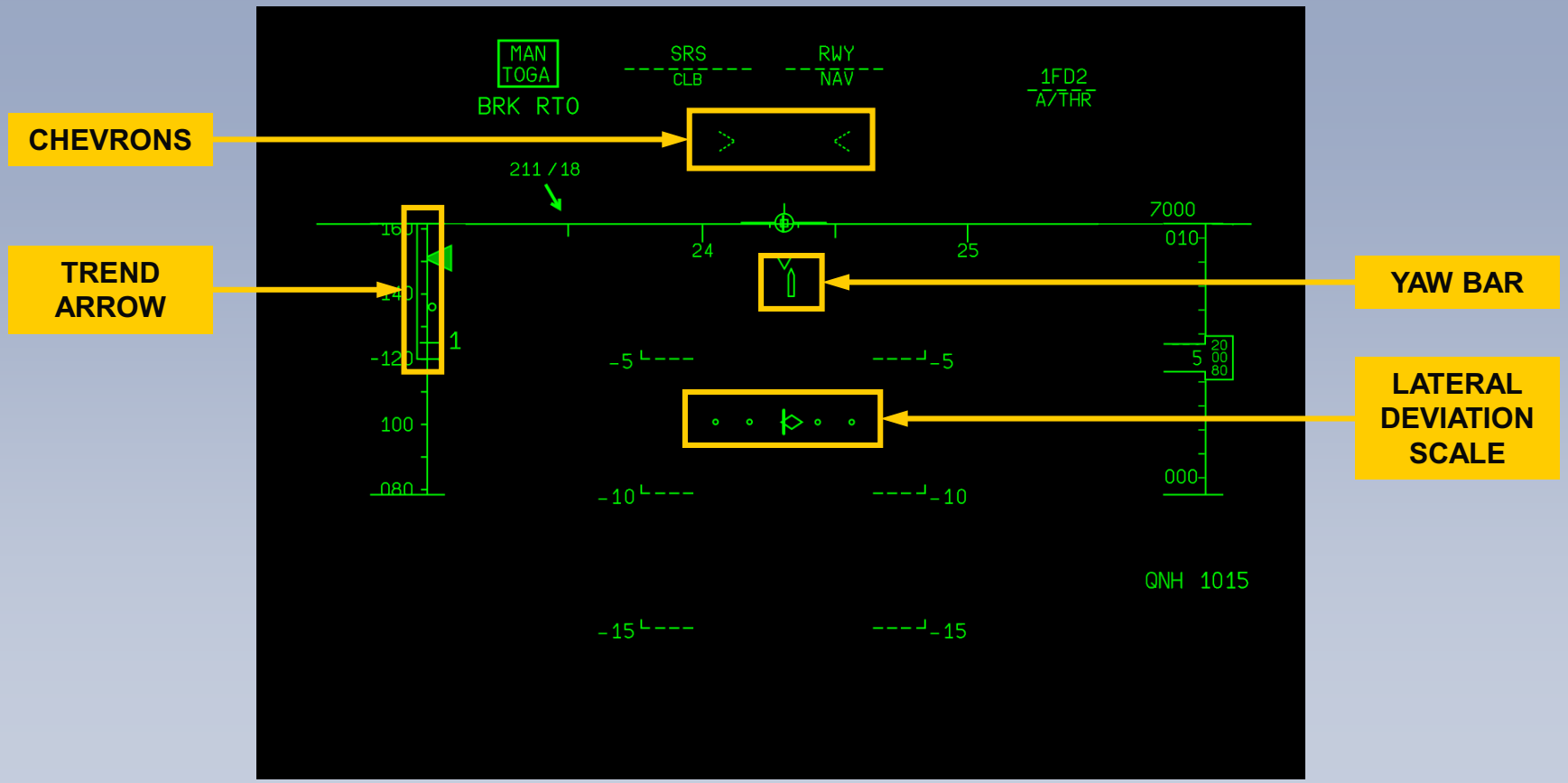
DECLUTTER MODE





TAKEOFF – TAKEOFF ROLL – NORMAL DISPLAY

NEXT

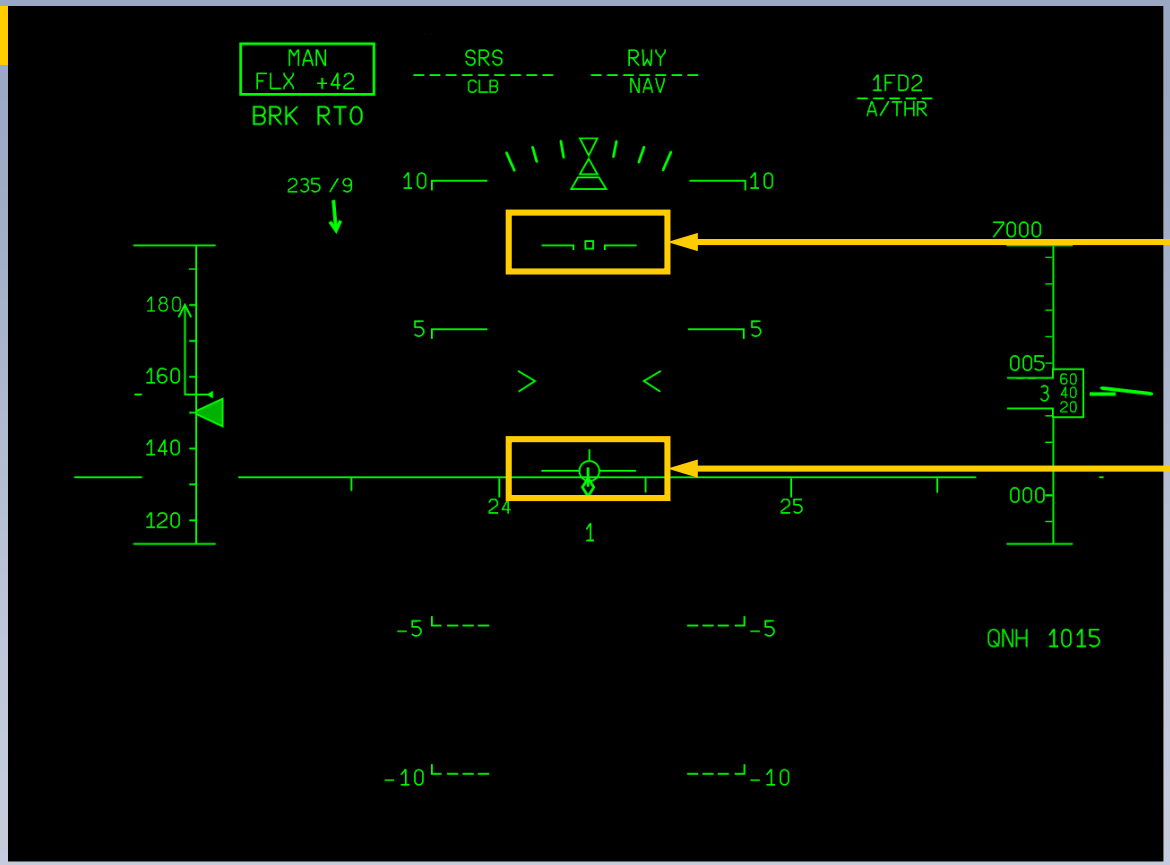


TAKEOFF ROLL

When the flight crew sets the takeoff thrust, the aircraft reference symbol and the yaw bar (if the ILS is available) appear on the HUD. The yaw bar shows you the yaw guidance order of the flight director to maintain or return the aircraft to the runway centerline by using the appropriate rudder pedals inputs.

TAKEOFF – ROTATION – NORMAL DISPLAY

AT LIFTOFF



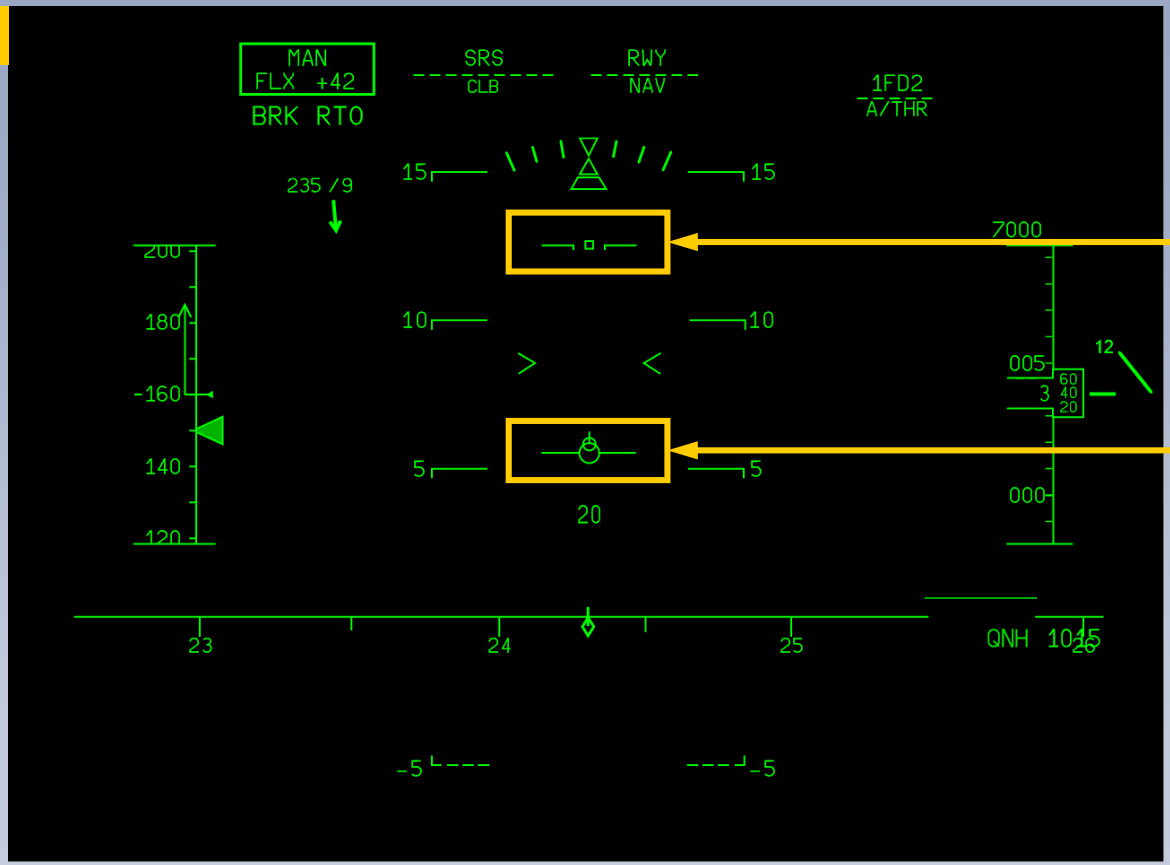
ROTATION

On the HUD, when the aircraft is on ground, the visible field of view above the horizon line is approximately 5°. Therefore, the pitch target (e.g. +12.5°) is out of the flight crew's field of view at rotation initiation.

The Bird remains aligned with horizon until aircraft lifts-off.

TAKEOFF – ROTATION – NORMAL DISPLAY

12.5° PITCH



ROTATION

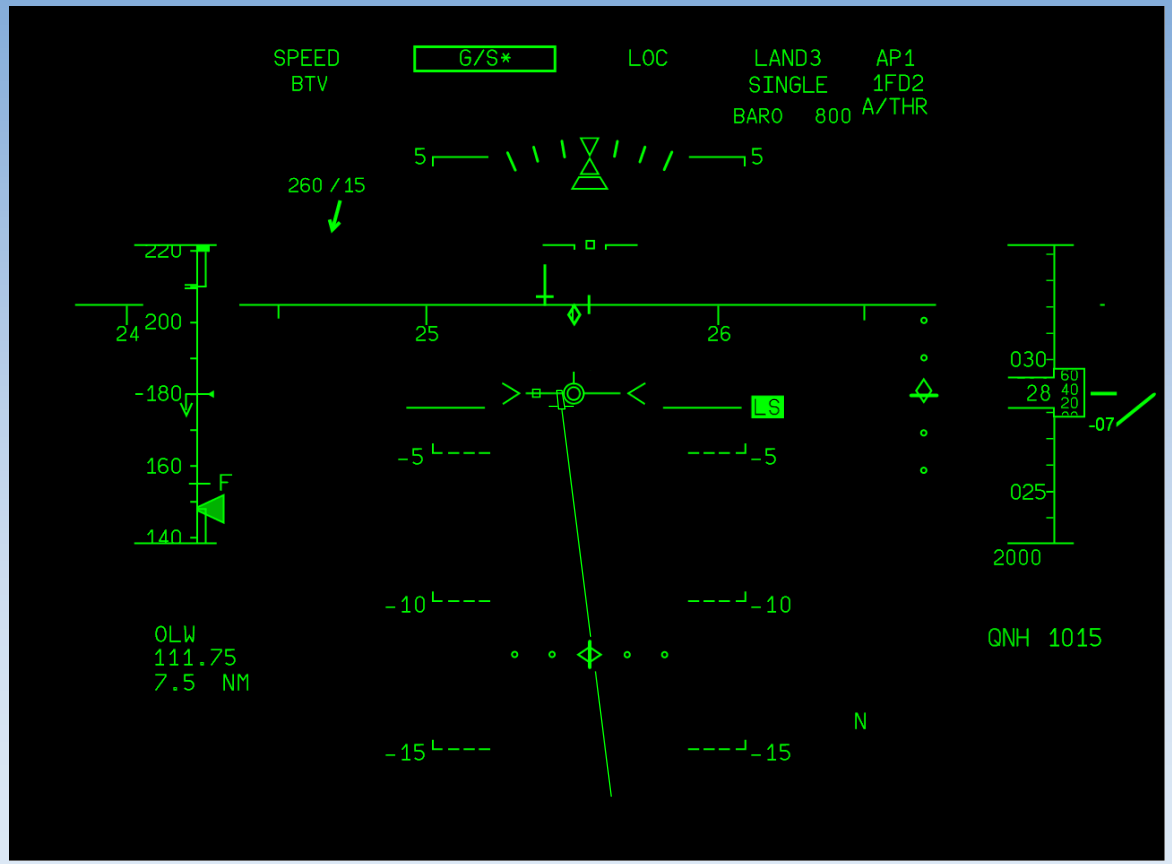
As soon as the pitch target is in sight, **apply first the +12.5° pitch attitude** then refer to the Flight Patch Director (FPD).

Note: The same recommendation applies for Go-Around.

APPROACH – DISPLAYS

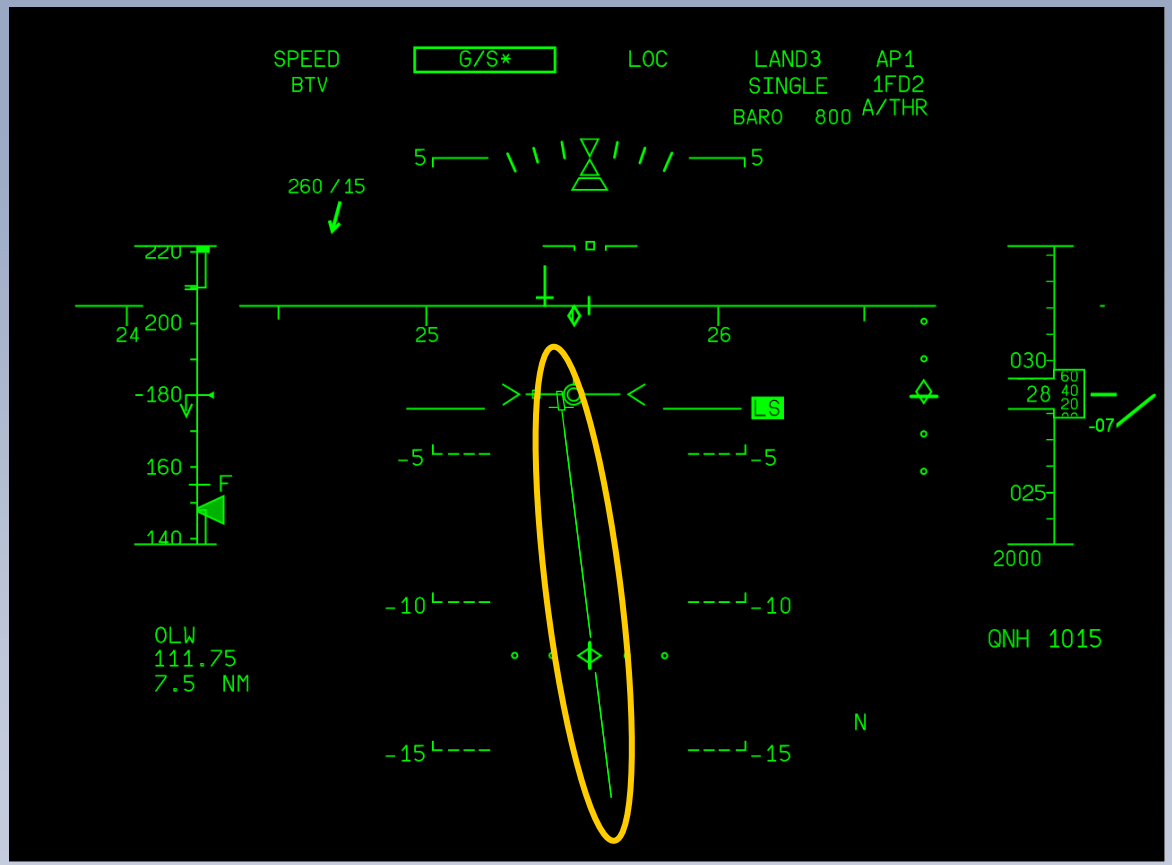
BACK

Normal Display i | Declutter Displays i | Crosswind Display i



APPROACH – NORMAL DISPLAY

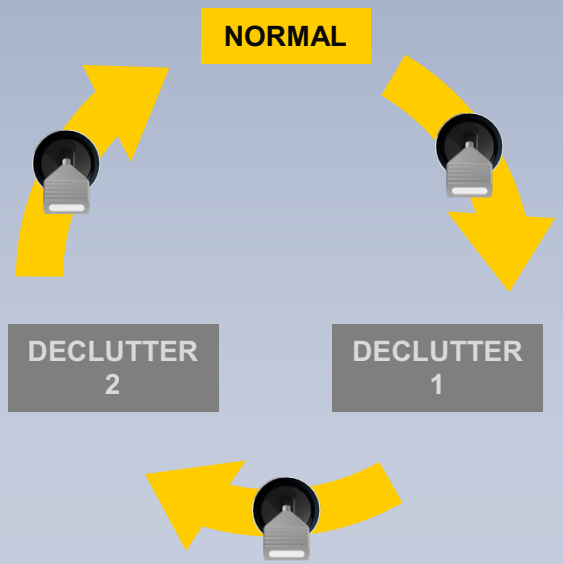
BACK

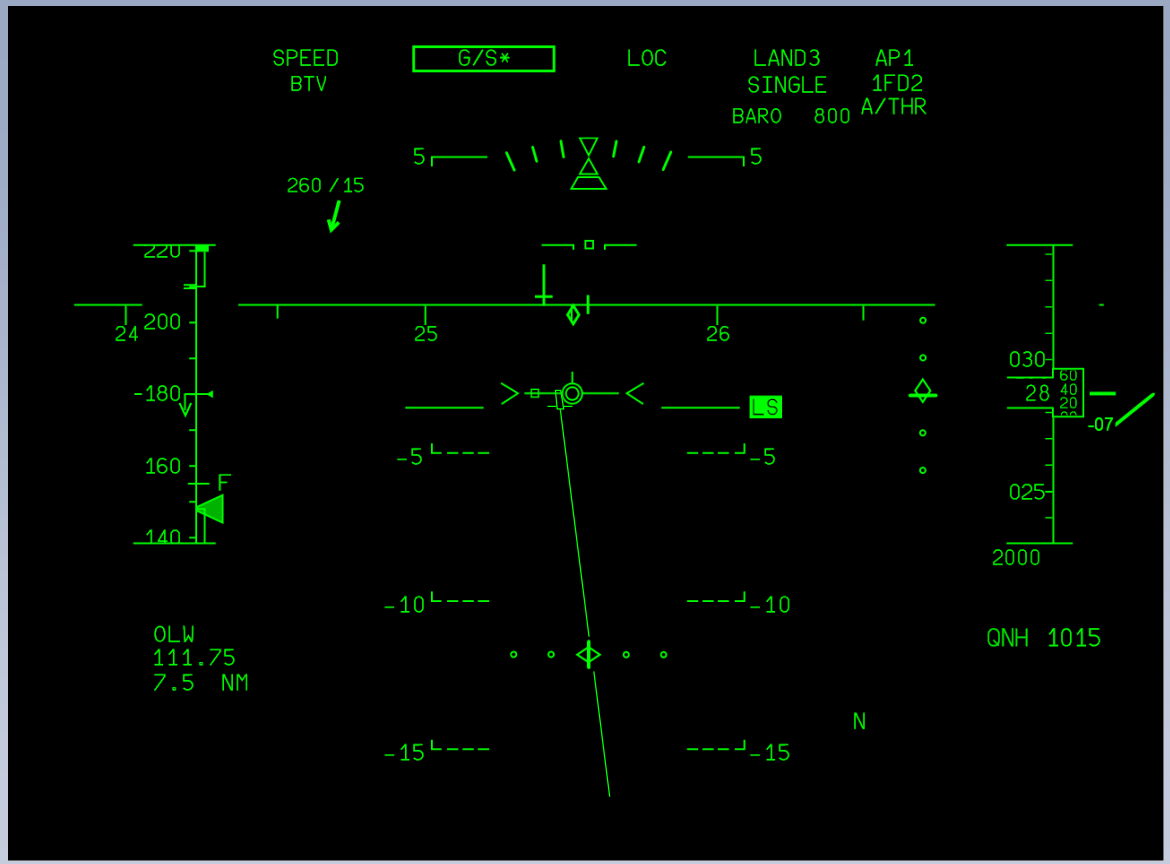


APPROACH – DECLUTTER DISPLAYS

NEXT

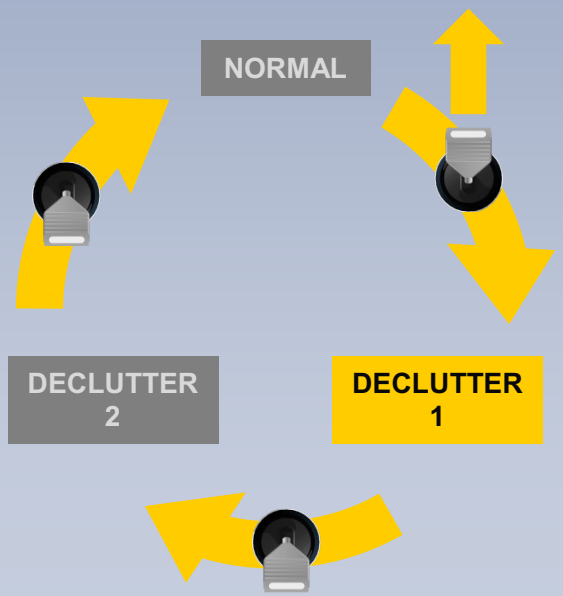
CAPTAIN (F/O) HUD CONTROL PANEL

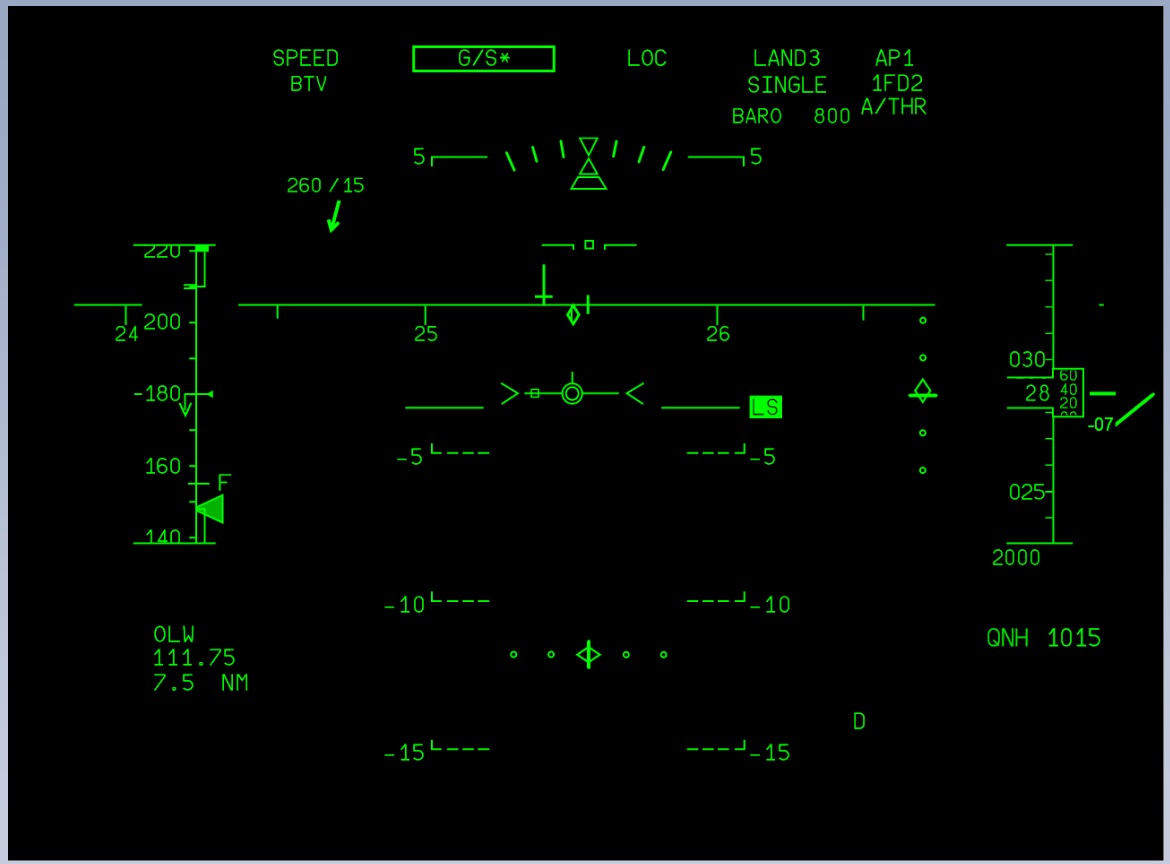




APPROACH – DECLUTTER DISPLAYS

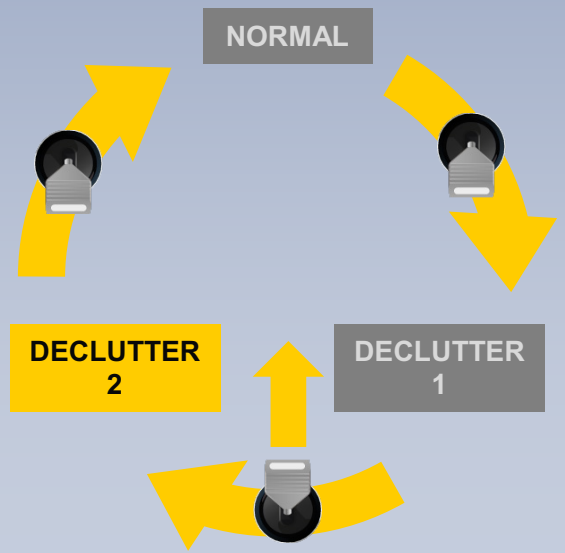
CAPTAIN (F/O) HUD CONTROL PANEL

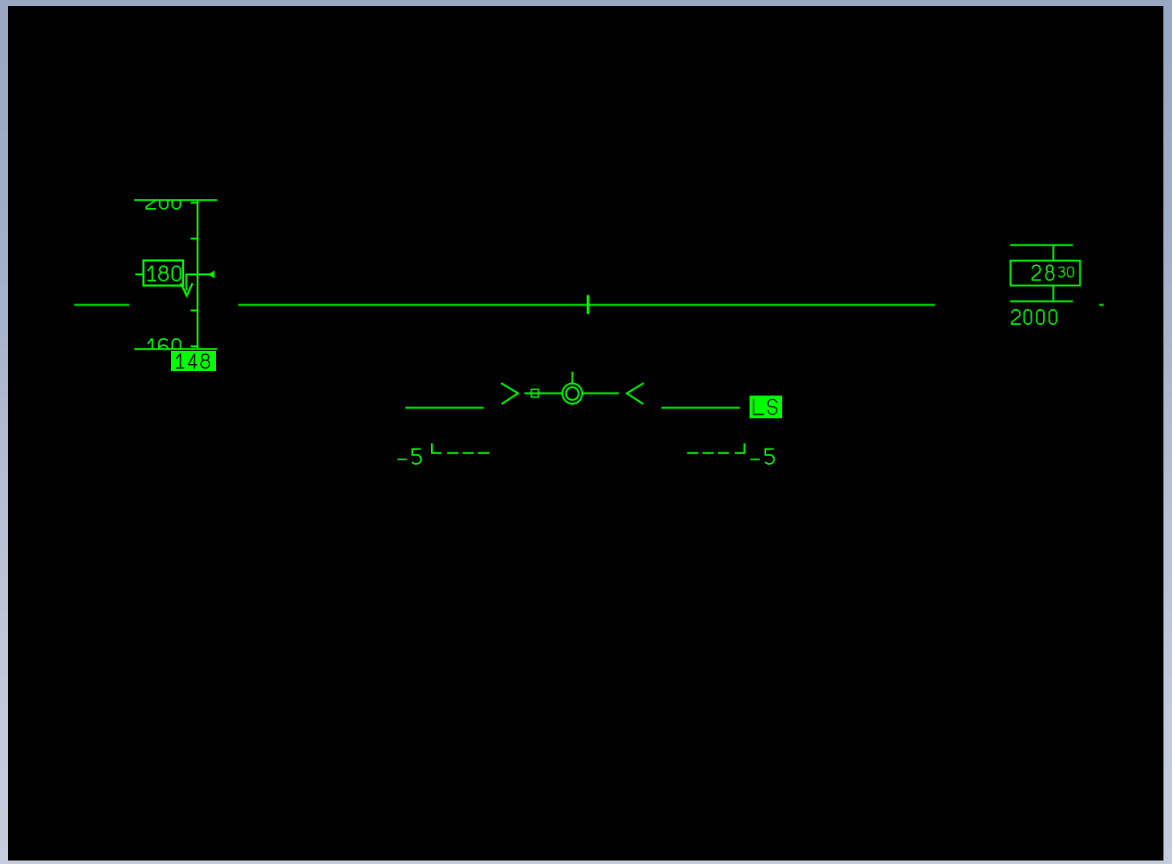




APPROACH – DECLUTTER DISPLAYS

CAPTAIN (F/O) HUD CONTROL PANEL

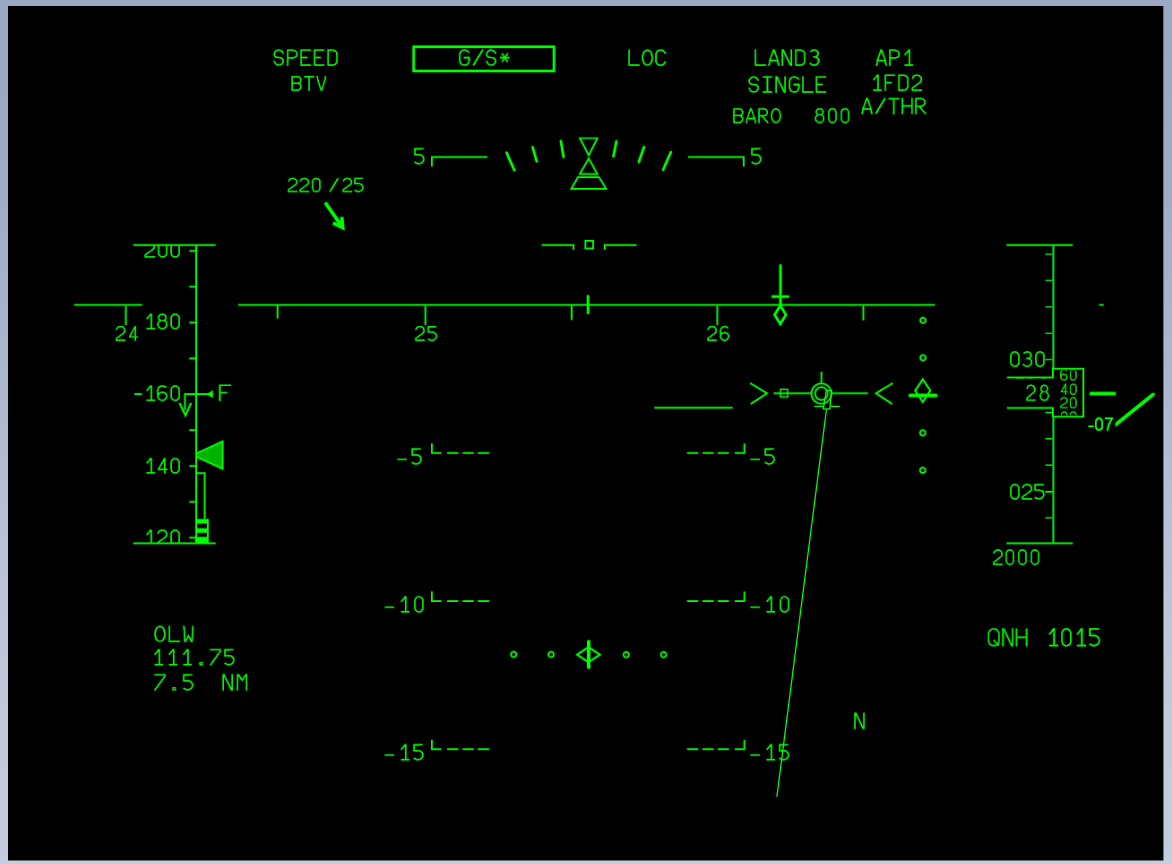




APPROACH – CROSSWIND DISPLAY

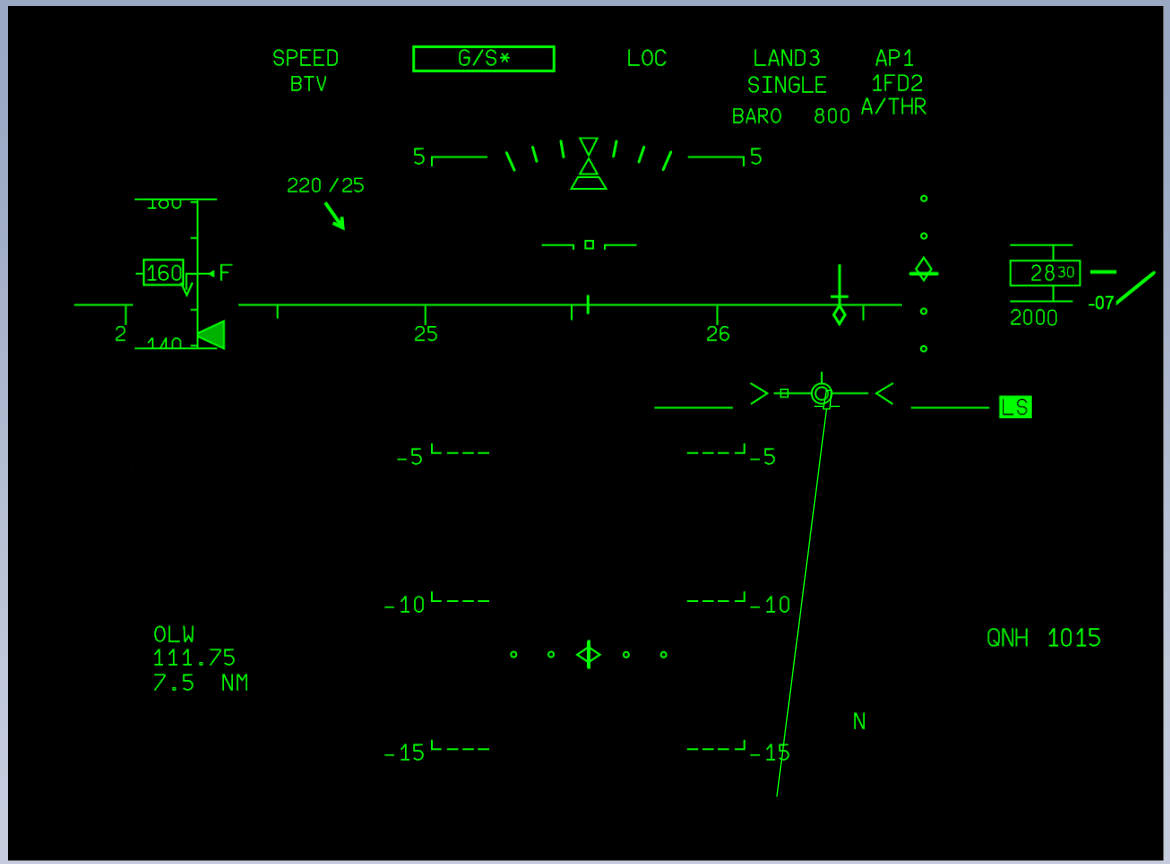
NEXT

CAPTAIN (F/O) HUD CONTROL PANEL



APPROACH – CROSSWIND DISPLAY

CAPTAIN (F/O) HUD CONTROL PANEL



FINAL APPROACH

BACK

The HUD provides similar symbols for instrument and visual approaches.

The similar type of information helps the flight crew to stabilize the aircraft on:

- The final approach path (i.e. the published final approach path for instrument approaches, or the selected final approach path for visual approaches)
- The lateral trajectory of the final approach, indicated either by a synthetic runway symbol, or the real runway when in view.

When the flight crew uses the HUD, the IMC/VMC transition is smooth because of the similar flying technique between a visual approach and an instrument approach.

Precision Approach Synthetic Runway i

Non Precision Approach Synthetic Runway i

Symbology i

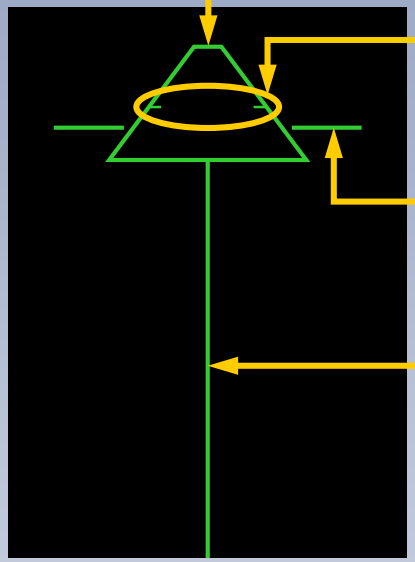
Final Approach FPA i

RADIO / BARO i

Flare Reminder i

PRECISION APPROACH – SYNTHETIC RUNWAY

BACK



RUNWAY

TOUCHDOWN POINT
BASED ON G/S RAW DATA

FINAL APPROACH FPA

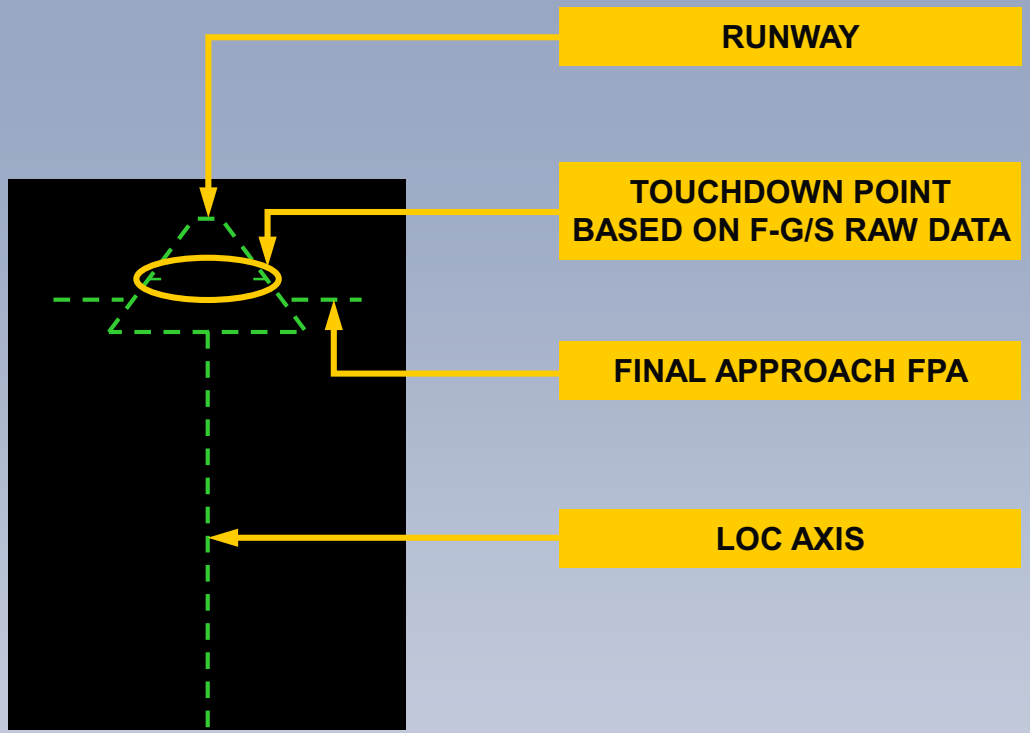
LOC AXIS

The flight crew must not use the synthetic runway for runway identification.

During a precision approach, the synthetic runway and the LOC axis on the HUD may not overlay the real runway.

NON PRECISION APPROACH – SYNTHETIC RUNWAY

BACK

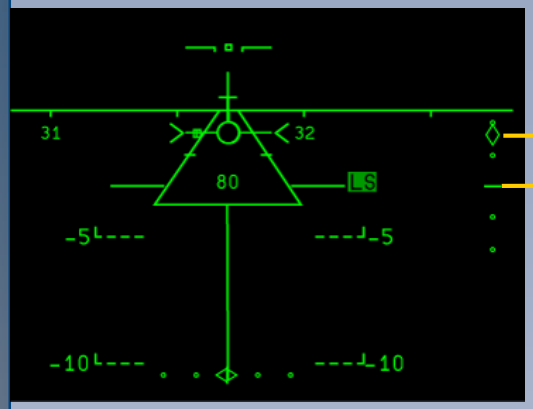


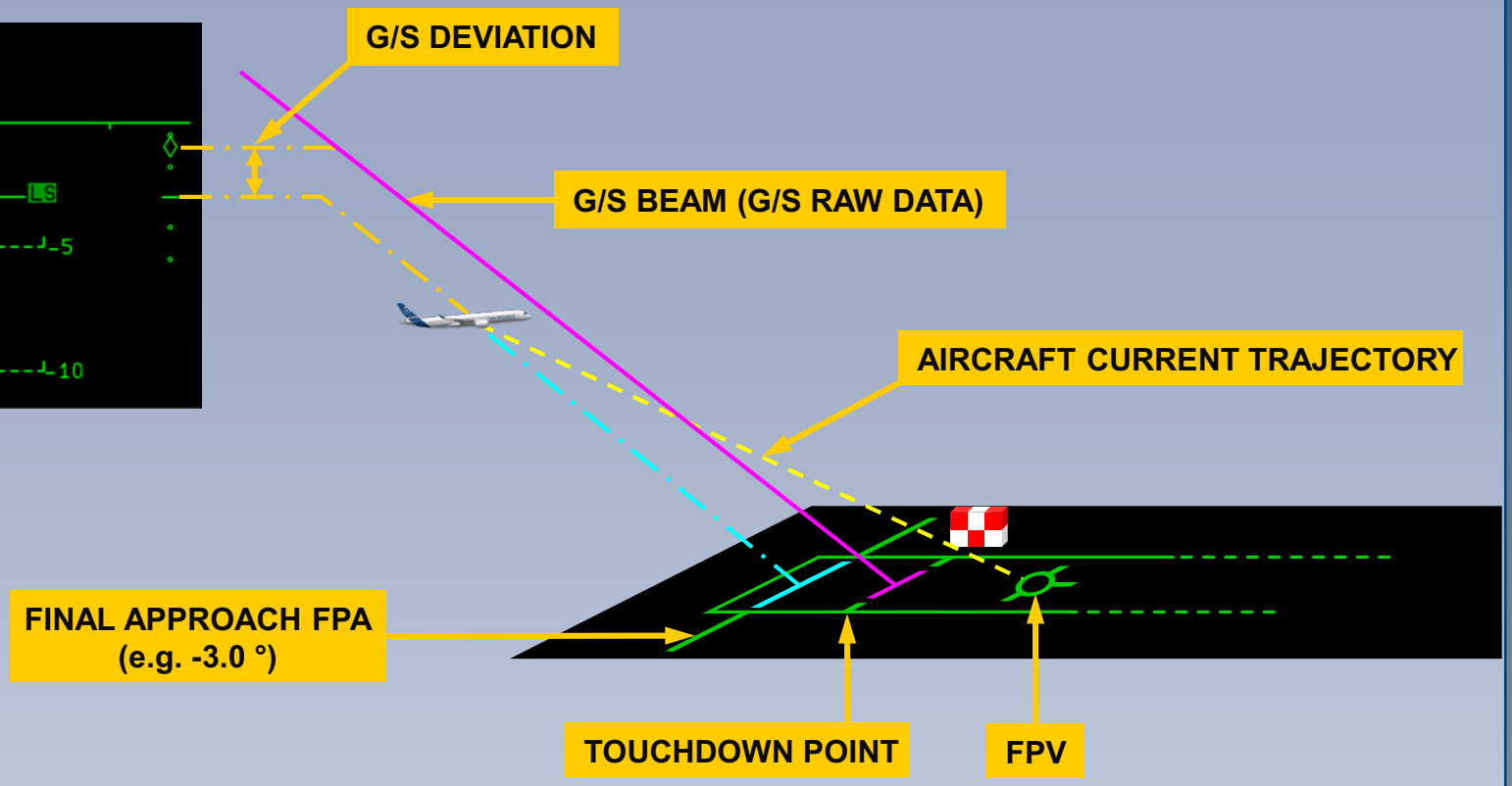
The flight crew must not use the synthetic runway for runway identification.

In Non-Precision Approaches (NPA), the synthetic runway course may be different from the real runway course by a few degrees.

SYMBOLOGY

BACK





On the above picture the aircraft is below the G/S and the pilot applies corrective action.

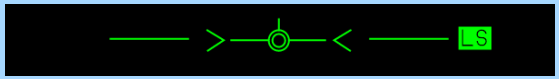
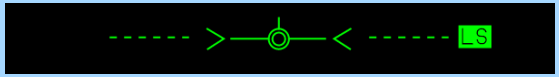
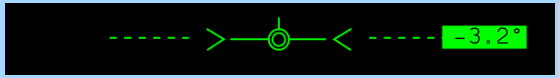
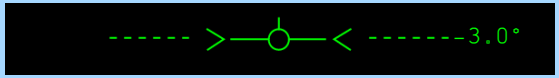
In order to stabilize the aircraft on the final approach path, the flight crew flies the FPV above (below), or in line with the touchdown point, so that the final approach FPA symbols remain aligned with the touchdown point.

When transitioning from IMC to VMC, the real runway gradually appears through the HUD.

The real runway should be superimposed by the synthetic runway symbol.

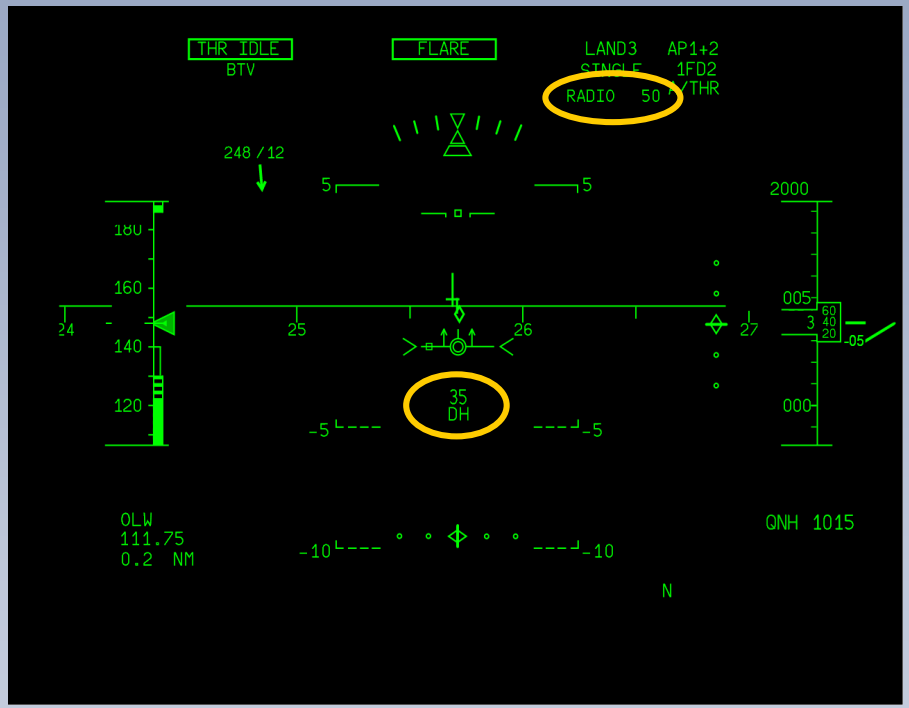
FINAL APPROACH FPA

BACK

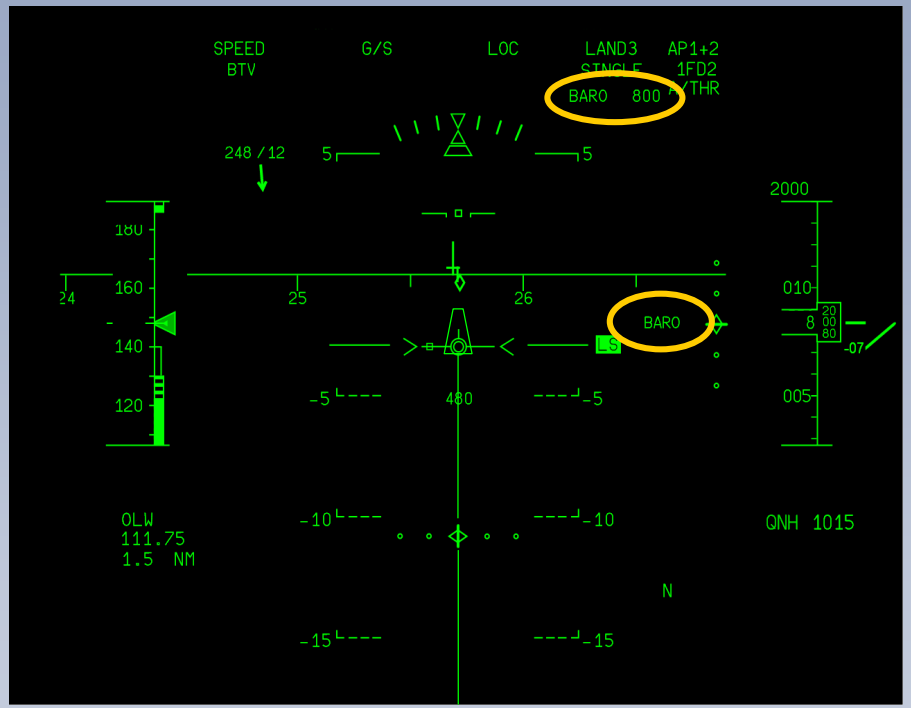
	FD or AP1 or AP2	FD and AP1 and AP2
LS	ILS, GLS or SLS guidance: Final FPA from FMS database 	
	FLS or Mix LOC/FLS guidance: Final FPA from MMR 	
LS	RNP AR	Final FPA from FMS database 
		
		Final FPA selected on AFS CP 

RADIO / BARO

BACK



RADIO

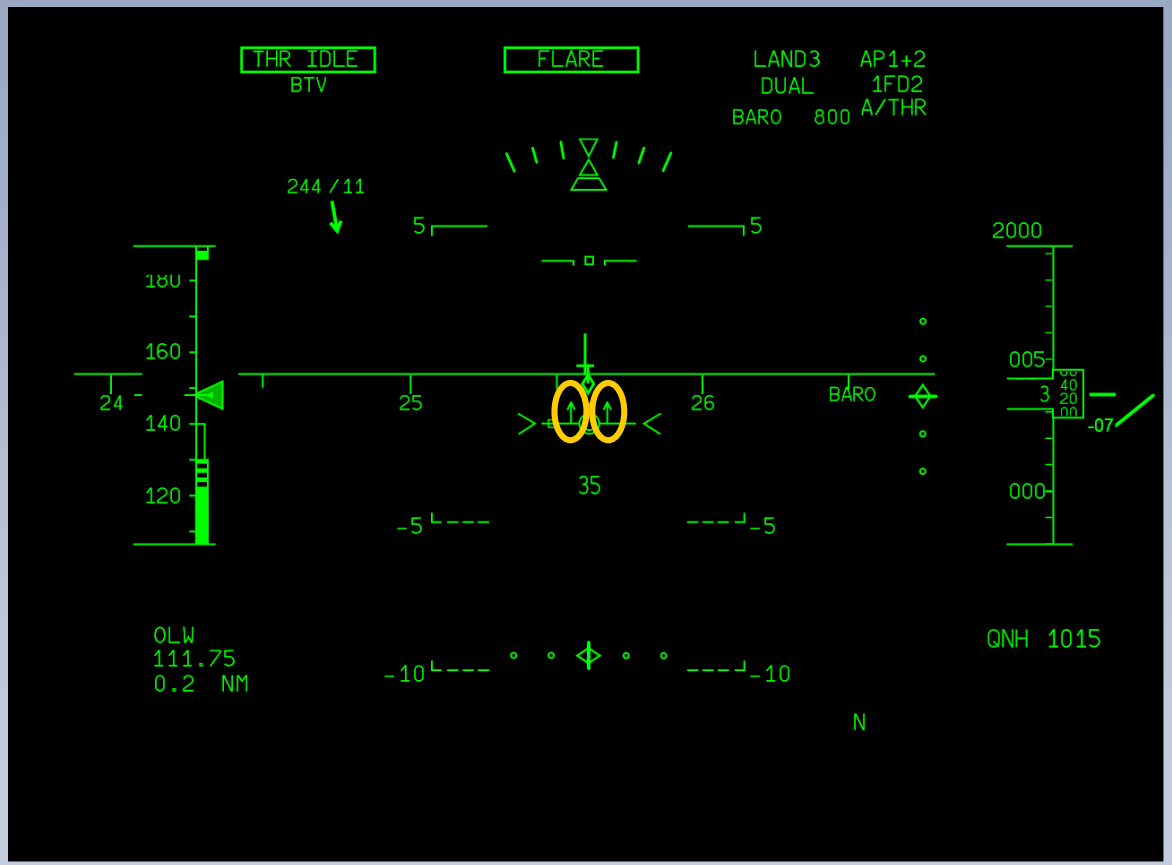


BARO

FLARE REMINDER

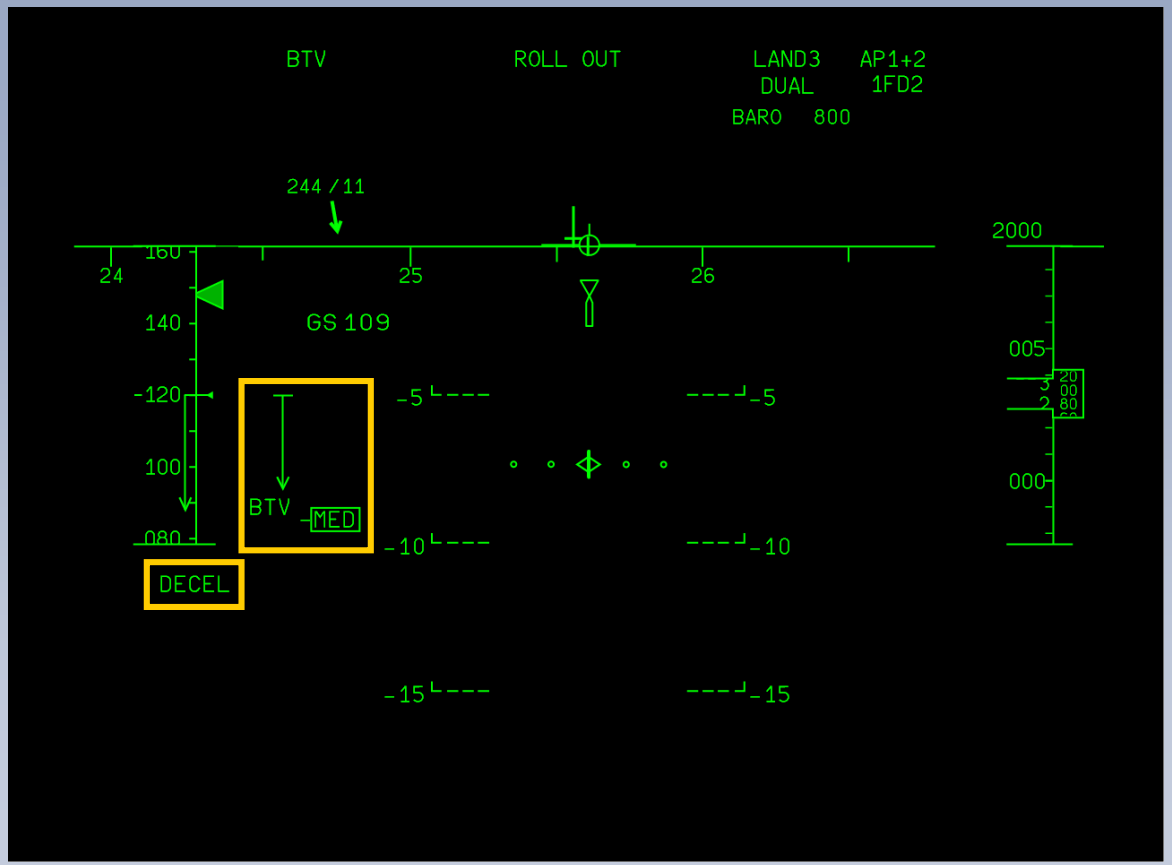
BACK

The HUD displays two arrows on the upper part of the FPV, that temporarily pulse when the aircraft reaches 40 ft RA.



The HUD helps the PF to perform accurate landings, due to the fact that the stabilization of the final descent path is more accurate, as the aircraft approaches the touchdown point.
The flight crew performs a conventional flare referring to visual cues when using the HUD for landing.

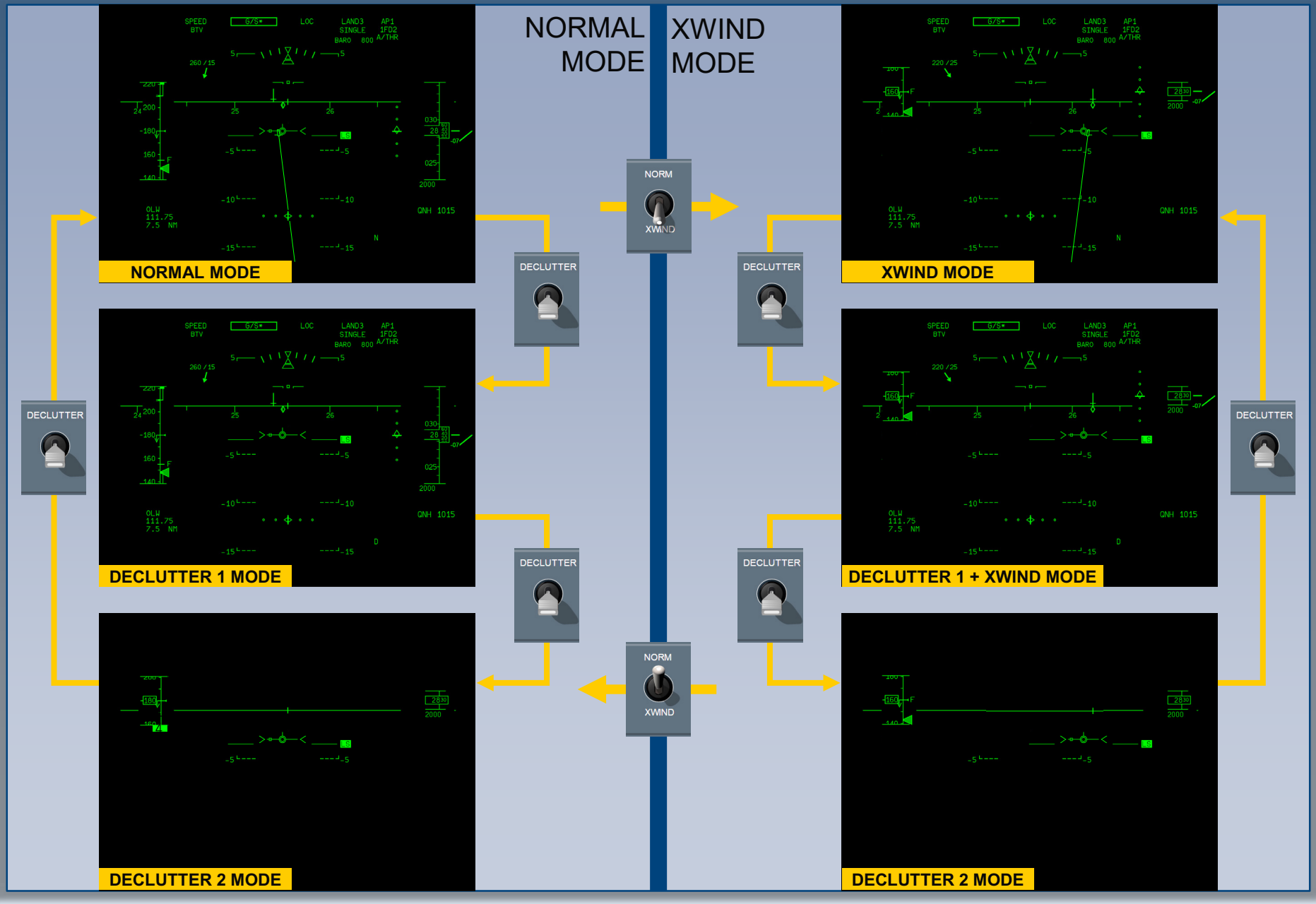
ROLLOUT



Following automatic approach and landing, the HUD is approved as a reversionary means for rollout in the event of untimely autopilot disconnection or failure of a system affecting the automatic rollout.

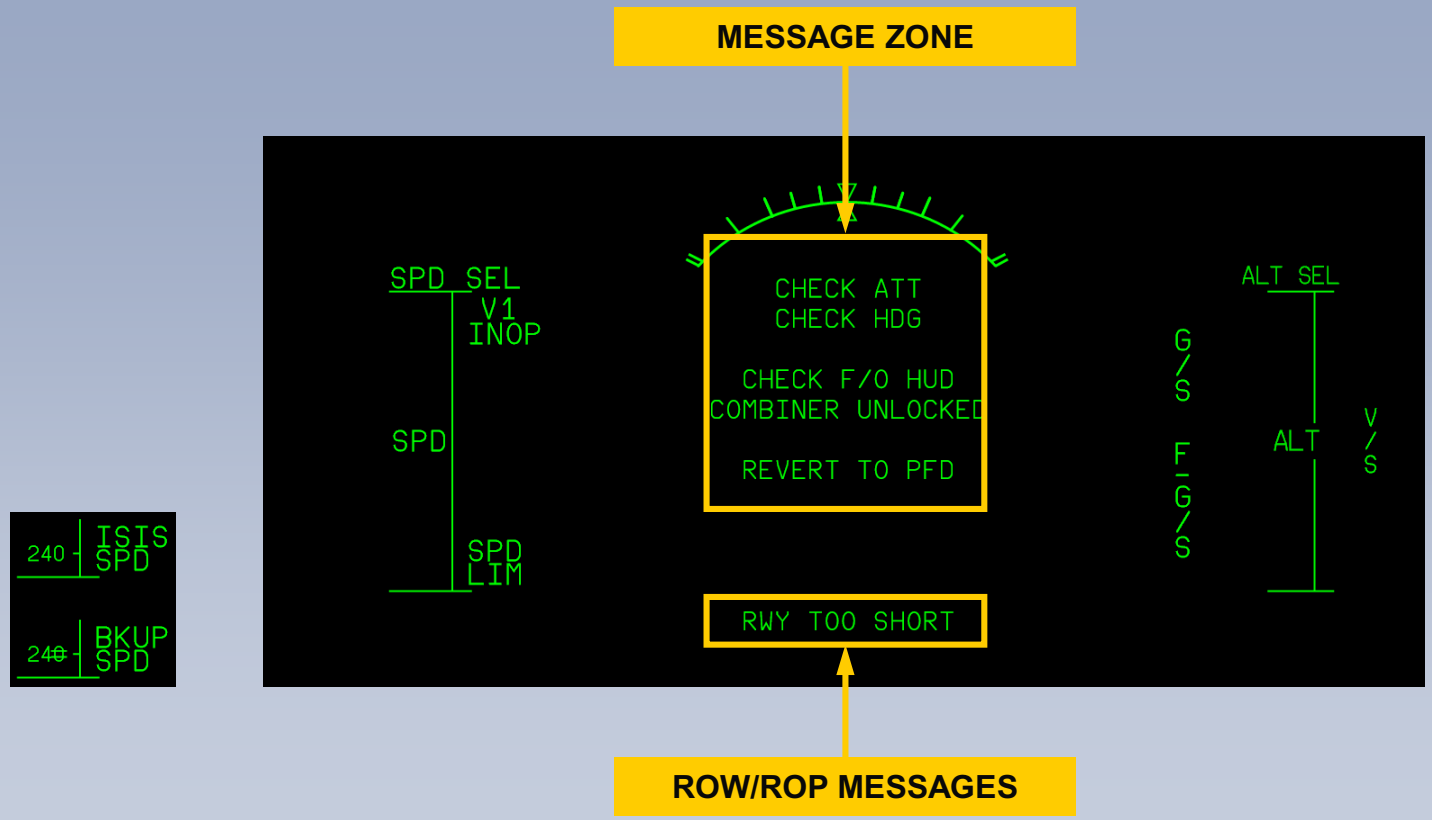
DECLUTTER AND CROSSWIND

BACK



FLAGS AND MESSAGES

BACK



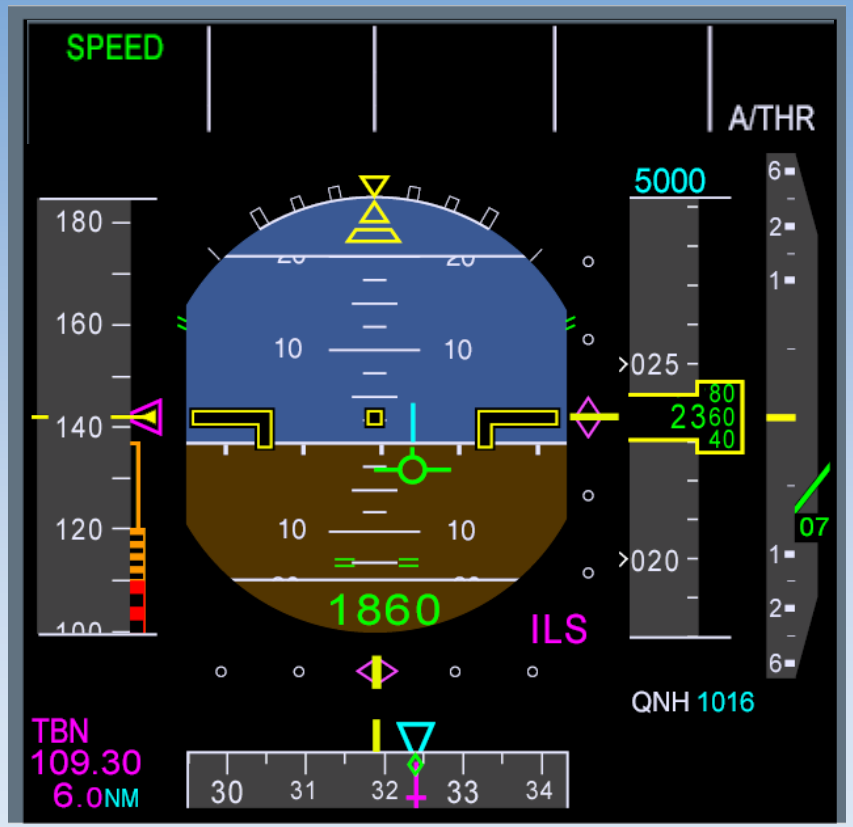
For more information about HUD flags and messages, refer to FCOM, section “Aircraft Systems – Control And Display System – HUD – System Description”.

ILS Raw Data

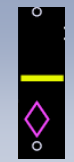
AIRBUS

ILS without AP & FD:

To fly an ILS Raw Data



GLIDE deviation



LOC deviation

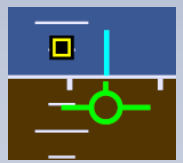
TO FLY AN ILS RAW DATA

BACK

LATERAL

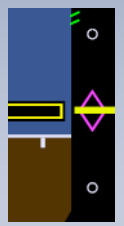
- Select the ILS track on the AFS CP

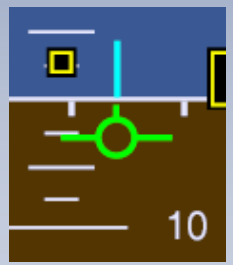
- When on the LOC, fly the Bird on the blue line.



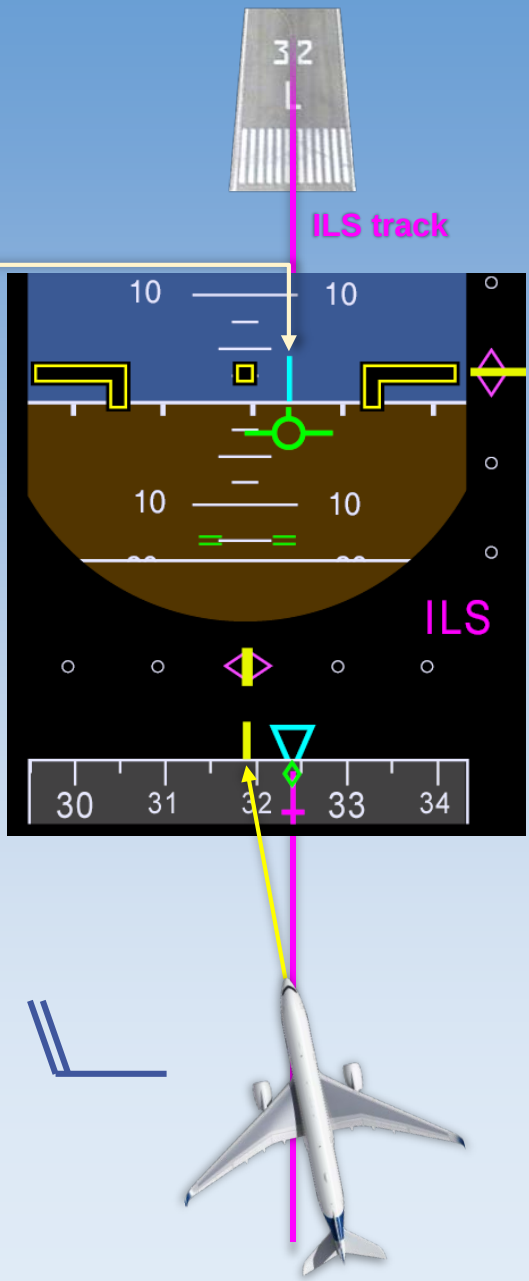
VERTICAL

When on the glideslope, fly the Bird on the ILS FPA.





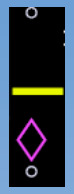
(e.g. -3°)



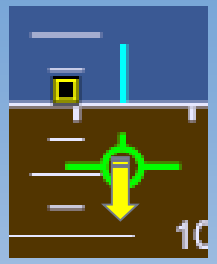
GLIDE DEVIATION

BACK

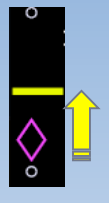
In case of GLIDE deviation:



Apply the appropriate correction to the flight path angle

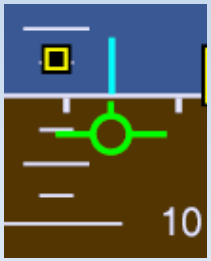


Monitor GLIDE deviation:



When back on the GLIDE:

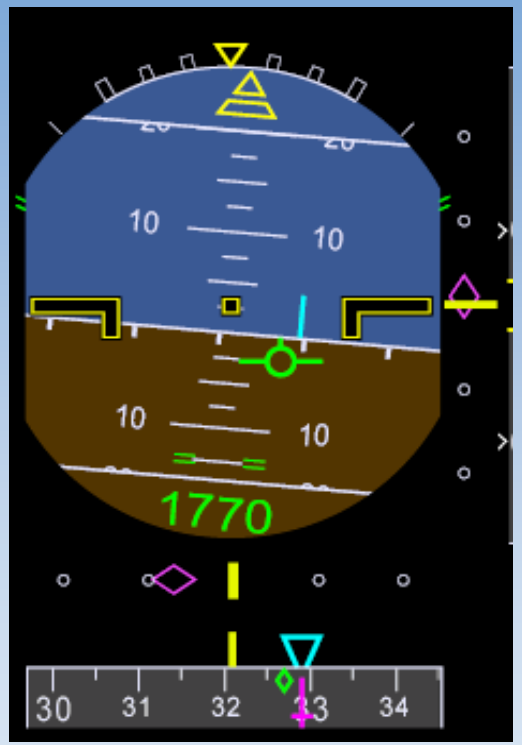
Resume the Bird on the appropriate path (e.g. -3°)



Close to the ground avoid too large pitch down corrections.

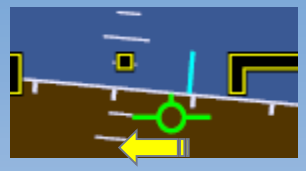
LOC DEVIATION

BACK

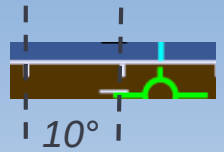


In case of LOC deviation:

Fly the Bird on a converging track.



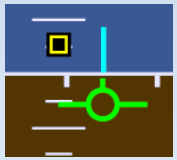
Use the heading scale on the horizon to determine the amount of correction needed.



Monitor LOC and deviation rate.

When back on LOC:

Align the Bird on the blue line.



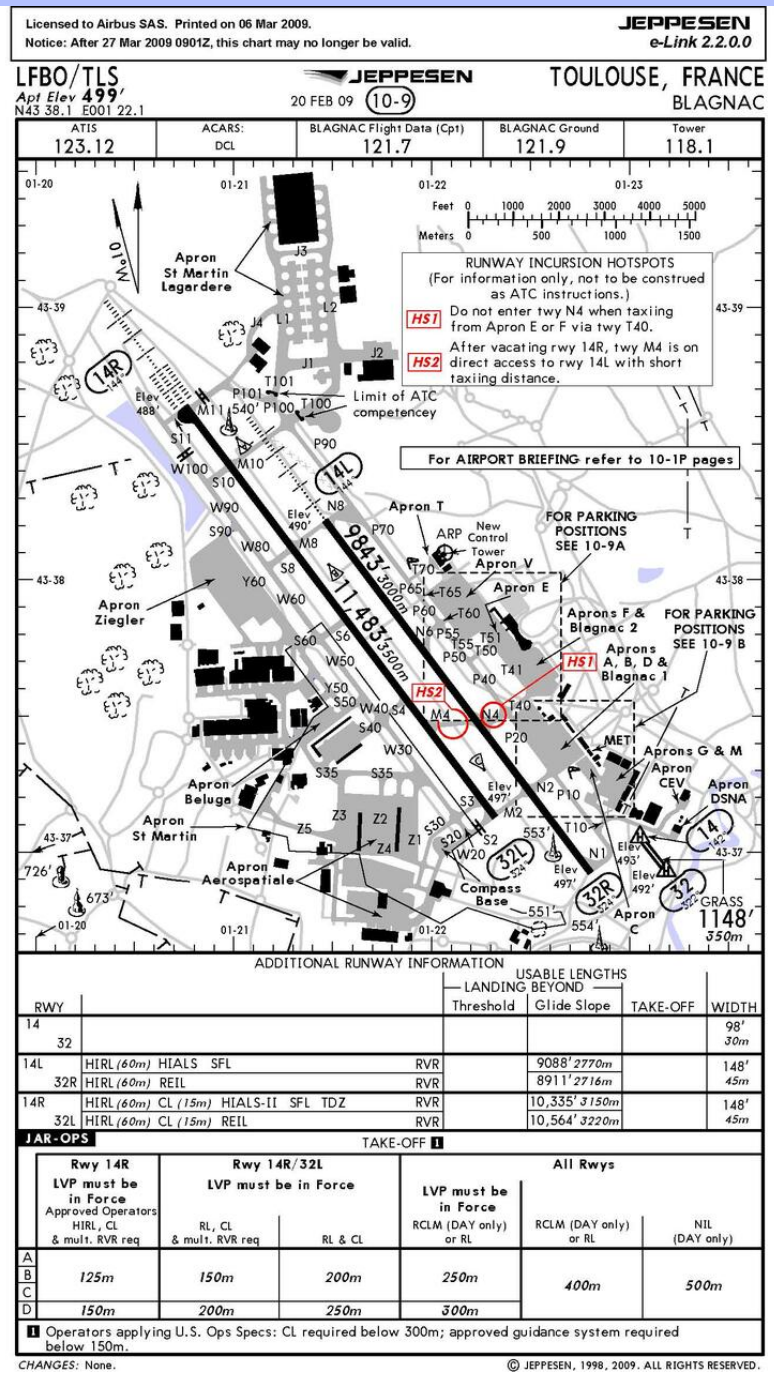
Low Visibility Operations

TAXI-OUT

PF	PM
HEAD UP AT ALL TIMES ..... KEEP	ANF / OANS if available (A350 and A380 only).....USE
TAXIWAY & RUNWAY CHART……..KEEP AVAILABLE	TAXIWAY & RUNWAY CHART……..KEEP AVAILABLE
	TAXIWAY HEADINGS & UPCOMING TURNS .....ADVISE
	GROUND SPEED.....MONITOR

- *Good crew coordination is essential. Avoid, during taxi: flight control checks, checklists and administrative work.*
- *Never cross a red stop bar when lining up or crossing a runway, unless unambiguous clearance to cross has been received by ATC.*
- *If unsure of position, the aircraft should be stopped and the parking brake set. ATC may provide assistance by use of ground radar or by sending a FOLLOW ME car.*
- *Bear in mind that, whereas bright lights may be visible, unlit obstacles and aircraft extremities may not.*

- *Adapt taxi speed to the actual visibility*



TAKEOFF

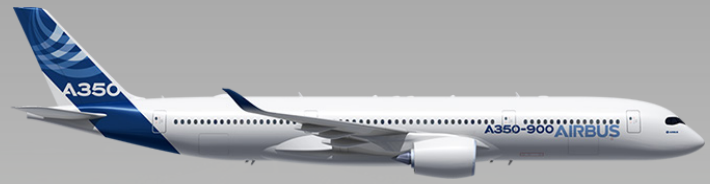
ALTERNATE | RVR | CHECKS | CREW INCAPACITATION | ROTATION | TAKEOFF (SOP)

A Low Visibility takeoff (LVTO) is a takeoff where the runway visual range is less then 550 meters.

Below 400 meters, training and authorization are required.

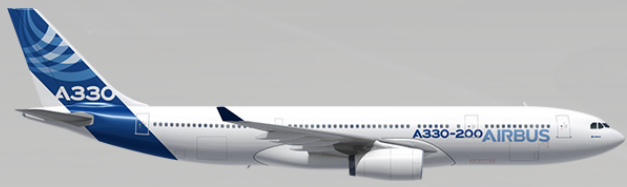
TAKEOFF: Takeoff Alternate

The commander should not commence take-off unless the weather conditions at the aerodrome of departure are equal to or better than applicable minima for landing at that aerodrome unless a weather-permissible take-off alternate aerodrome is available. (Refer to Operational manual).

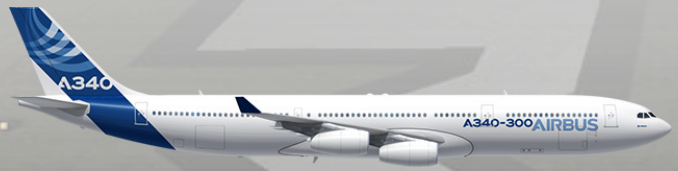


A350 ≈ 400 NM

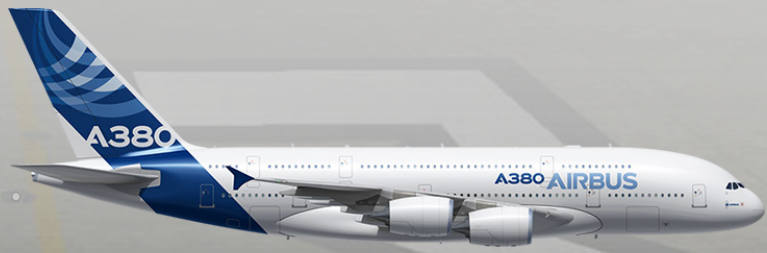
A320 ≈ 380 NM



A330 ≈ 390 NM



A340 ≈ 860 NM



A380 ≈ 890 NM

TAKEOFF : RVR

Requirements for takeoffs with a minimum RVR of 125 m:

- *Runway centerline markings, runway end lights, runway edge lights (spaced 60 m or less) and runway centerline lights (spaced 15 m or less)*
- *The minimum RVR value should be achieved for all reporting points within the Accelerate-Stop-Distance (ASD)*
- *The reported RVR value representative for the initial part of the takeoff-run can be replaced by pilot assessment (e.g. seeing 7 centerline lights)*

TAKEOFF: Checks

NEXT

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

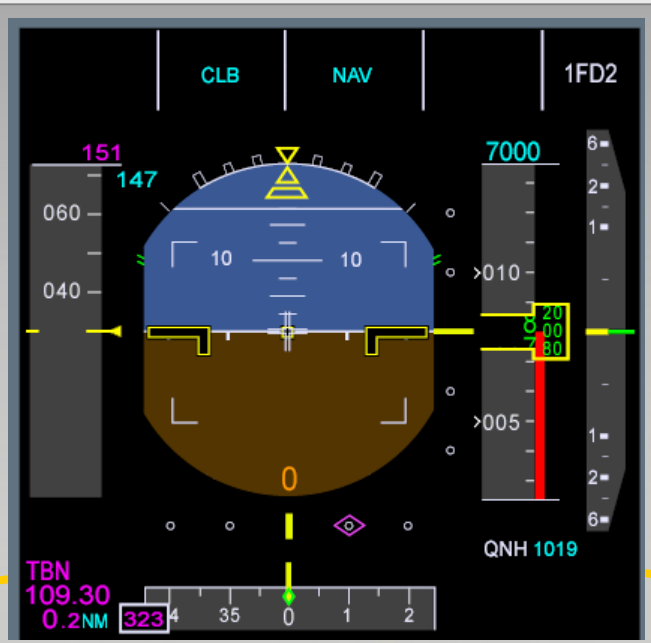
- *The runway markings.*
- *The runway lights, be careful that in low visibility, edge lights could be mixed up with the center line lights.*
- *The ILS signal, If the runway is ILS equipped, the flight crew can press the ILS pb (or LS pb): The LOC deviation should be centered after line up.*
- *The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

TAKEOFF: Checks

PREV NEXT

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.*



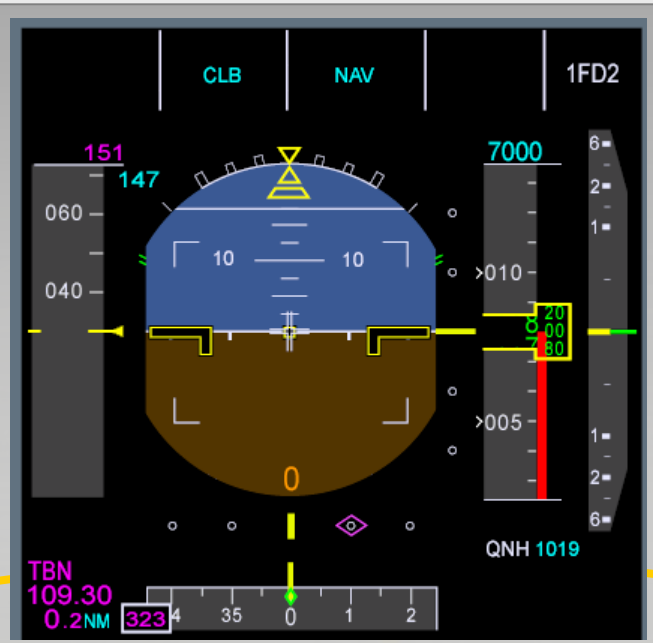
BEFORE ENTERING RUNWAY

TAKEOFF: Checks

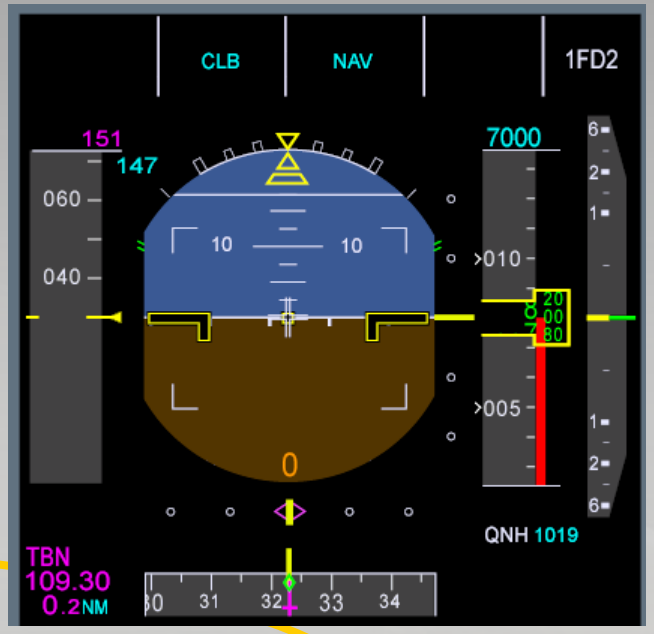
PREV

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.*



BEFORE ENTERING RUNWAY



ONCE ALIGNED

TAKEOFF: Crew Incapacitation

PM: Be ready to take over

TAKEOFF: Rotation

NORMAL ROTATION AS PER FCOM

- *At VR, initiate the rotation to achieve a continuous rotation with a rate of about 3 °/s, towards the correct pitch attitude.*
- *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.*

Type	A320	A330	A340	A350	A380
Target attitude all engines	15.0° SRS	15.0° SRS	12.5° SRS	12.5° SRS	12.5° SRS
Target attitude engine out	12.5° SRS	12.5° SRS	12.5° SRS	10° SRS	10° SRS

ANNOUNCE……..……..”TAKEOFF”

BRAKES……..……..RELEASE

DIRECTIONNAL CONTROL……..ENSURE

THRUST LEVERS……..FLX or TOGA

HEAD .....UP

RUNWAY CENTERLINE .....VISUALLY FOLLOW

DIRECTIONNAL CONTROL……..…MONITOR

CHRONO……..……..START

HEAD.....DOWN

DEVIATIONS .....MONITOR

ANNOUNCE……..……..”TAKEOFF”

BRAKES……..……..RELEASE

DIRECTIONNAL CONTROL……..ENSURE

THRUST LEVERS……..FLX or TOGA

HEAD .....UP

RUNWAY CENTERLINE .....VISUALLY FOLLOW

DIRECTIONNAL CONTROL……MONITOR

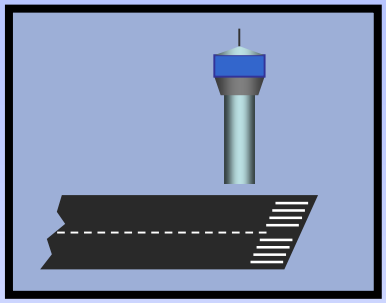
CHRONO……..……..START

HEAD.....DOWN

DEVIATIONS .....MONITOR

- *CM2 must call out any lateral deviation.*

CRUISE: APPROACH PREPARATION

LOW VISIBILITY OPERATIONS =  +  + 

LVO CAPABILITY

AIRPORT FACILITIES

CREW CAPABILITY

A/C CAPABILITY

Preparation:

- *Verify weather conditions*
- *Check crew qualification*
- *Check aircraft technical status*
- *Check airport status*
- *Evaluate downgrading options*
- *Check diversion options*
- *Fuel pred extra time for holding*

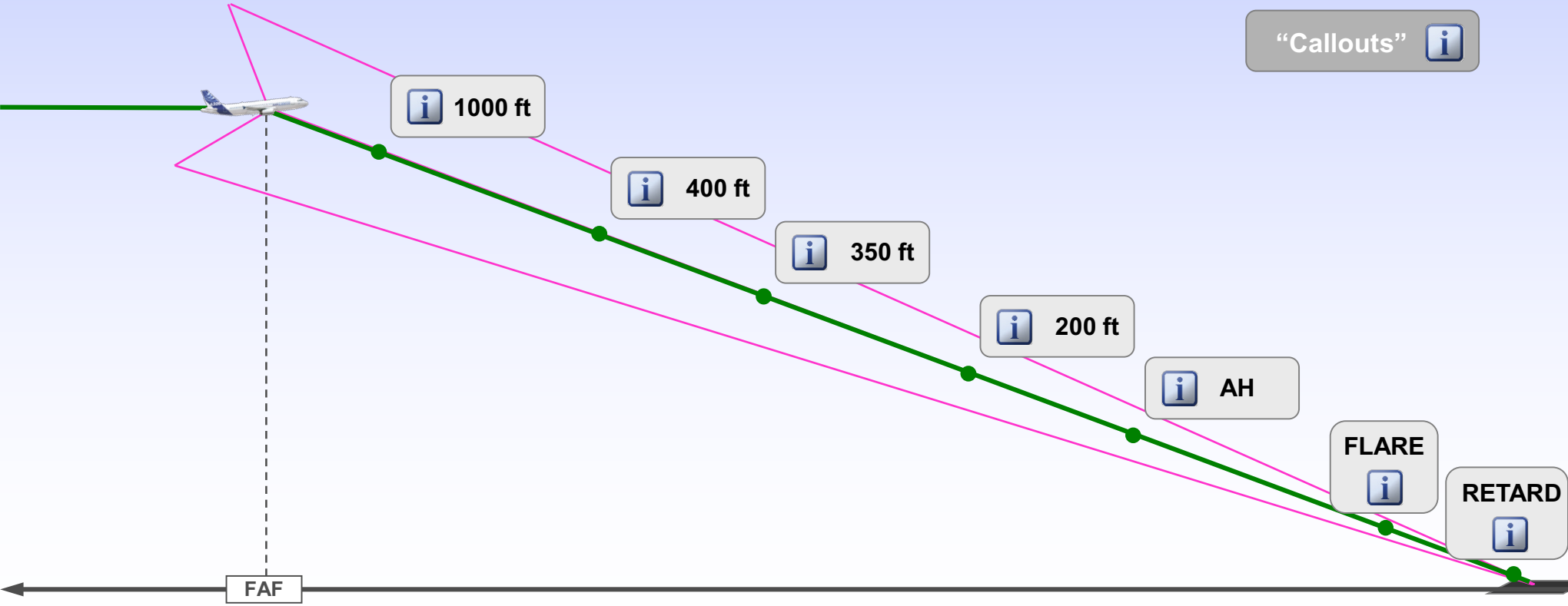
Arrival Briefing Specifics:

- *Task sharing and callouts*
- *Management of degraded guidance/equipment*
- *Low visibility procedures at the airport*

APPROACH

INTERMEDIATE APPR

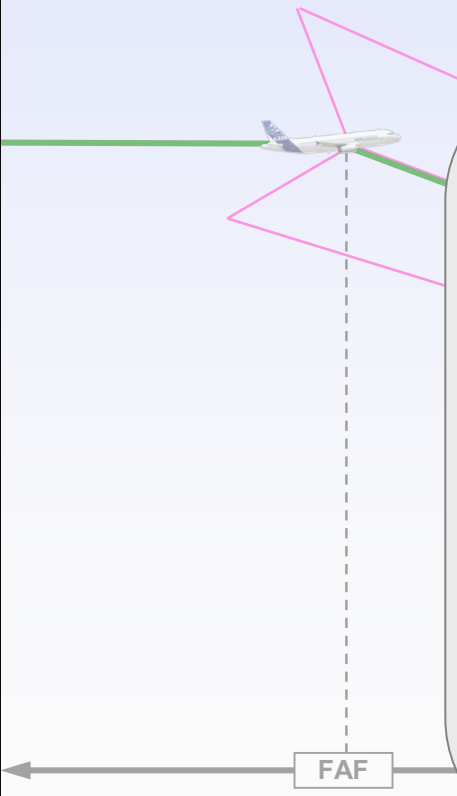
FINAL APPR



APPROACH

INTERMEDIATE APPR

FINAL APPR



"Callouts"

1000 ft

Abnormals during final approach:

Failure above 1000 ft AAL:

Approach may be continued if:

- *ECAM/QRH complete and required equipment checked (FCOM or QRH)*
- *Weather permits*
- *Briefing and DH are updated and*
- *Aircraft is stabilized before 1000 ft AAL.*

Failure below 1000 ft AAL:

Approach may be continued if:

- *The pilot has the runway in sight and*
- *The type of failure does not affect the landing performance.*

Otherwise, GO-AROUND.

Note: This does not impair the emergency authority of the commander.

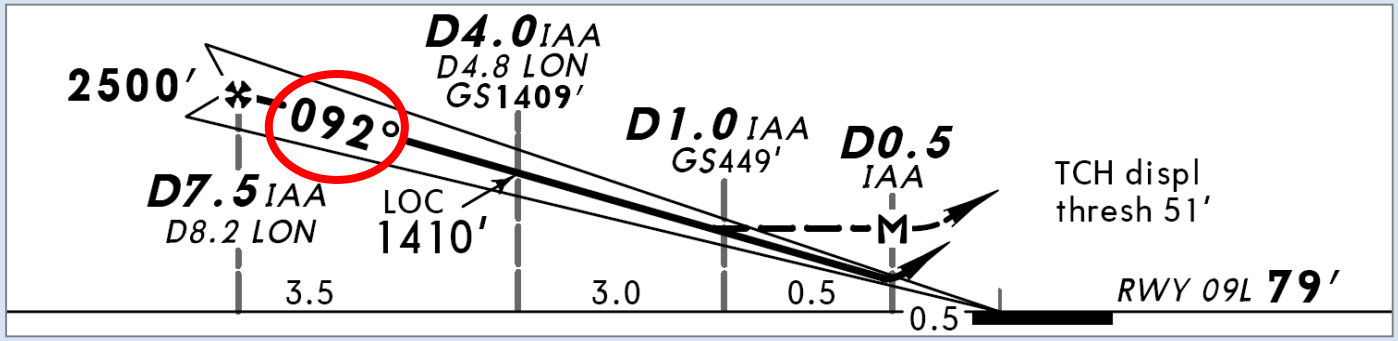
ETARD

LAND MODE.....CHECK

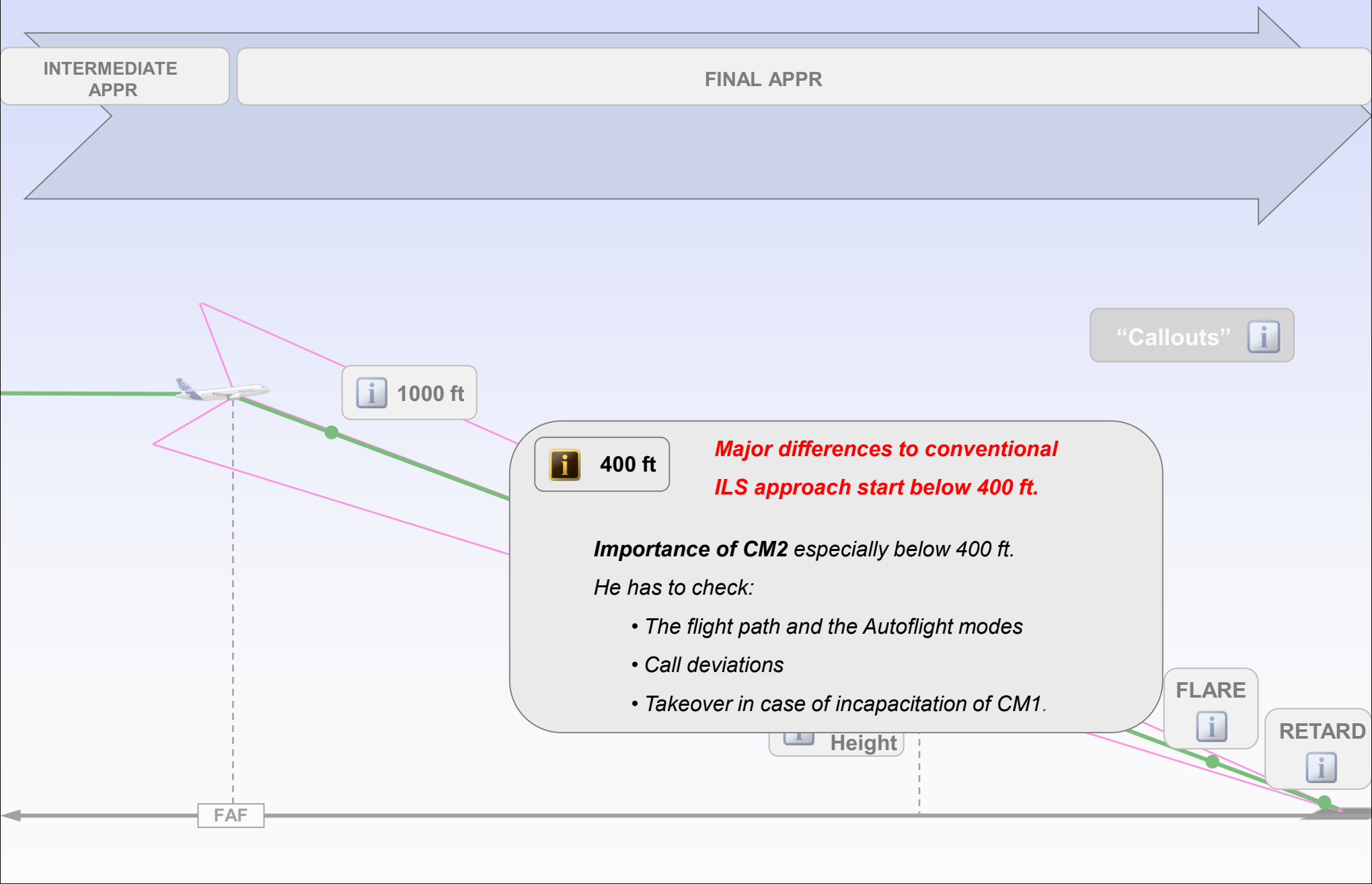
If LAND mode not available ⇨ **Go around**

ILS COURSE.....CHECK

If ILS course not in agreement ⇨ **Go around**



APPROACH


INTERMEDIATE APPR
FINAL APPR
"Callouts"
1000 ft
400 ft
Major differences to conventional ILS approach start below 400 ft.
Importance of CM2 especially below 400 ft.
He has to check:
• The flight path and the Autoflight modes
• Call deviations
• Takeover in case of incapacitation of CM1.
FLARE
RETARD
Height
FAF

APPROACH

INTERMEDIATE APPR

FINAL APPR

"Callouts"

1000 ft

400 ft

350 ft

- ***LAND*** *mode to be* ***checked*** *(called out):*

  If not available ⇨ **Go around**.

- ***ILS course*** *on PFD to be* ***in agreement*** *with* ***published figure***.

  If not in agreement ⇨ **Go around**.

RETARD

FAF

APPROACH

INTERMEDIATE APPR

FINAL APPR

"Callouts"

1000 ft

400 ft

200 ft

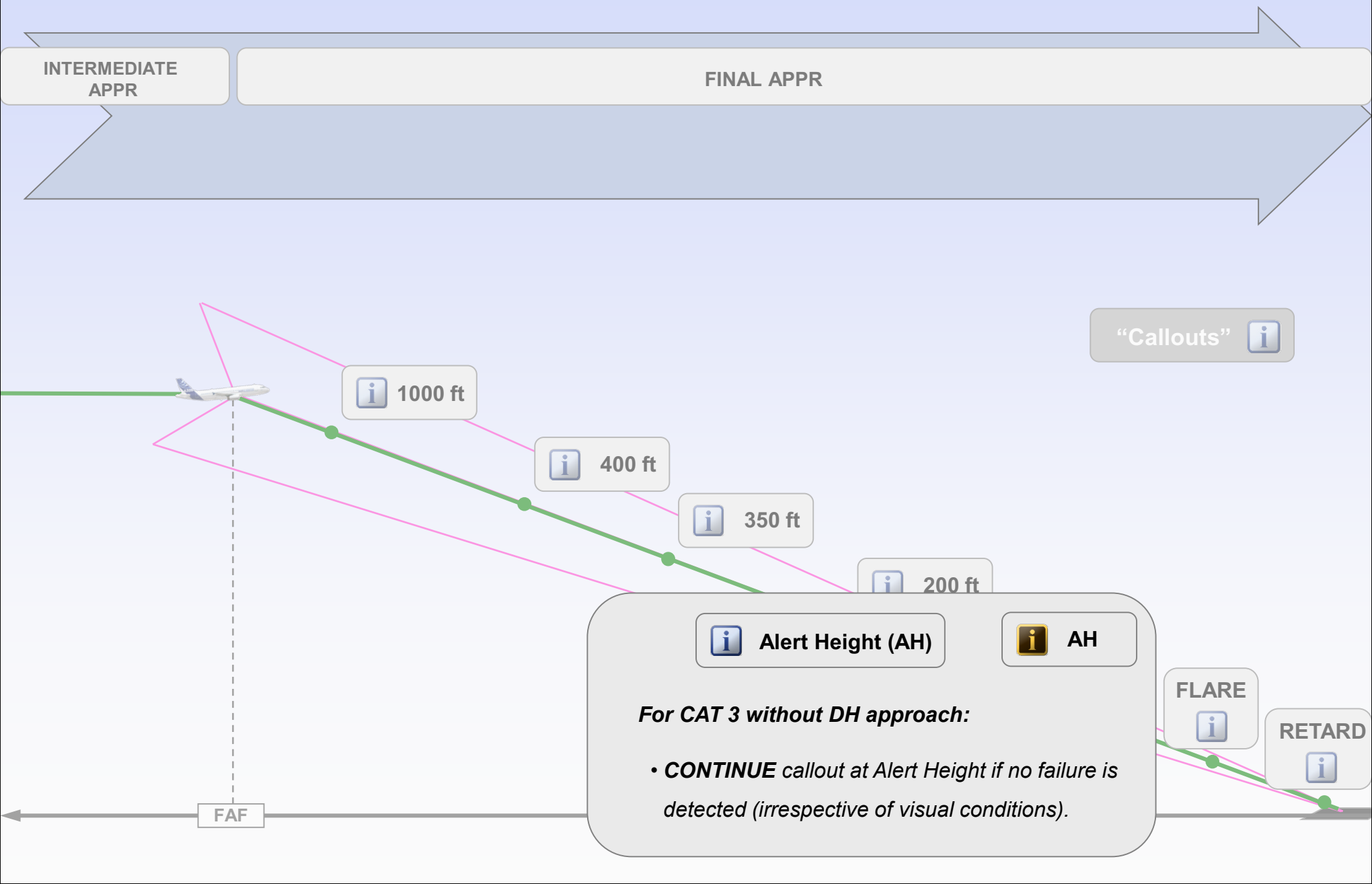
AUTO LAND

If AUTOLAND warning light activates (armed below 200 ft) a go around has to be performed.

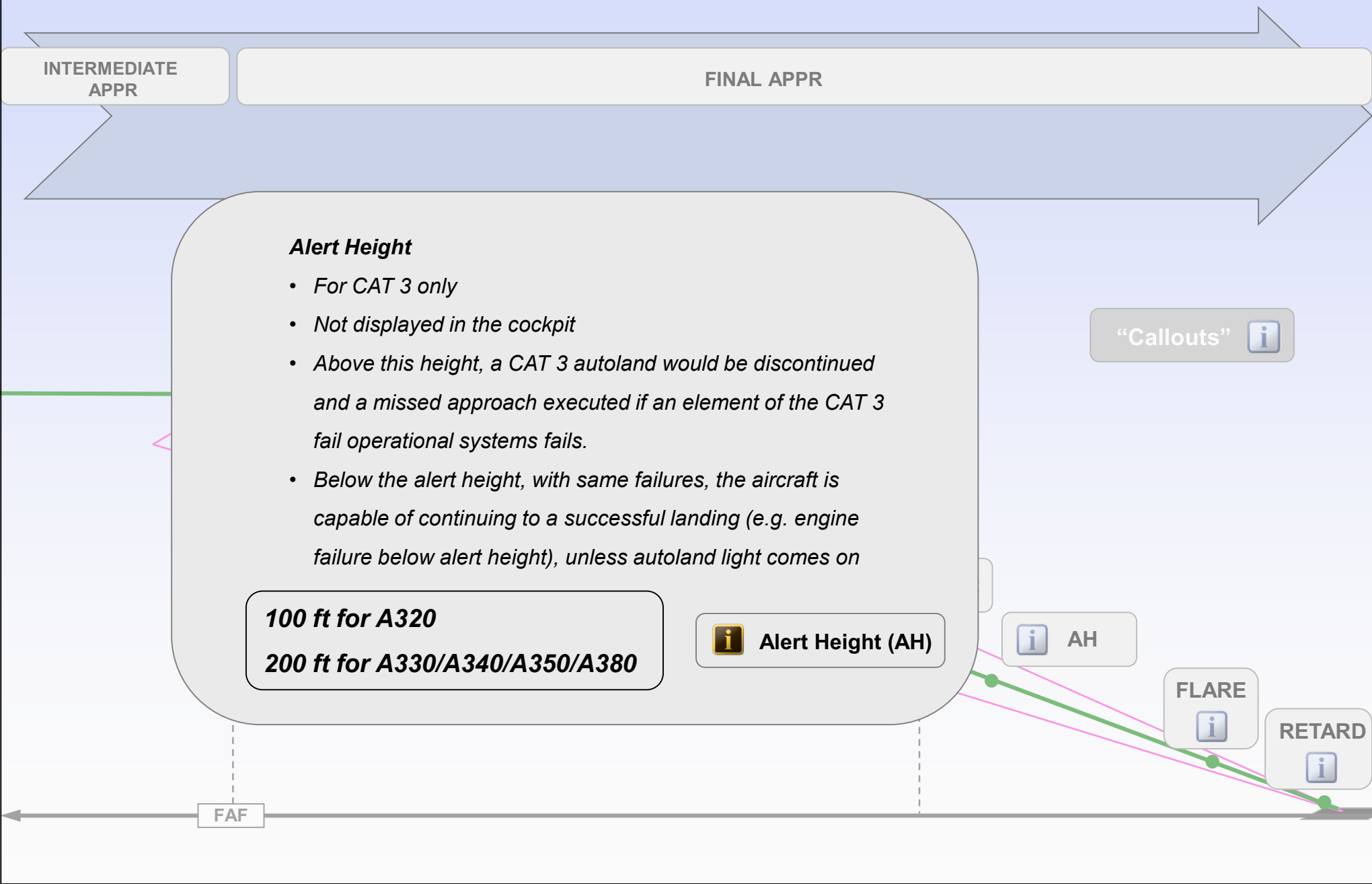
The approach may be continued manually if visual references are sufficient.

FAF

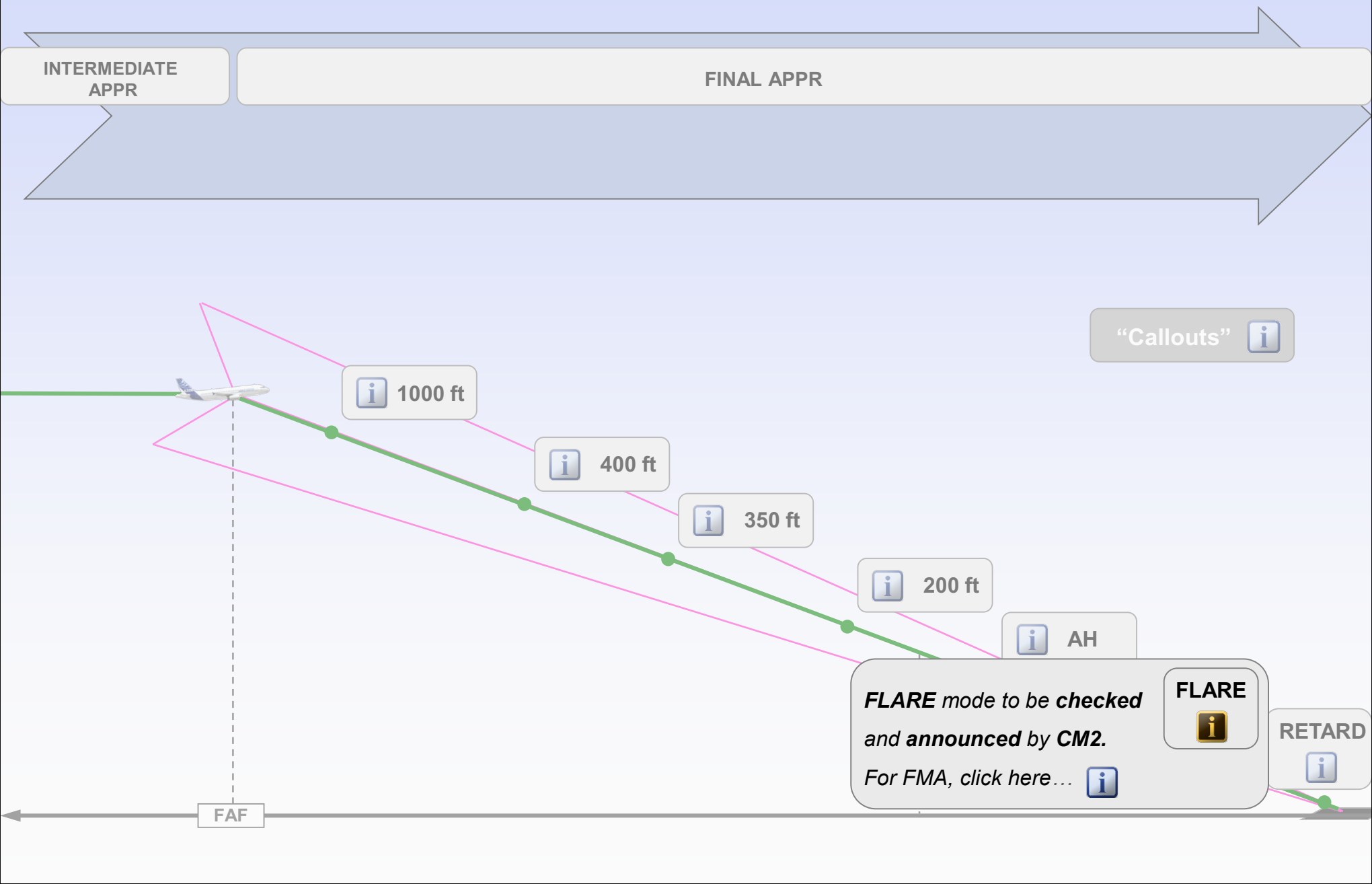
APPROACH


INTERMEDIATE APPR
FINAL APPR
"Callouts"
1000 ft
400 ft
350 ft
200 ft
Alert Height (AH)
AH
For CAT 3 without DH approach:
• CONTINUE callout at Alert Height if no failure is detected (irrespective of visual conditions).
FLARE
RETARD
FAF

APPROACH


INTERMEDIATE APPR
FINAL APPR
Alert Height
• For CAT 3 only
• Not displayed in the cockpit
• Above this height, a CAT 3 autoland would be discontinued and a missed approach executed if an element of the CAT 3 fail operational systems fails.
• Below the alert height, with same failures, the aircraft is capable of continuing to a successful landing (e.g. engine failure below alert height), unless autoland light comes on
100 ft for A320
200 ft for A330/A340/A350/A380
Alert Height (AH)
"Callouts"
AH
FLARE
RETARD
FAF

APPROACH


INTERMEDIATE APPR
FINAL APPR
"Callouts"
1000 ft
400 ft
350 ft
200 ft
AH
FLARE mode to be checked and announced by CM2.
For FMA, click here…
FLARE
RETARD
FAF

APPROACH

INTERMEDIATE APPR

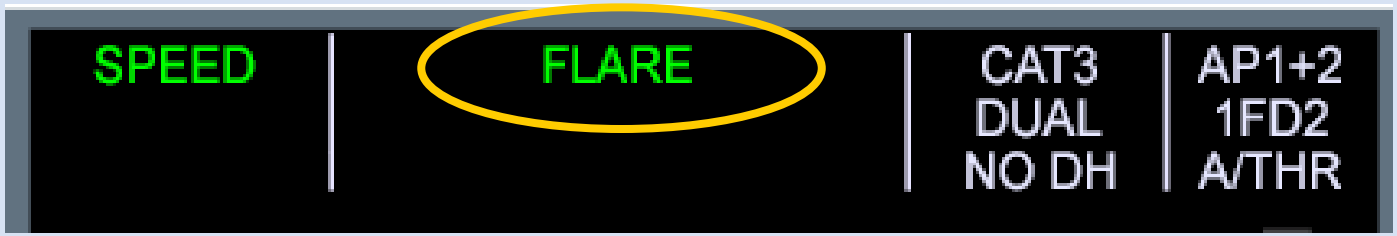
FINAL APPR

"Callouts"

1000 ft

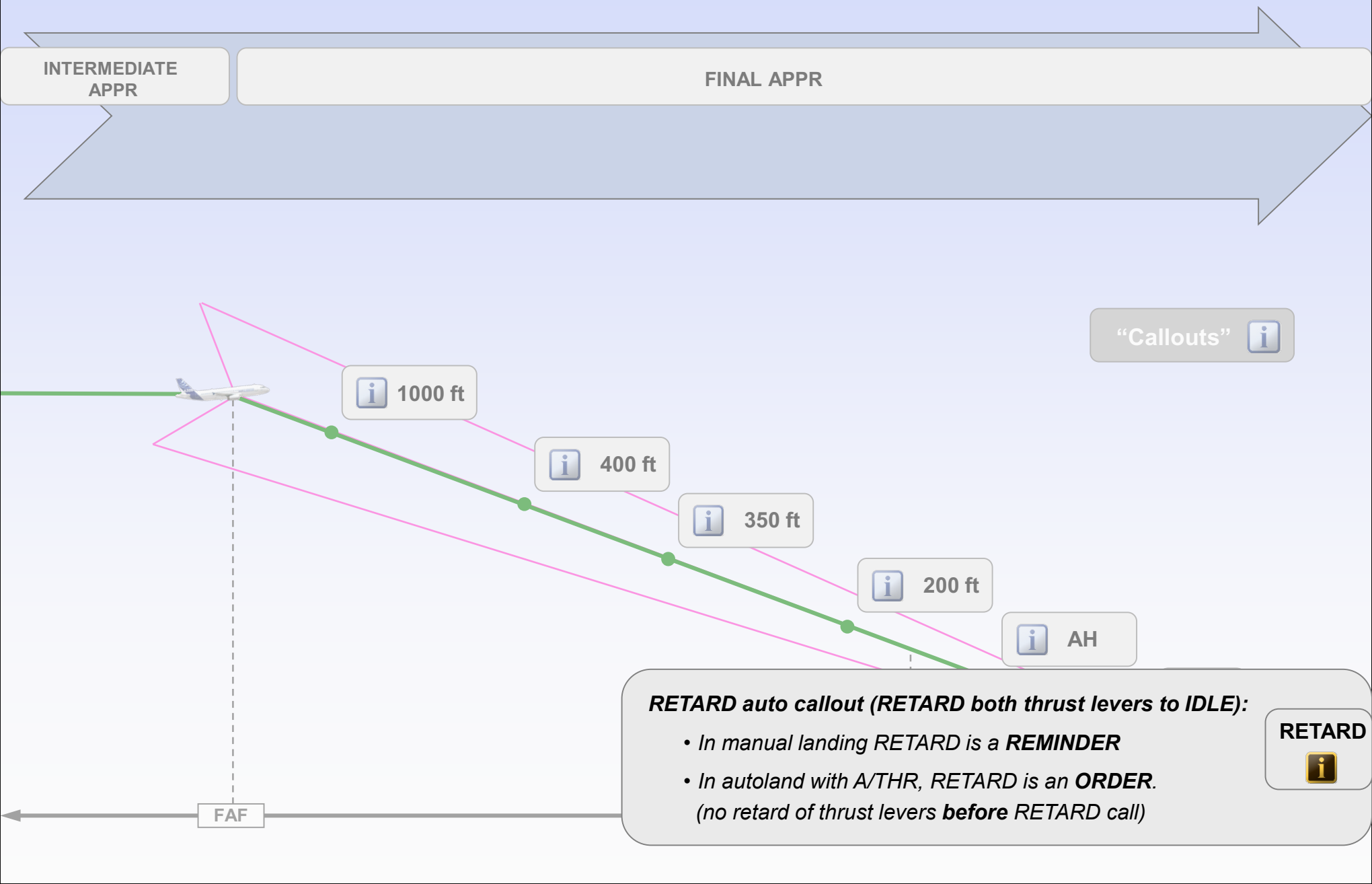
400 ft

FLARE mode.....CHECK



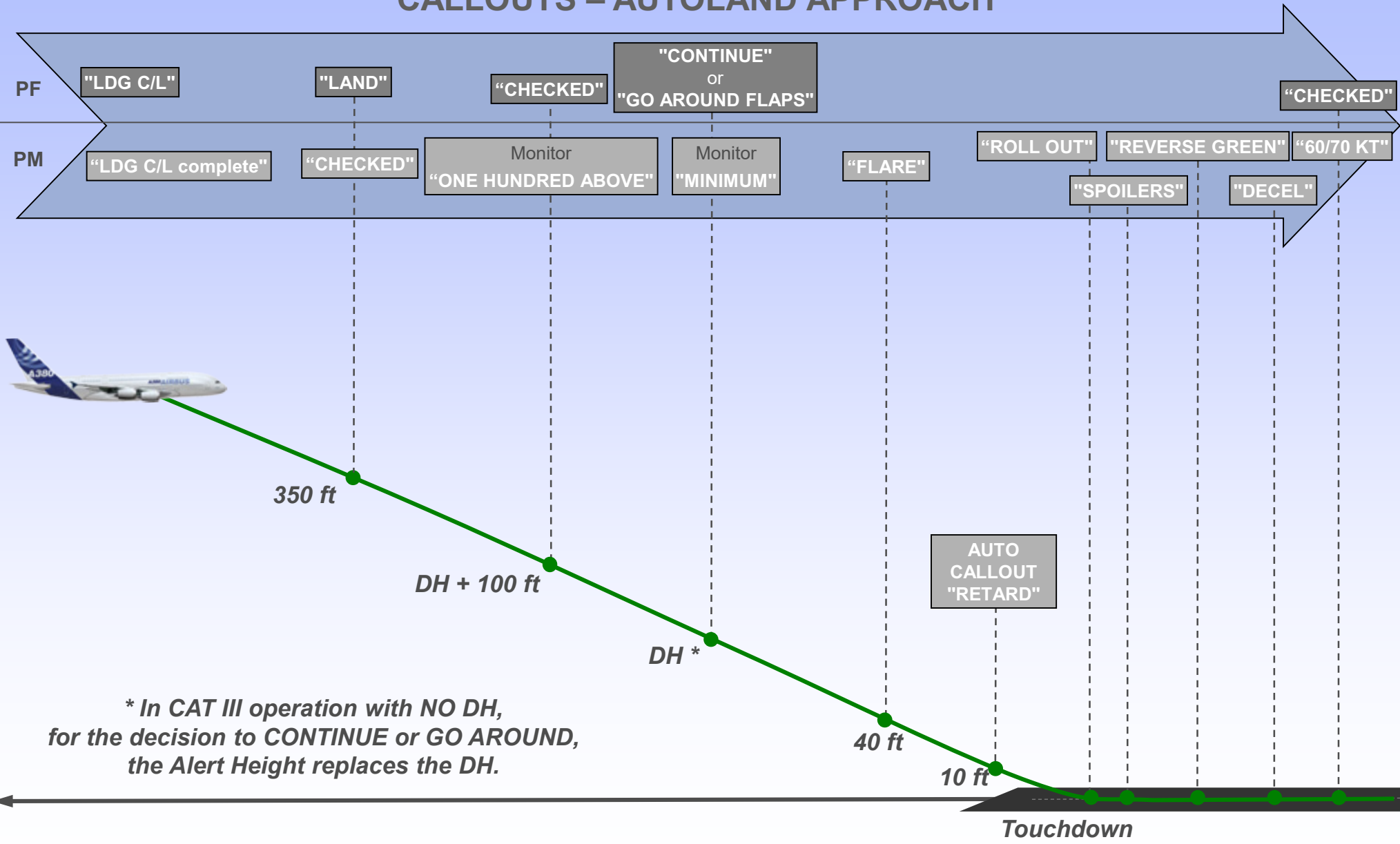
ETARD

APPROACH


INTERMEDIATE APPR
FINAL APPR
"Callouts"
1000 ft
400 ft
350 ft
200 ft
AH
FAF
RETARD auto callout (RETARD both thrust levers to IDLE):
• In manual landing RETARD is a REMINDER
• In autoland with A/THR, RETARD is an ORDER.
(no retard of thrust levers before RETARD call)
RETARD

APPROACH

CALLOUTS – AUTOLAND APPROACH



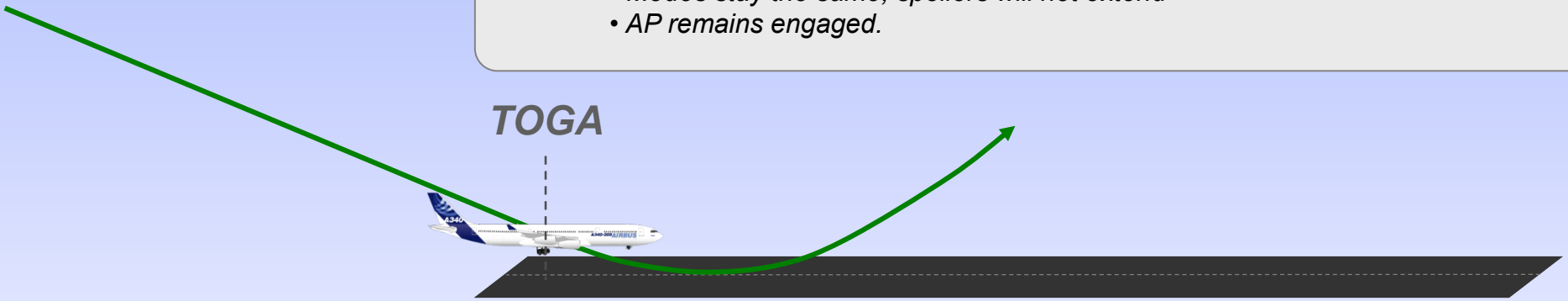
** In CAT III operation with NO DH,*
for the decision to CONTINUE or GO AROUND,
the Alert Height replaces the DH.

GO-AROUND

LOW GO-AROUND ⇨ AIRCRAFT TOUCHES THE RUNWAY

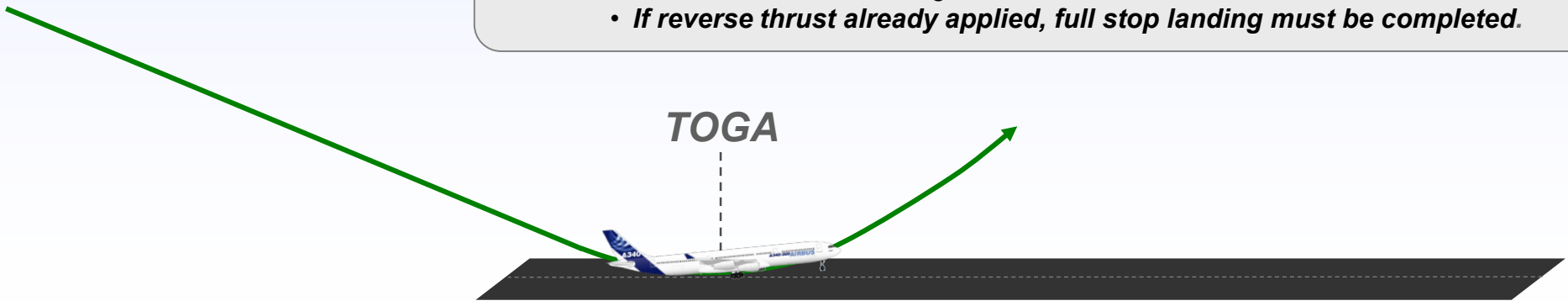
Case 1 - TOGA IS APPLIED BEFORE TOUCH DOWN

- *The G/A phase will not be disturbed even when the aircraft touches the runway*
- *Modes stay the same, spoilers will not extend*
- *AP remains engaged.*



Case 2 - TOGA IS APPLIED AFTER TOUCH DOWN:

- *TOGA thrust applied ⇨ CONFIG warning if CONF FULL*
- *AP disengages*
- *Retract L/G when positive rate of climb and no risk of further touch down*
- *Climb out as for standard go-around*
- ***If reverse thrust already applied, full stop landing must be completed.***

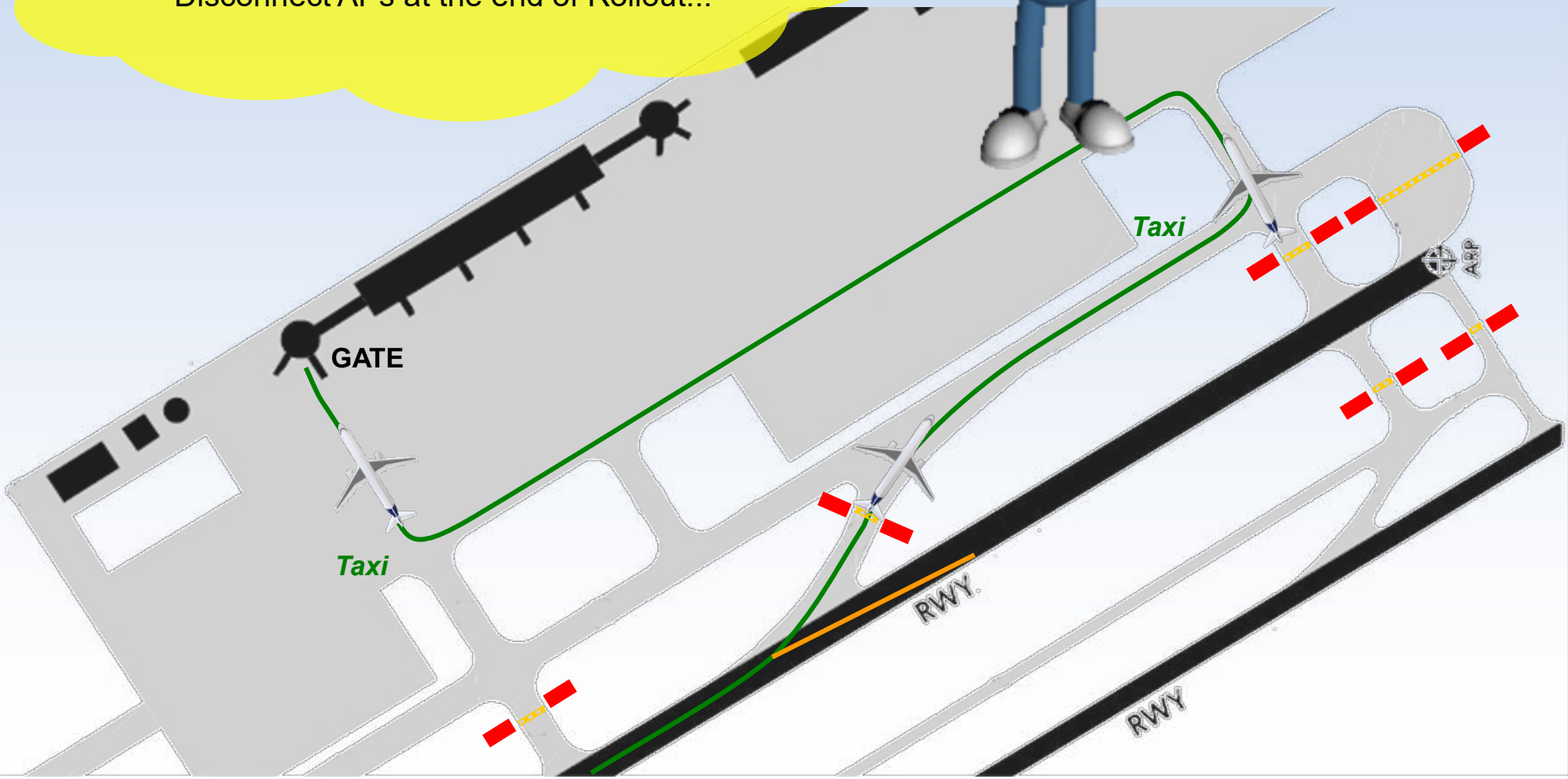


ROLLOUT and TAXI-IN

All aircraft, except BXL

Three things have to be done manually in autoland:

- Retard THR LEVERS when ordered
- Select REVERSERS when main wheels touch down
- Disconnect APs at the end of Rollout...



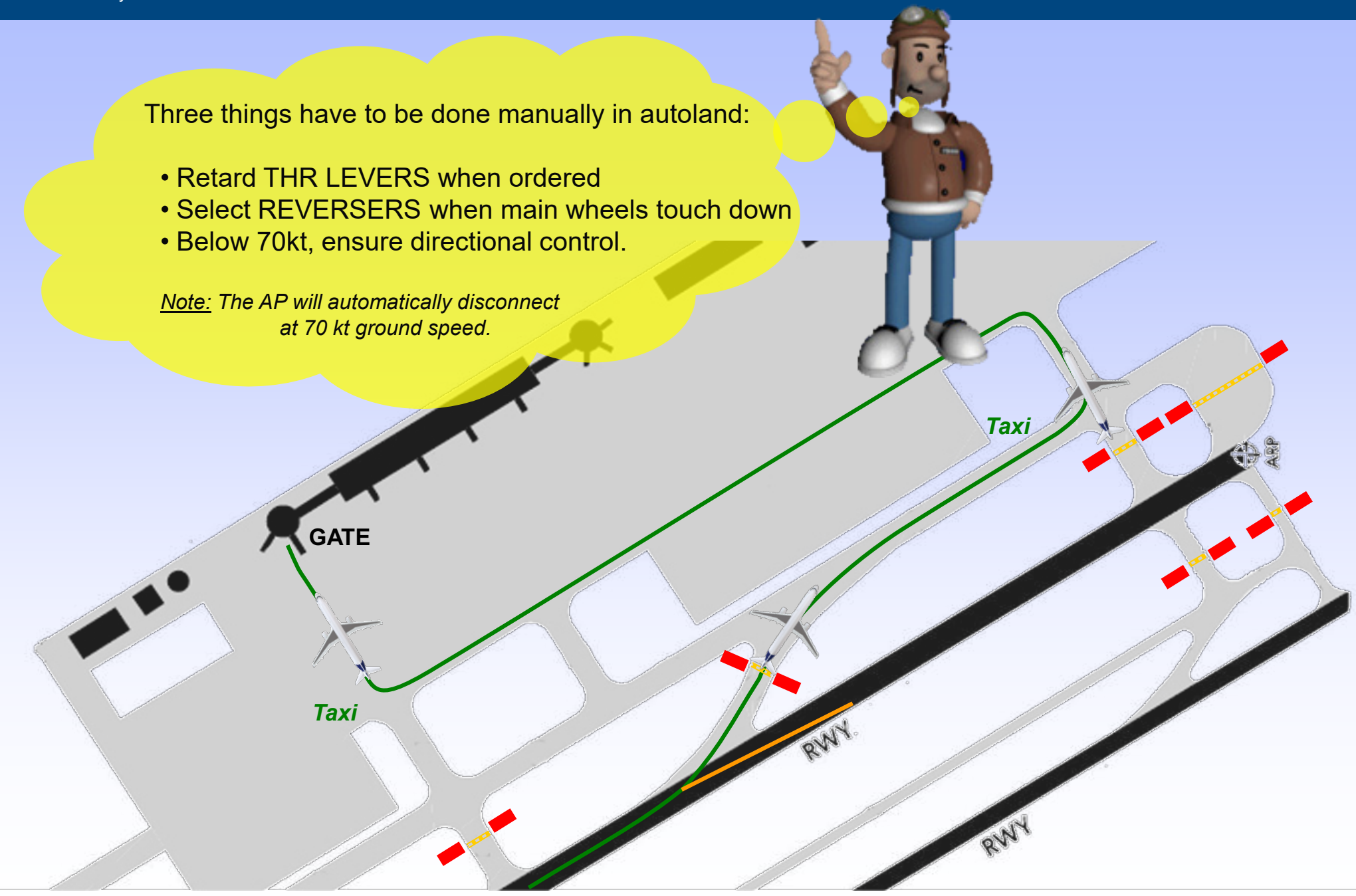
BXL only

ROLLOUT and TAXI-IN

Three things have to be done manually in autoland:

- Retard THR LEVERS when ordered
- Select REVERSERS when main wheels touch down
- Below 70kt, ensure directional control.

<u>Note:</u> The AP will automatically disconnect at 70 kt ground speed.



MODE REVERSIONS

Mode reversions are automatic mode changes that unexpectedly occur.

They are designed to ensure coherent and safe AP, FD and A/THR operation.

"Click
Click
Click"

Check FMA

GOLDEN RULE #3 **Understand the FMA at all times.**

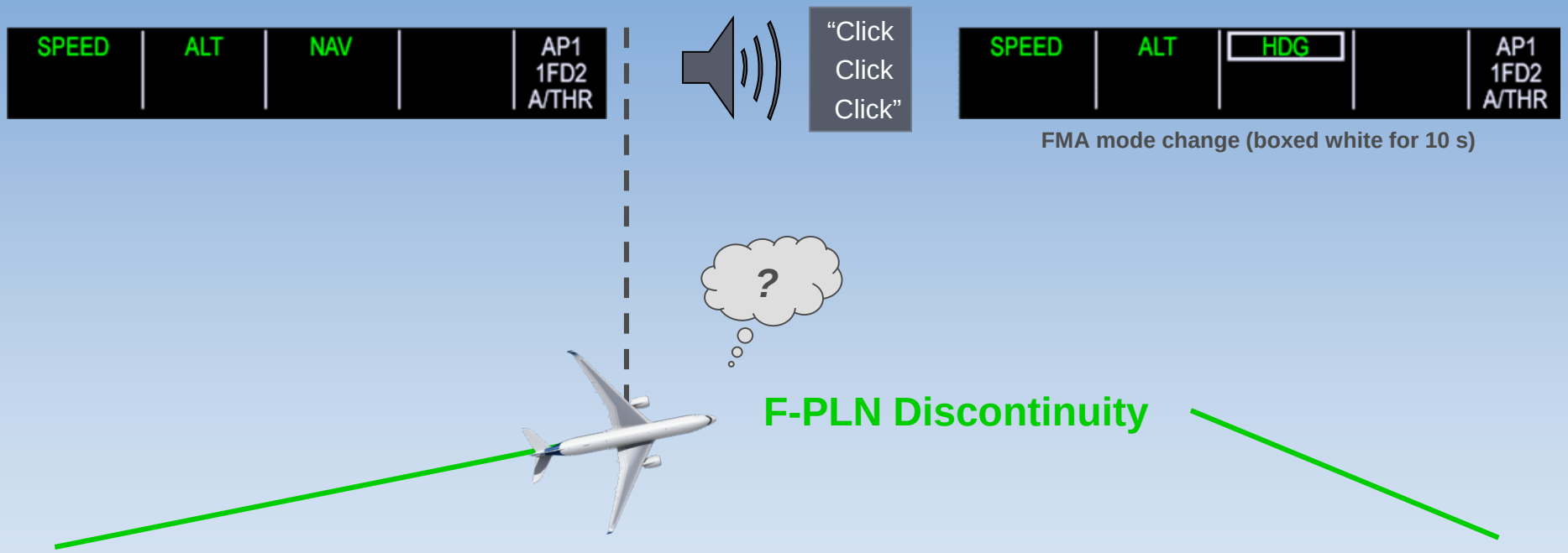
Example of
lateral mode reversion

Examples of
vertical mode reversions

Note: This tutorial shows some examples of mode reversions.

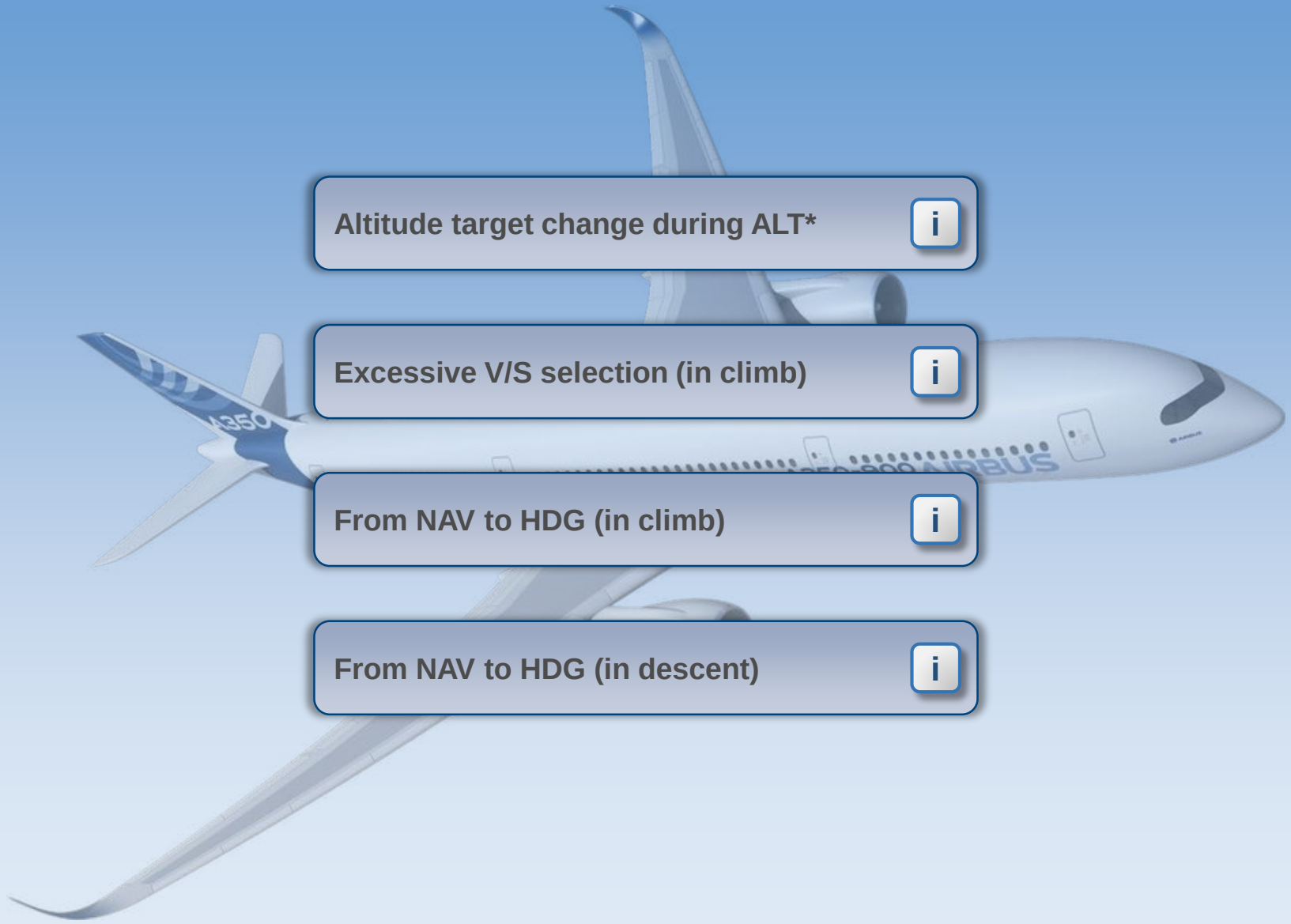
EXAMPLE OF LATERAL MODE REVERSION:
F-PLN DISCONTINUITY

BACK



EXAMPLE OF VERTICAL MODE REVERSION

BACK

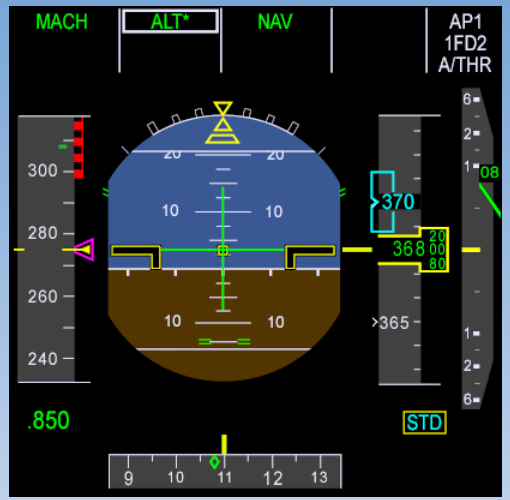


- Altitude target change during ALT* (i)
- Excessive V/S selection (in climb) (i)
- From NAV to HDG (in climb) (i)
- From NAV to HDG (in descent) (i)

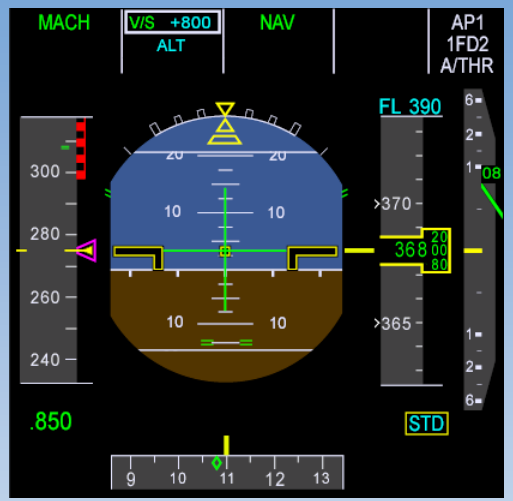
EXAMPLE OF VERTICAL MODE REVERSION:
ALTITUDE TARGET CHANGE DURING ALT*

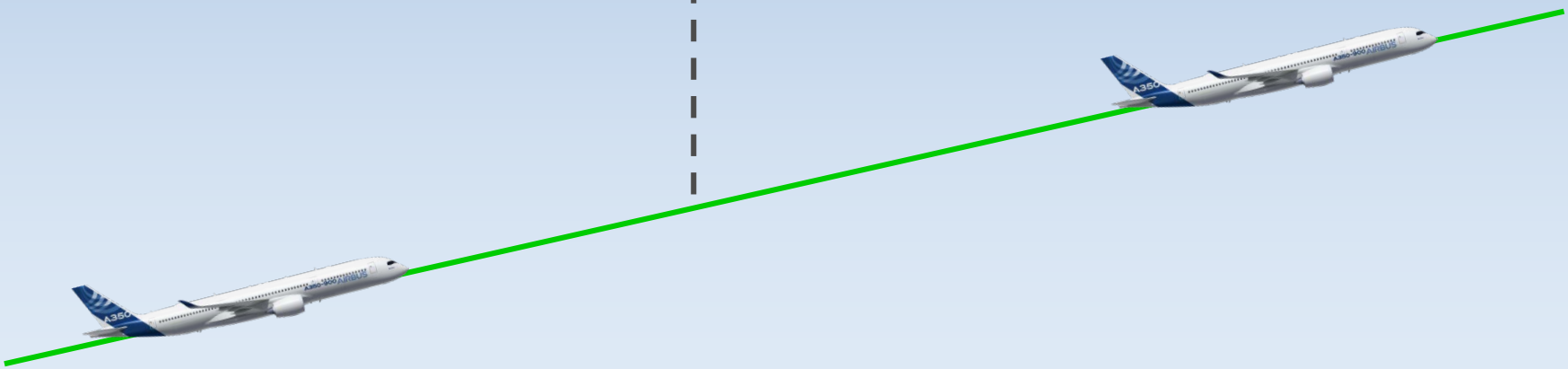
BACK

- FMA mode changes (boxed white for 10 s)
- V/S engages on current A/C V/S



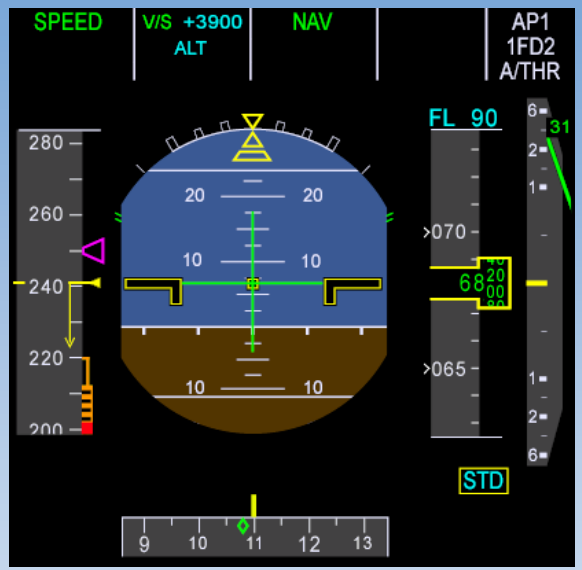
"Click
Click
Click"





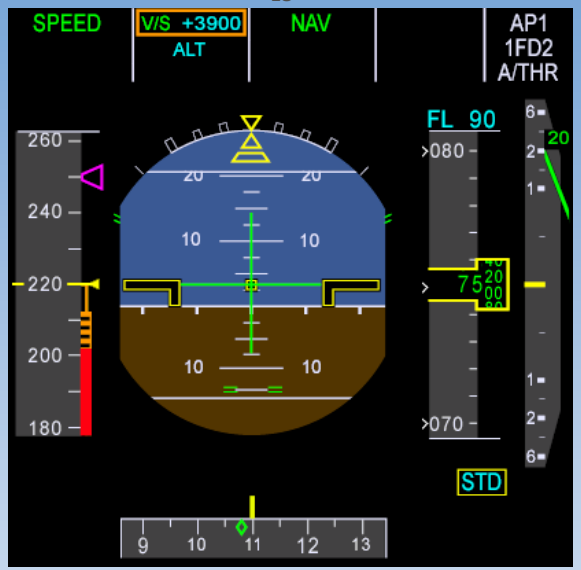
Example of Vertical Mode Reversion:
Excessive V/S Selection (in Climb)

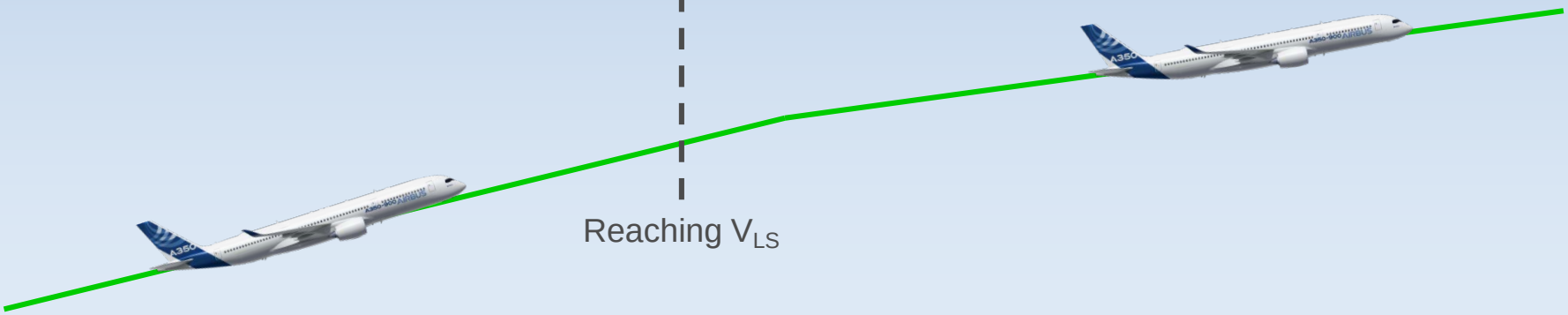
BACK



"Click
Click
Click"

- FMA mode changes (boxed amber for 10 s)
- The A/C maintains V_{LS}.

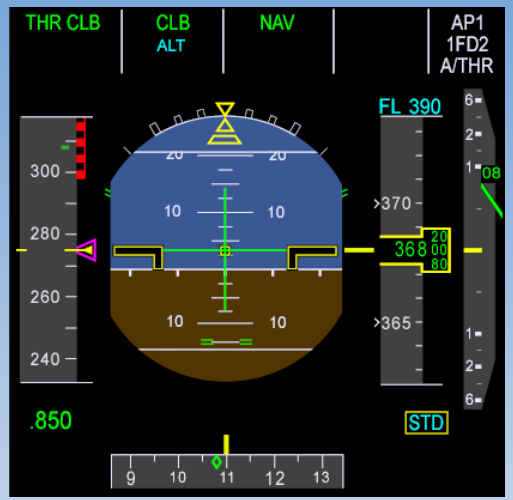




Reaching V_{LS}

EXAMPLE OF VERTICAL MODE REVERSION:
FROM NAV TO HDG (IN CLIMB)

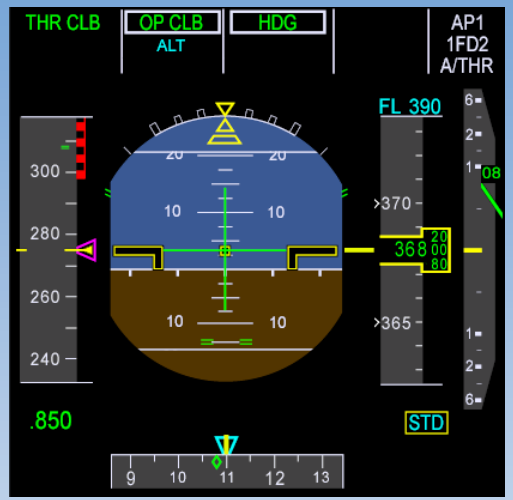
BACK

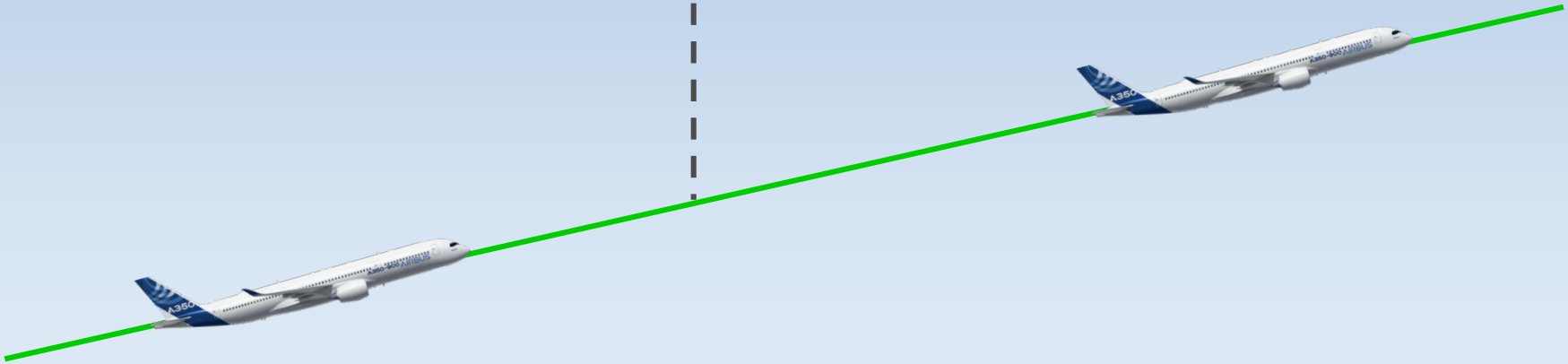


PULL

"Click
Click
Click"

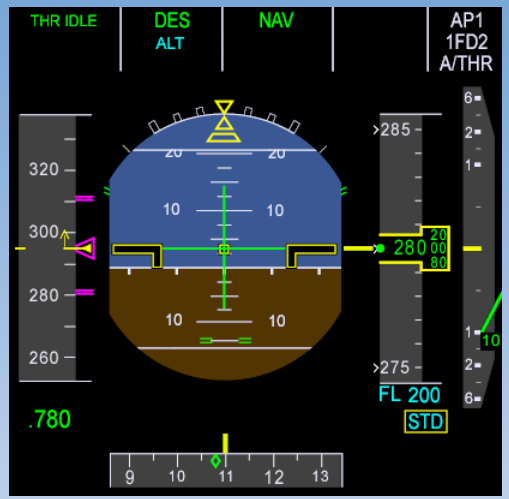
FMA modes change (boxed white for 10 s)





Example of Vertical Mode Reversion:
From NAV to HDG (in Descent)

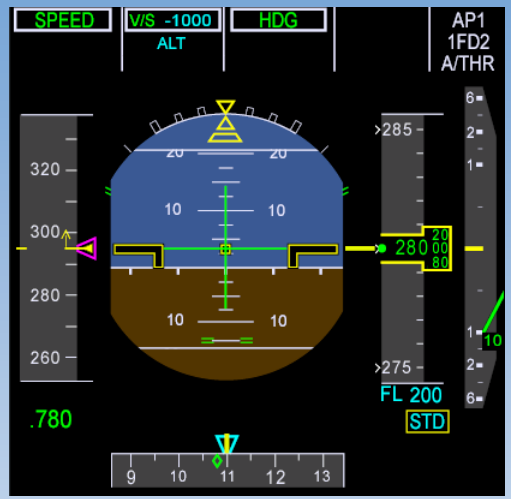
BACK

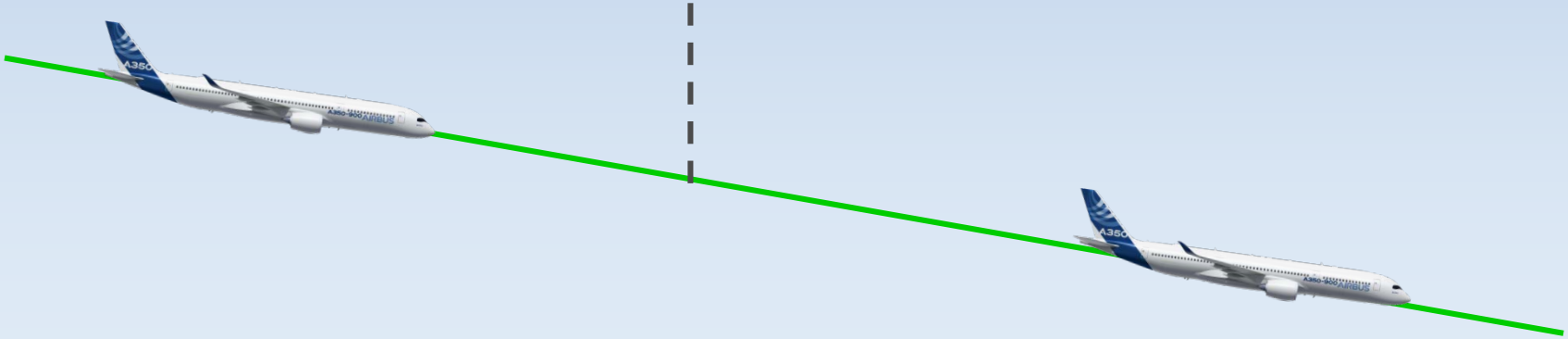


PULL

"Click
Click
Click"

FMA modes change (boxed white for 10 s)





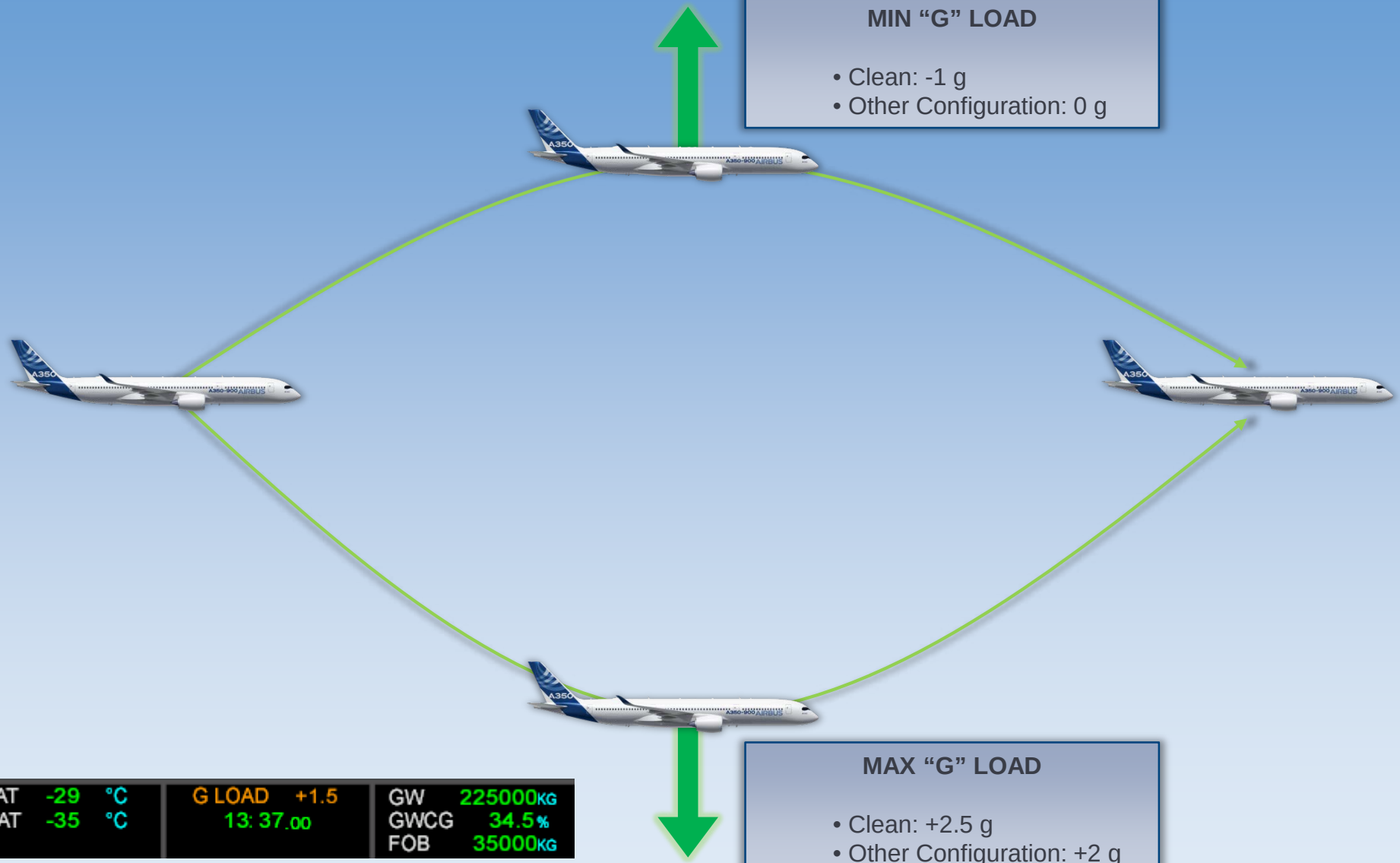
NORMAL LAW PROTECTIONS

- Load Factor Protection
- Pitch Attitude Protection
- Bank Angle Protection
- High Speed Protection
- Low Speed Protections
- AP IN PROT

For more information on protection,
refer to FCOM / Aircraft Systems / 22-27 / Protections

LOAD FACTOR PROTECTION

BACK



MIN "G" LOAD

- Clean: -1 g
- Other Configuration: 0 g

MAX "G" LOAD

- Clean: +2.5 g
- Other Configuration: +2 g

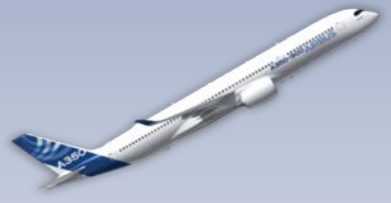
Note: G LOAD is displayed if the G load is less than 0.7 g or more than 1.4 g. G LOAD remains displayed for at least 5 s.

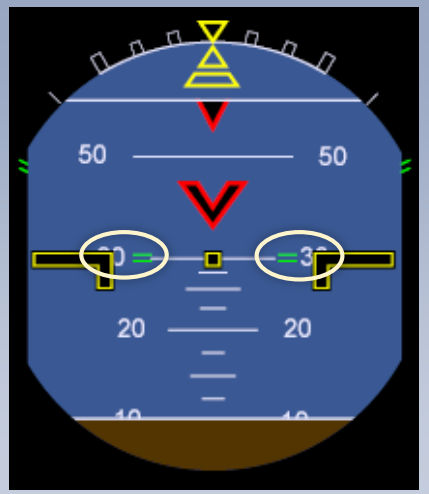
PITCH ATTITUDE PROTECTION

BACK

PITCH UP LIMIT

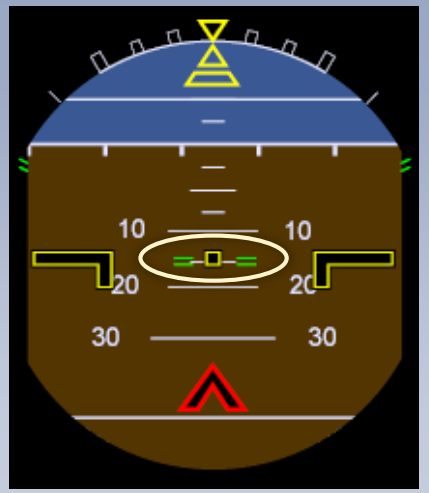
Pitch is limited to 30° nose up (25° at low speed).





PITCH DOWN LIMIT

Pitch is limited to 15° nose down.

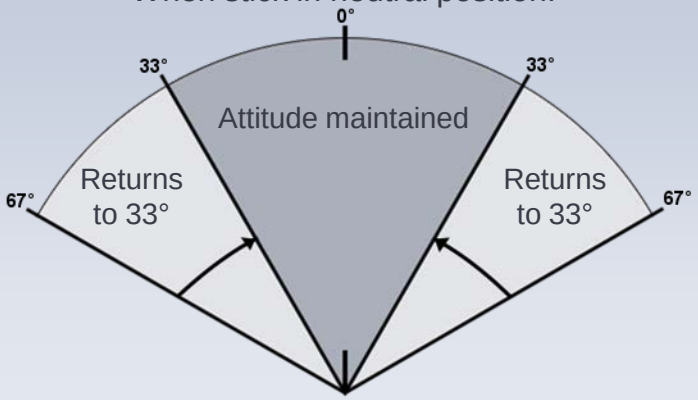


BANK ANGLE PROTECTION

BACK

BANK ANGLE

When stick in neutral position:

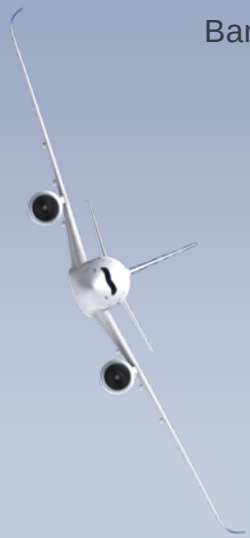


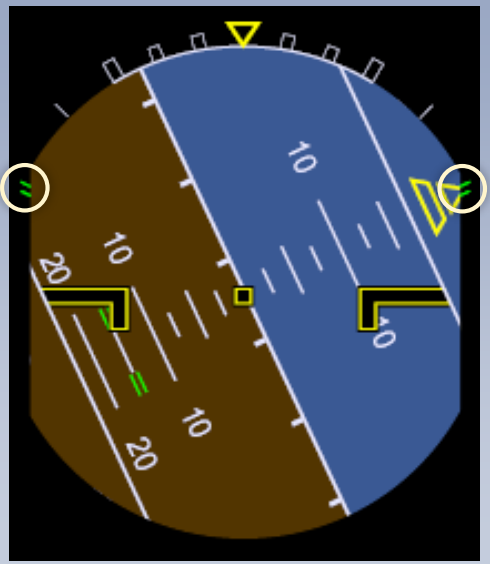
Automatic turn coordination within the envelope.

Do not use rudder in Normal Law (except for takeoff, landing and single engine operation).

BANK ANGLE LIMIT

Bank angle is limited to 67°.





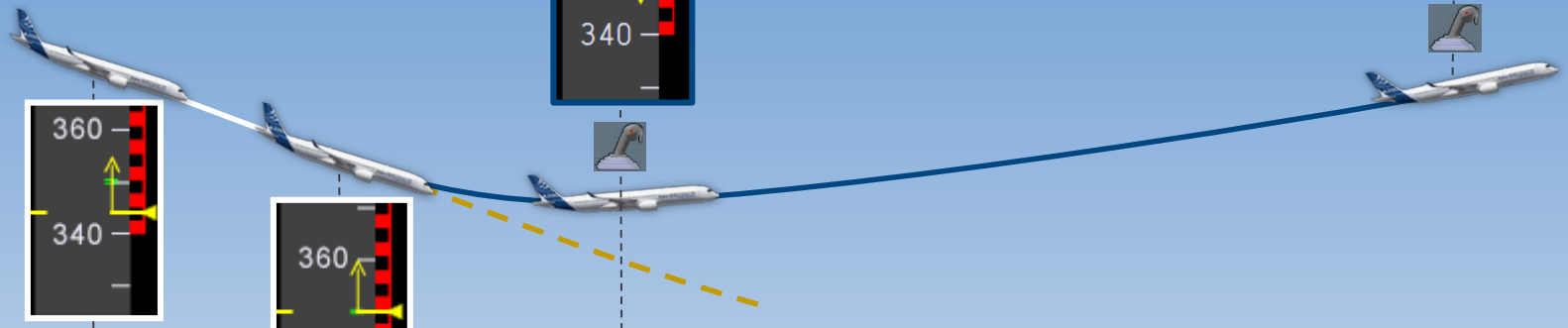
HIGH SPEED PROTECTION (HSP) 1/2

BACK

Stick released

Stick full forward

NEXT



Speed returns below VMO + 10 kt (MMO + 0.02)

With aircraft not exceeding VMO + 10 kt (MMO + 0.02), the speedbrakes do not automatically extend.

From VMO + 10 kt (MMO + 0.02) the static stability takes over.

At VMO + 4 kt (MMO + 0.006) :

CRC

MASTER WARN

VMO = 340 kt (MMO = 0.89)
VD = 375 kt (MD = 0.96)

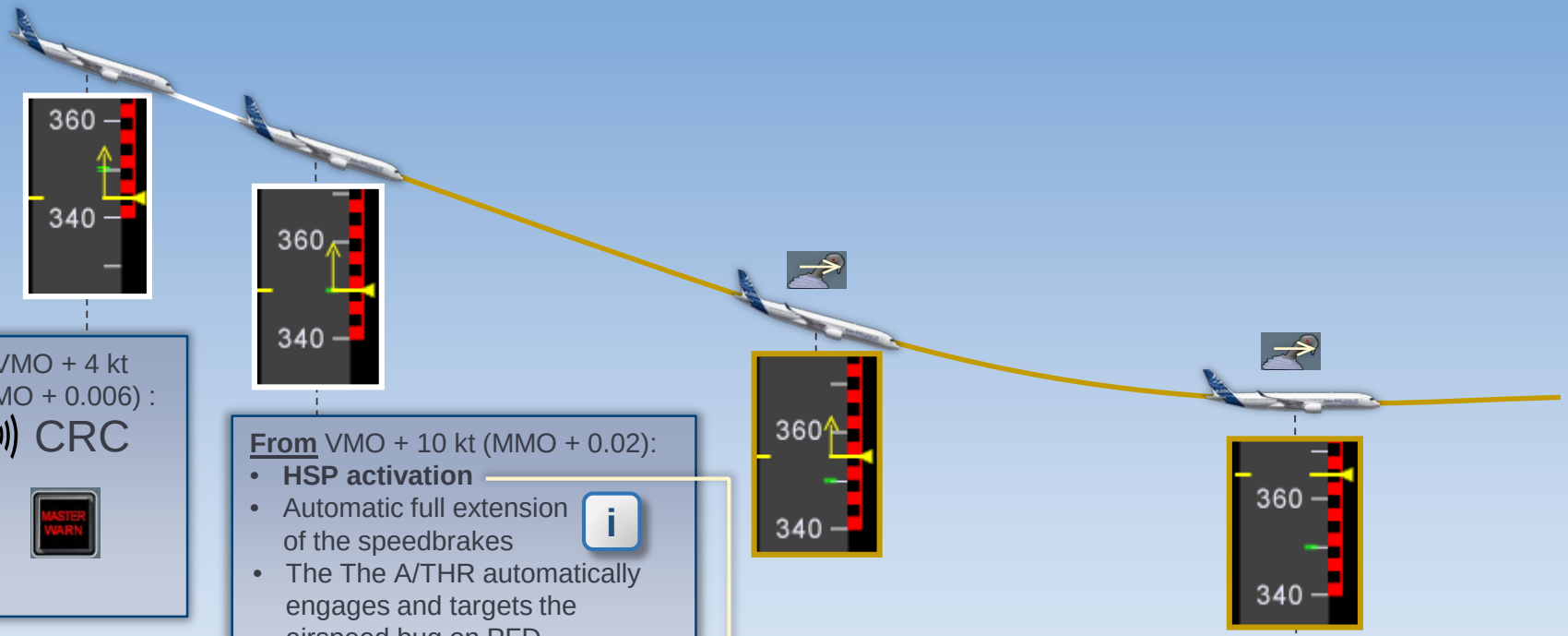
HIGH SPEED PROTECTION (HSP) 2/2

BACK

PREV

Stick released

Stick full forward



At VMO + 4 kt
(MMO + 0.006) :

CRC

MASTER WARN

From VMO + 10 kt (MMO + 0.02):

- **HSP activation**
- Automatic full extension of the speedbrakes
- The The A/THR automatically engages and targets the airspeed bug on PFD.

HSP activation:

- Pitch trim frozen
- Bank angle limited to 45°
- Bank angle reduces to 0° with zero roll input
- Automatic pitch up command, that the PF can override until VMO + 15 kt (MMO + 0.04).

With full forward stick input, the HSP will stabilize the speed at VD - 10 kt (MD - 0.02).

Note:

When A/THR is OFF and available, the A/THR automatically engages and targets the lowest of:

- *airspeed bug on PFD, or*
- *VMO/MMO.*

This is to prevent the aircraft from entering into the HSP.

VMO = 340 kt (MMO = 0.89)
VD = 375 kt (MD = 0.96)

HIGH SPEED PROTECTION

SPEEDBRAKES

BACK

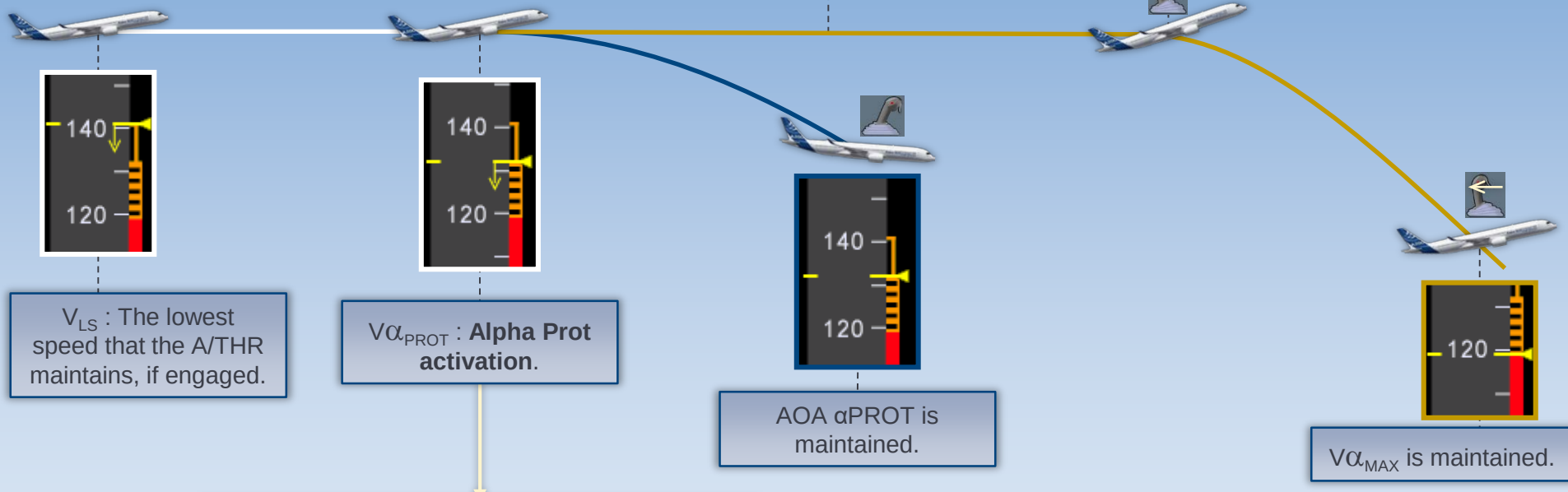
- No automatic extension if sidestick is more than half forward position,
- When speed reduces below VMO + 2 kt, and if the SPEED BRAKE lever is on the retracted (RET) position, the speedbrakes automatically retract.

LOW SPEED PROTECTION

BACK

Stick released

Stick full back



Alpha Floor i

$V\alpha_{MAX}$

V_{LS} : The lowest speed that the A/THR maintains, if engaged.

$V\alpha_{PROT}$: **Alpha Prot activation**.

AOA αPROT is maintained.

$V\alpha_{MAX}$ is maintained.

Alpha Prot activation:

- Pitch trim frozen
- Pitch down command with stick free
- Bank angle limit gradually reduced below 67°
- Bank angle returns to 0° if no roll input
- Sidestick directly commands the AOA
- Speedbrakes are automatically retracted. i

LOW SPEED PROTECTION

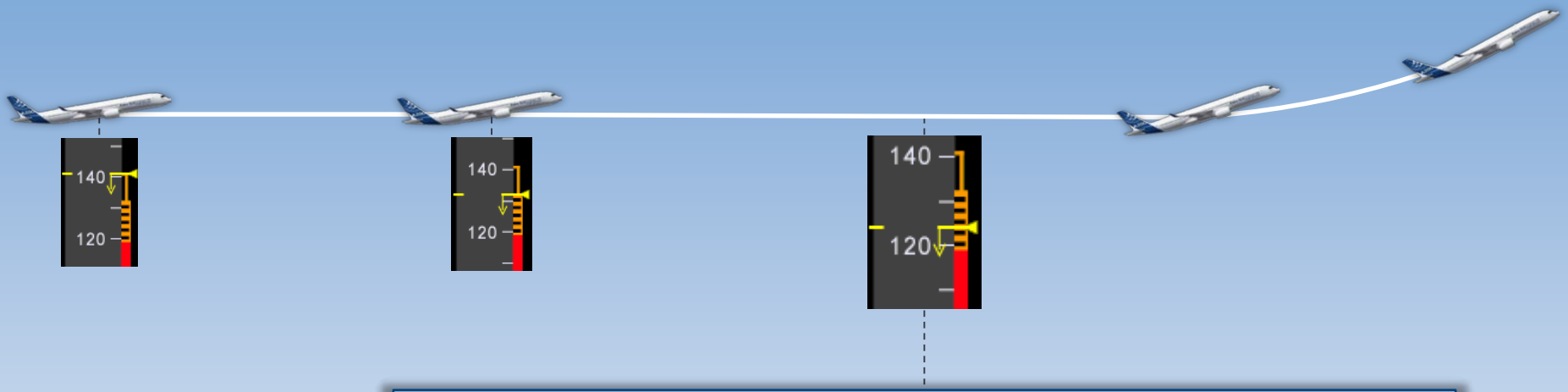
SPEEDBRAKES

BACK

When protection are no longer active, to extend speedbrakes again, the SPEED BRAKE handle must be set to RET for at least 5 seconds.

LOW SPEED PROTECTION
ALPHA FLOOR

BACK



$V\alpha_{FLOOR}$

TOGA thrust is applied, regardless of THR levers position or A/THR engagement status.

Alpha Floor will remain active until speed above V_{LS}.

Above V_{LS} , the A/THR reverts to the mode engaged before the activation of Alpha Floor.

NORMAL LAW PROTECTIONS

AP IN PROT

BACK

If a protection is triggered with the AP engaged, the AP/FD remains engaged. However, the flight envelope protection takes over the autopilot.

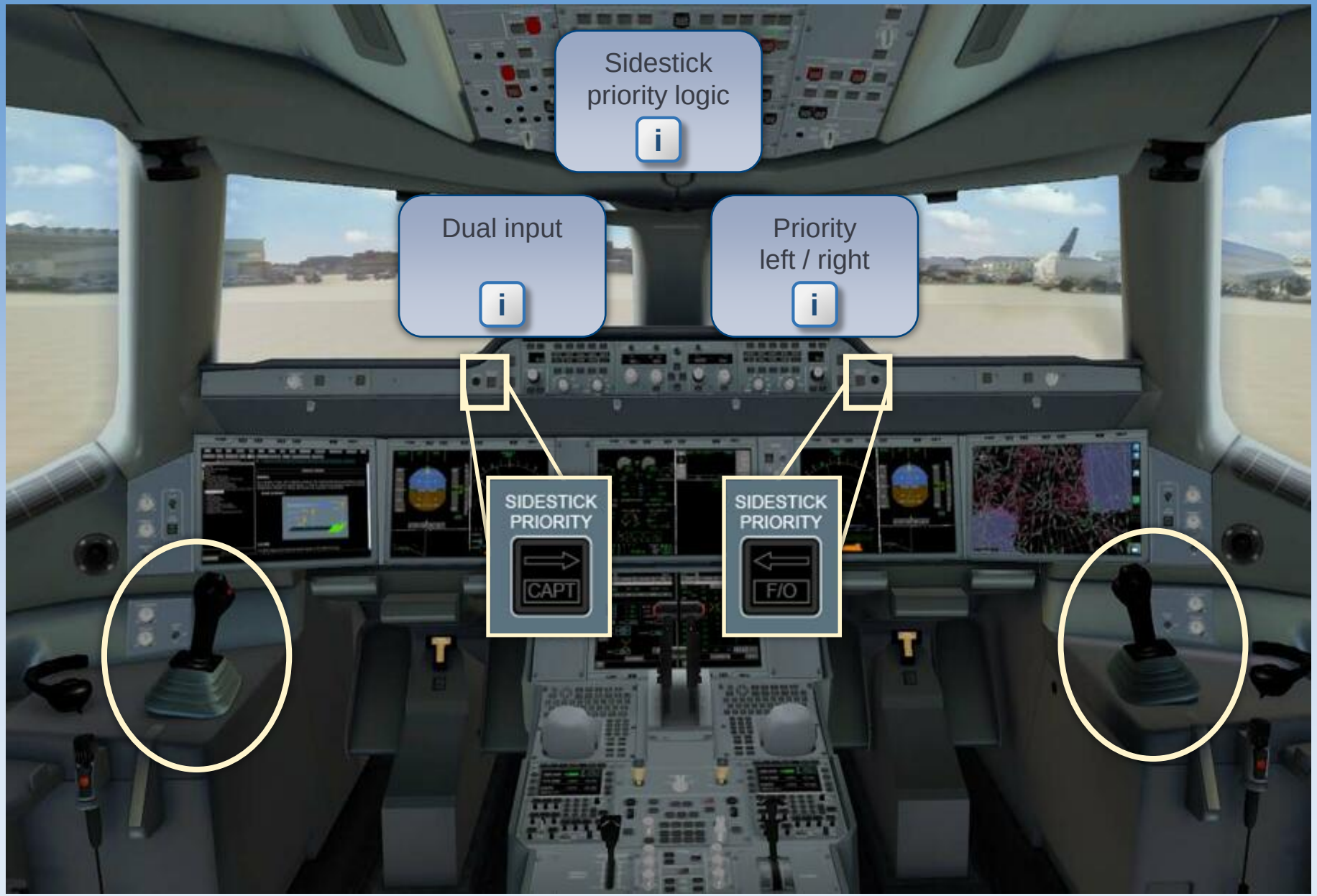
In that case:

- The message **AP IN PROT** appears on the FMA
- The AP does not follow the FD bars
- The FMA displays an amber flashing box around the modes that the AP is not able to maintain while in protection mode
- A triple click sounds.

Do not follow the FD bars if the AP IN PROT message is displayed.

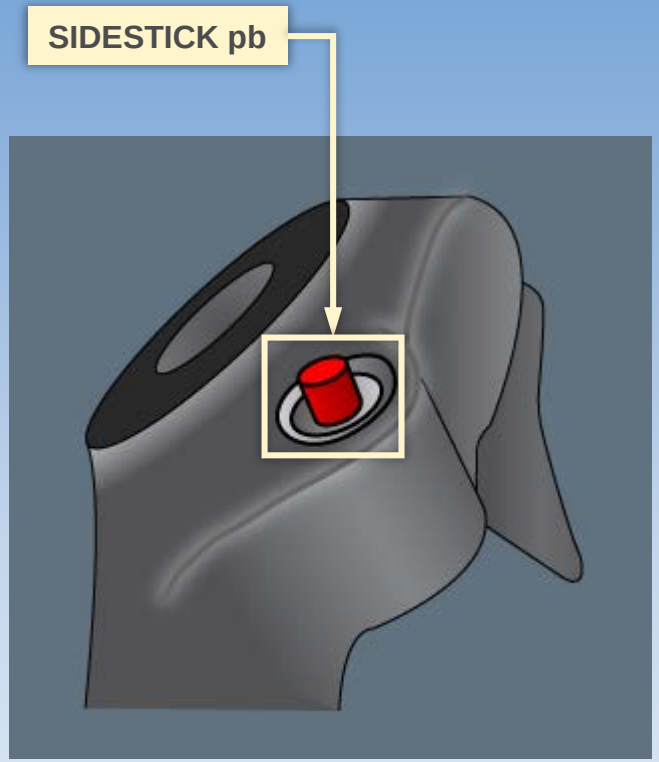
When the aircraft comes back in the normal flight envelope (**AP IN PROT** disappears), the autopilot recovers the aircraft guidance. Read FMA and adjust targets if necessary.

SIDESTICK PRIORITY LOGIC



SIDESTICK PRIORITY LOGIC

BACK



Only one crewmember must fly the aircraft.

DUAL INPUT

If both flight crewmembers use their sidesticks simultaneously, the orders are algebraically added. The combined orders are limited to the equivalent of the full deflection of one sidestick.

Remember: Only one crewmember must fly the aircraft. If required, take over.

PRIORITY / TAKEOVER

A flight crewmember can take full priority by pressing and keeping pressed the SIDESTICK pb.

If both crewmembers press and keep pressed their SIDESTICK pb, the last crewmember to press gets the priority.

SIDESTICK DEACTIVATION

If a flight crewmember presses his SIDESTICK pb for 40 s, the other sidestick is deactivated, until any flight crewmember presses his SIDESTICK pb.

If one sidestick was deactivated on ground, the **CONFIG L(R) SIDESTICK FAULT (BY TAKEOVER)** alert is triggered :

- during the T.O CONFIG test, or
- at takeoff thrust application.

DUAL INPUT

BACK

If both flight crewmembers simultaneously move their sidesticks:

- The **“ DUAL INPUT ”** aural alert is triggered “ DUAL INPUT ”
- The **CAPT** and **F/O** lights flash

- The sidestick orders are algebraically added.

Remember: Only one crewmember must fly the aircraft. If required, take over.

PRIORITY LEFT / RIGHT

BACK

A flight crewmember can press his(her) SIDESTICK pb to takeover controls.

If the CAPT presses his(her) SIDESTICK pb:

- The **" PRIORITY LEFT "** aural alert triggers

" PRIORITY LEFT "

- The F/O RED ARROW light comes on

- If the F/O moves his(her) sidestick, the **CAPT** light comes on.

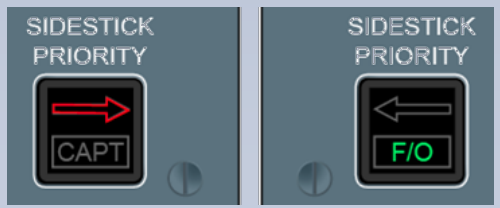
If the F/O presses his(her) SIDESTICK pb:

- The **" PRIORITY RIGHT "** aural alert triggers

" PRIORITY RIGHT "

- The CAPT RED ARROW light comes on

- If the CAPT moves his(her) sidestick, the **F/O** light comes on.



USE OF AFS CP

GOLDEN RULES

VERTICAL GUIDANCE

LATERAL GUIDANCE

SPEED GUIDANCE

VERTICAL SPEED GUIDANCE

Note: The context of this tutorial is a climb phase.

USE OF AFS CP

AIRBUS

GOLDEN RULES

BACK

GOLDEN RULE #1	**Fly, Navigate, Communicate** In that order, with the appropriate tasksharing.
GOLDEN RULE #2	**Use the appropriate level of automation at all times.**
GOLDEN RULE #3	**Understand the FMA at all times.**
GOLDEN RULE #4	**Take actions if things do not go as expected.**

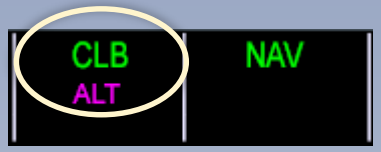
VERTICAL GUIDANCE 1/3

MANAGED AND SELECTED – WITH ALT CONSTRAINT

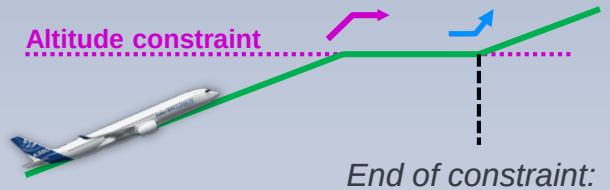
NEXT

BACK

VERTICAL GUIDANCE IN MANAGED MODE



Altitude constraints will be respected.

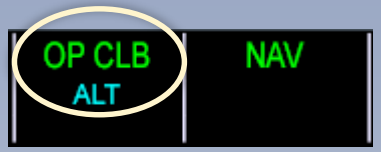


End of constraint:
No action required

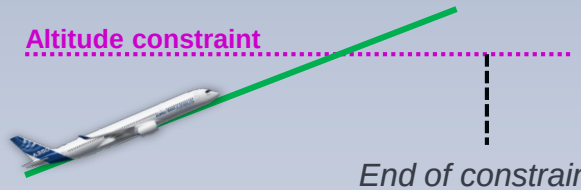
Pull the ALT knob

Push the ALT knob

VERTICAL GUIDANCE IN SELECTED MODE



Altitude constraints will not be respected.



End of constraint

Constraints i

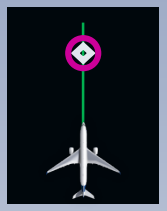
VERTICAL GUIDANCE1/3

MANAGED AND SELECTED – WITH ALT CONSTRAINT

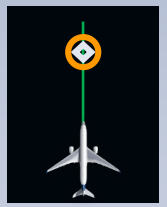
ALT CONSTRAINTS

BACK

On the ND:



The aircraft **can** match the constraint.



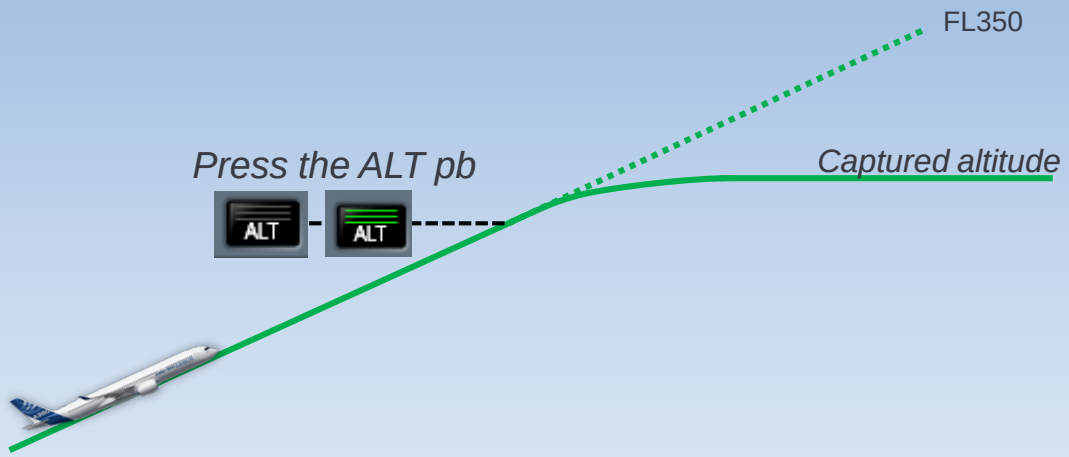
The aircraft **cannot** match the constraint.

VERTICAL GUIDANCE 2/3

USE OF ALT PB – LEVEL-OFF

PREV NEXT BACK

When pressed, the aircraft levels off and maintains the captured altitude.

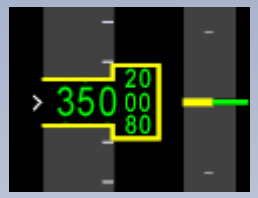


VERTICAL GUIDANCE 3/3

ALTITUDE CHANGE

PREV BACK

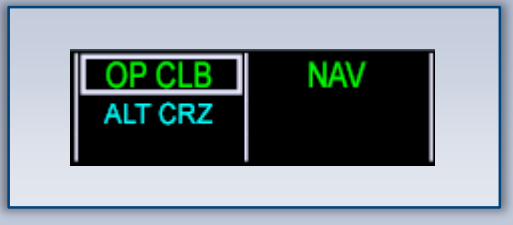
FLIGHT GUIDANCE MAINTAINING ALTITUDE

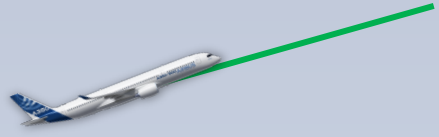


1. Turn the knob to display the new target altitude

2. Push (or Pull) the knob

FLIGHT GUIDANCE INITIATING ALTITUDE CHANGE





When maintaining altitude, the correct sequence to initiate an altitude change is:

1. Turn the knob, then
2. Push (or pull) the knob.

In **HDG** lateral mode, turn then pull the knob.

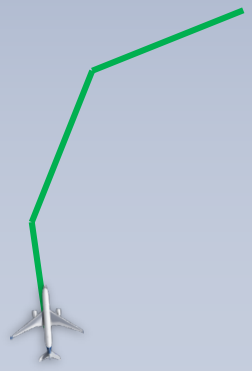
LATERAL GUIDANCE 1/2

MANAGED TO SELECTED

NEXT BACK

LATERAL GUIDANCE IN NAV MANAGED MODE

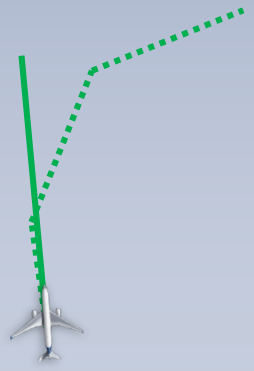
The aircraft follows the active flight plan.



Pull the HDG/TRK knob

LATERAL GUIDANCE IN HDG SELECTED MODE

The aircraft follows the heading selected in the AFS CP.



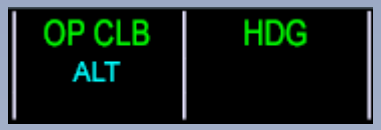
The altitude constraints are linked to the flight plan.
As a consequence, when the managed mode changes to a selected lateral mode, the vertical mode automatically changes to a selected vertical mode.

LATERAL GUIDANCE 2/2

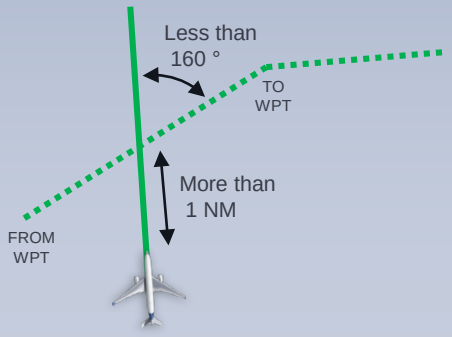
SELECTED TO MANAGED

PREV BACK

LATERAL GUIDANCE IN HDG SELECTED MODE



The aircraft maintains selected heading.



Push the HDG/TRK knob

LATERAL GUIDANCE IN NAV MANAGED MODE

The aircraft maintains present heading until the interception area.

Then the aircraft follows the active flight plan after the interception point.

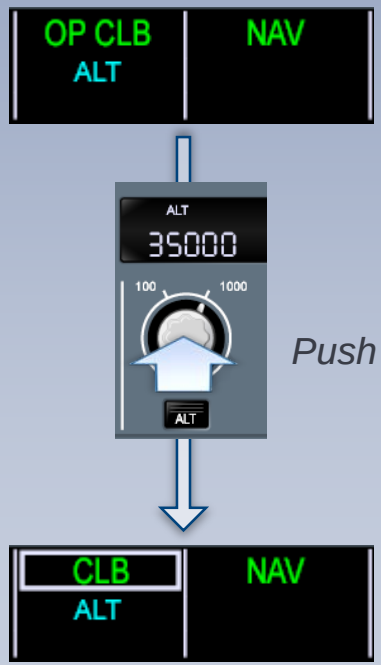
LATERAL MANAGEMENT 2/2

SELECTED TO MANAGED

OP CLB TO CLB

BACK

To engage **CLB** mode and respect altitude constraints, push the ALT knob, when the **NAV** mode is engaged.



Push the ALT knob

SPEED GUIDANCE 1/2

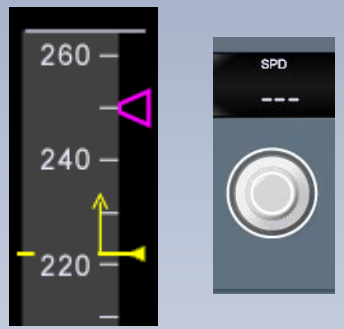
MANAGED VERSUS SELECTED

NEXT

BACK

SPEED MANAGED

Speed is managed by the FMS.

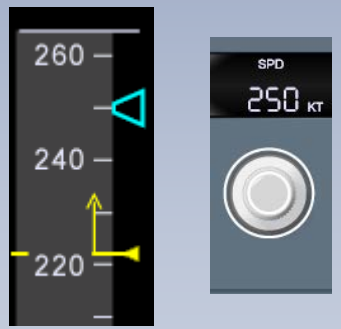


Pull the SPD/MACH knob

Push the SPD/MACH knob

SPEED SELECTED

Speed is selected by the flight crew.

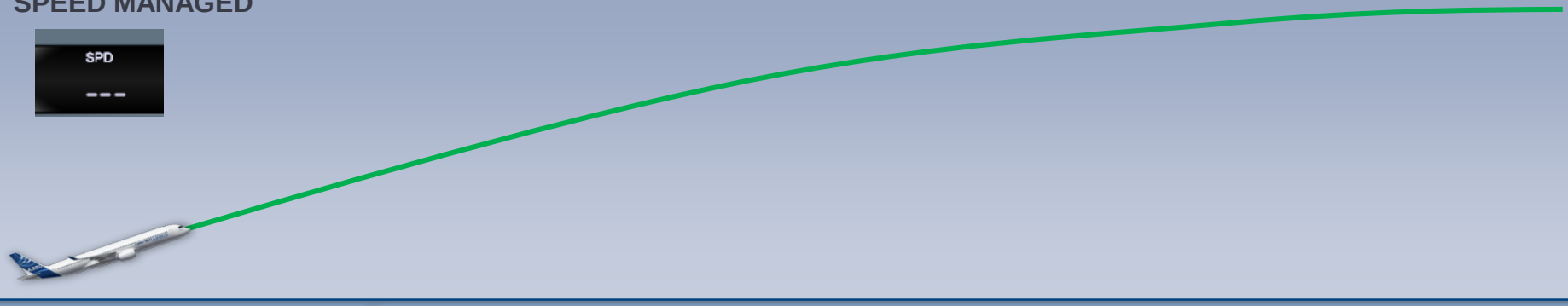


SPEED GUIDANCE 2/2

USE OF SELECTED SPEED TO EXPEDITE CLIMB

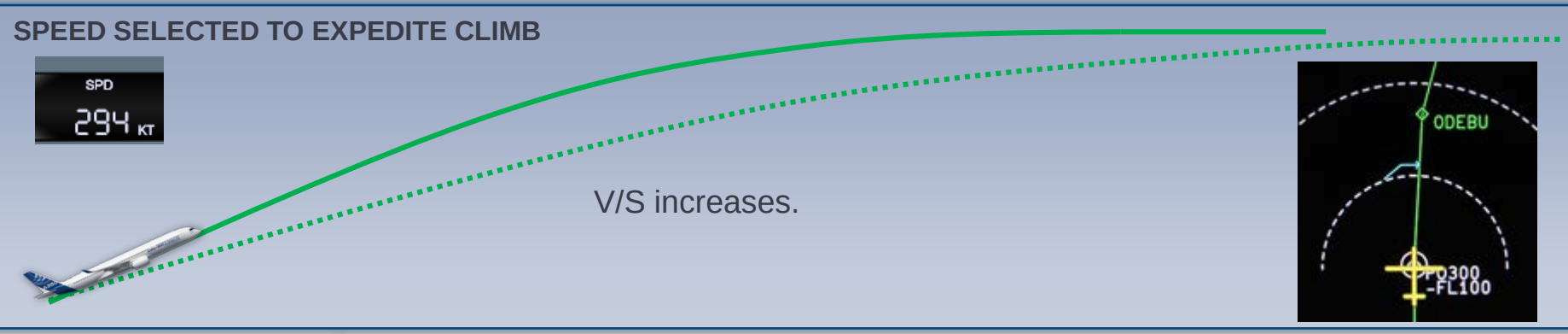
PREV BACK

SPEED MANAGED



To expedite climb and increase temporarily the vertical speed, select a lower speed (between present speed and green dot). Monitor target altitude with the blue arrow.

SPEED SELECTED TO EXPEDITE CLIMB



V/S increases.

To resume standard climb, manage speed.

At high altitude, acceleration to recover the managed speed may take a long time.

V/S GUIDANCE 1/2

SELECT A VERTICAL SPEED

NEXT

BACK

VERTICAL SPEED DASHED

Vertical speed is the result of aircraft performance.

Pull the V/S knob then turn

VERTICAL SPEED SELECTED

Vertical speed is selected by the flight crew.

V/S GUIDANCE 2/3

RESUME VERTICAL SPEED DASHED

PREV NEXT BACK

VERTICAL SPEED SELECTED

Vertical speed is selected by the flight crew.

Push (or pull) the ALT knob

VERTICAL SPEED DASHED

Vertical speed is the result of aircraft performance.

V/S GUIDANCE 3/3

PUSH TO LEVEL OFF

PREV

BACK

AIRCRAFT CLIMBING

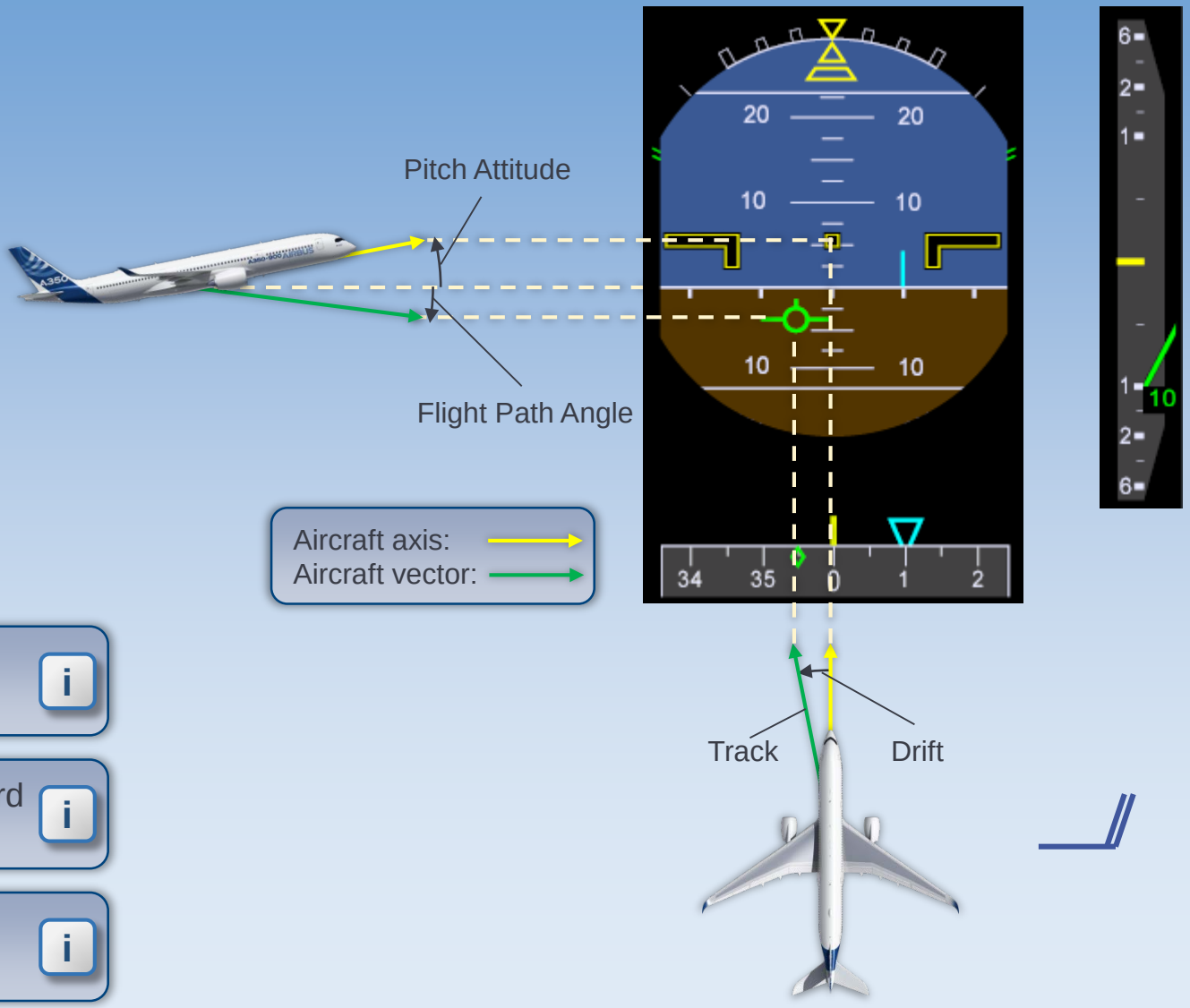
Push the V/S knob

VERTICAL SPEED ZERO

A vertical speed of 0 feet per minute is automatically set.

USE OF BIRD

The Bird displays the Flight Path Angle (FPA) and the track (TRK) on the PFD.



Bird and -3° FPA

Displays of Bird Symbols

Blue Line

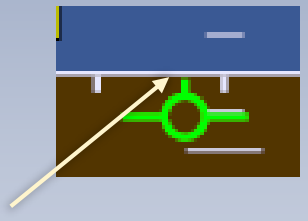
BIRD AND -3° FPA

BACK

BIRD AND -3° FPA

The Bird is designed to facilitate the approach with a -3° FPA.

Example of Bird with a FPA of -3° (TRK/FPA, FD OFF):



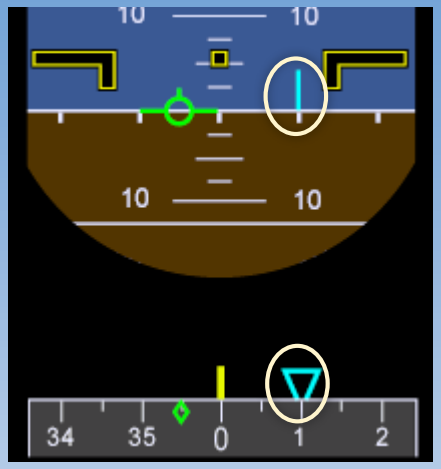
When established on a -3° descent path, the top of the Bird symbol touches the horizon line.

DISPLAYS OF THE BIRD SYMBOL

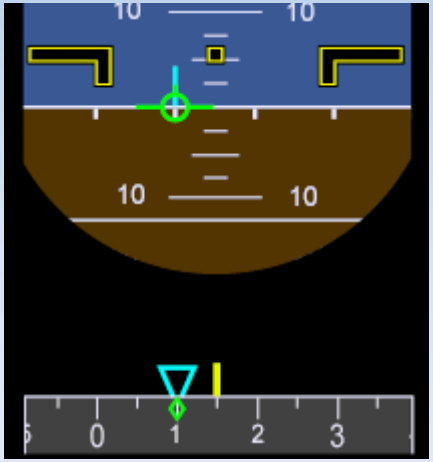
	Without Bird	With Bird		
		VV (black Bird)		FPV (green Bird)
	HDG --- VV	HDG --- VV		TRK --- VV
FD			HDG V/S Press	
FD				

BLUE LINE

When TRK/FPA flying reference is selected on the AFS CP, the blue line and the blue triangle represent the selected TRACK.

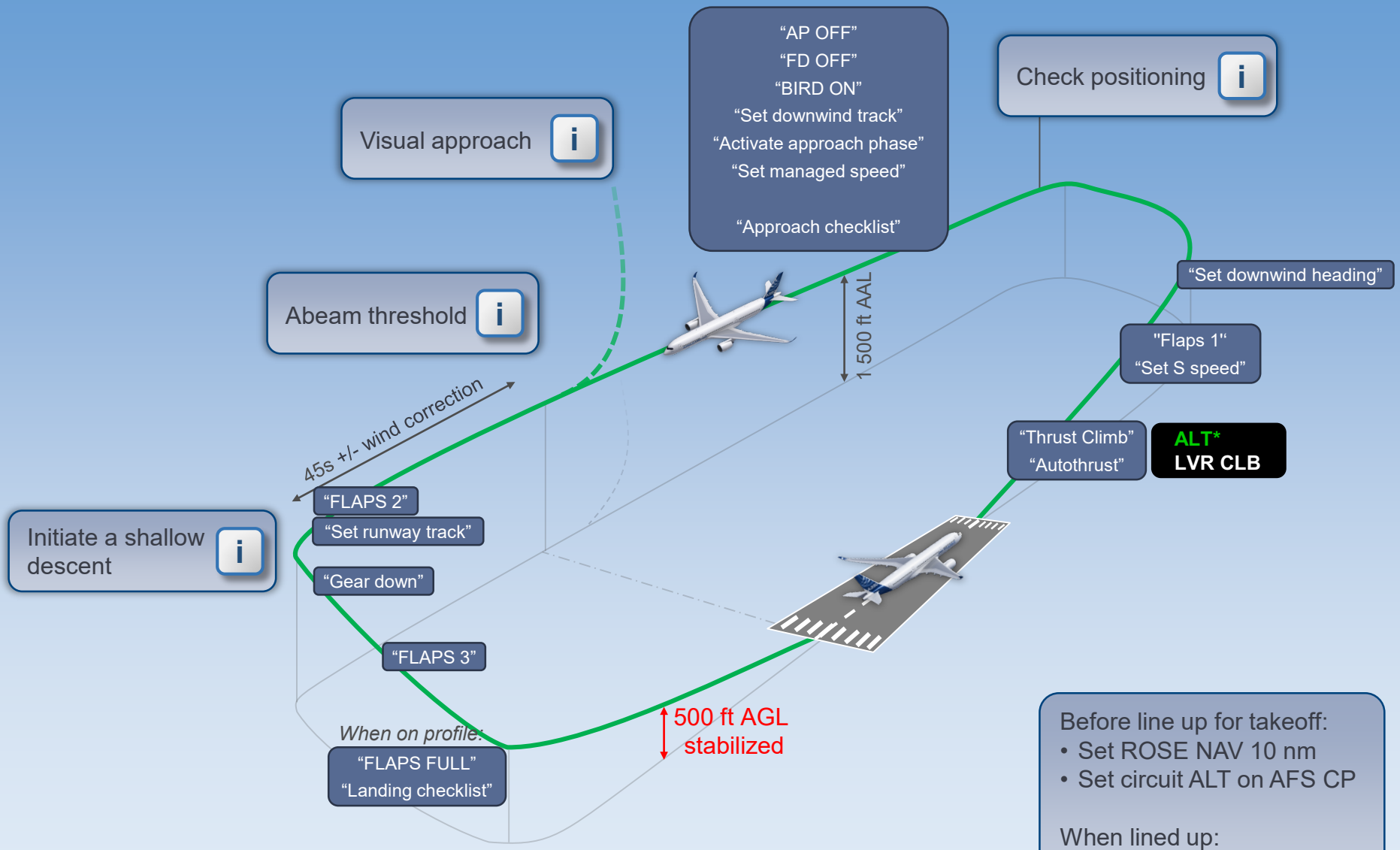


Fly the Bird on the Blue Line to follow the selected TRACK:



VISUAL CIRCUIT / VISUAL APPR

AIRBUS



Note: This briefing only highlights PF callouts, associated PM callouts are to be done as per SOP.

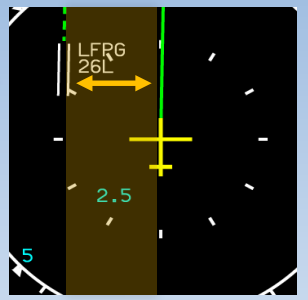
ENTERING DOWNWIND

BACK

After TRK-FPA selection:

Set downwind track

Maintain a crosstrack of ~2.5 nm



Use the dotted arcs of the ND range to monitor the runway position vs the aircraft track.

ABEAM THRESHOLD

BACK

Start Chrono

- **3 s per 100 ft** above airport elevation (45 s for 1500 ft)
- Wind correction:
  - +1 s per 1 kt of headwind
  - -1 s per 1 kt of tailwind

Example:

Compare TAS and GS :

TAS 186 – GS 195 = – 9 kt (tailwind)

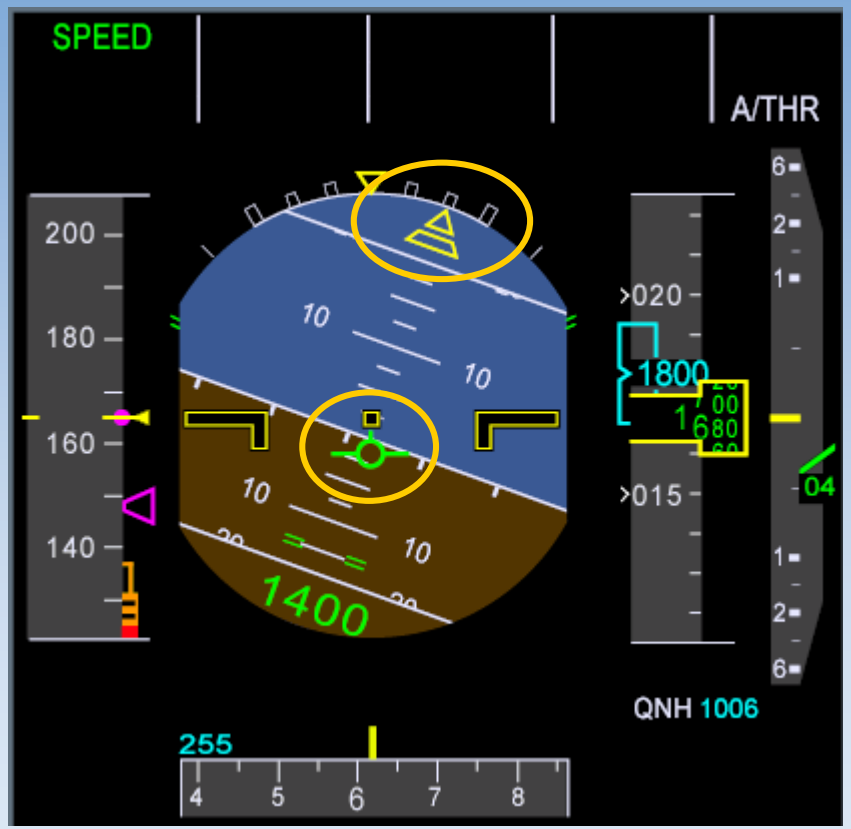
Wind Correction = – 9 s

In this example, the downwind leg extension will be:
45 s – 9 s = 36 s

VISUAL CIRCUIT

BACK

Initiate a shallow descent to reach the profile



VISUAL CIRCUIT / VISUAL APPR

AIRBUS

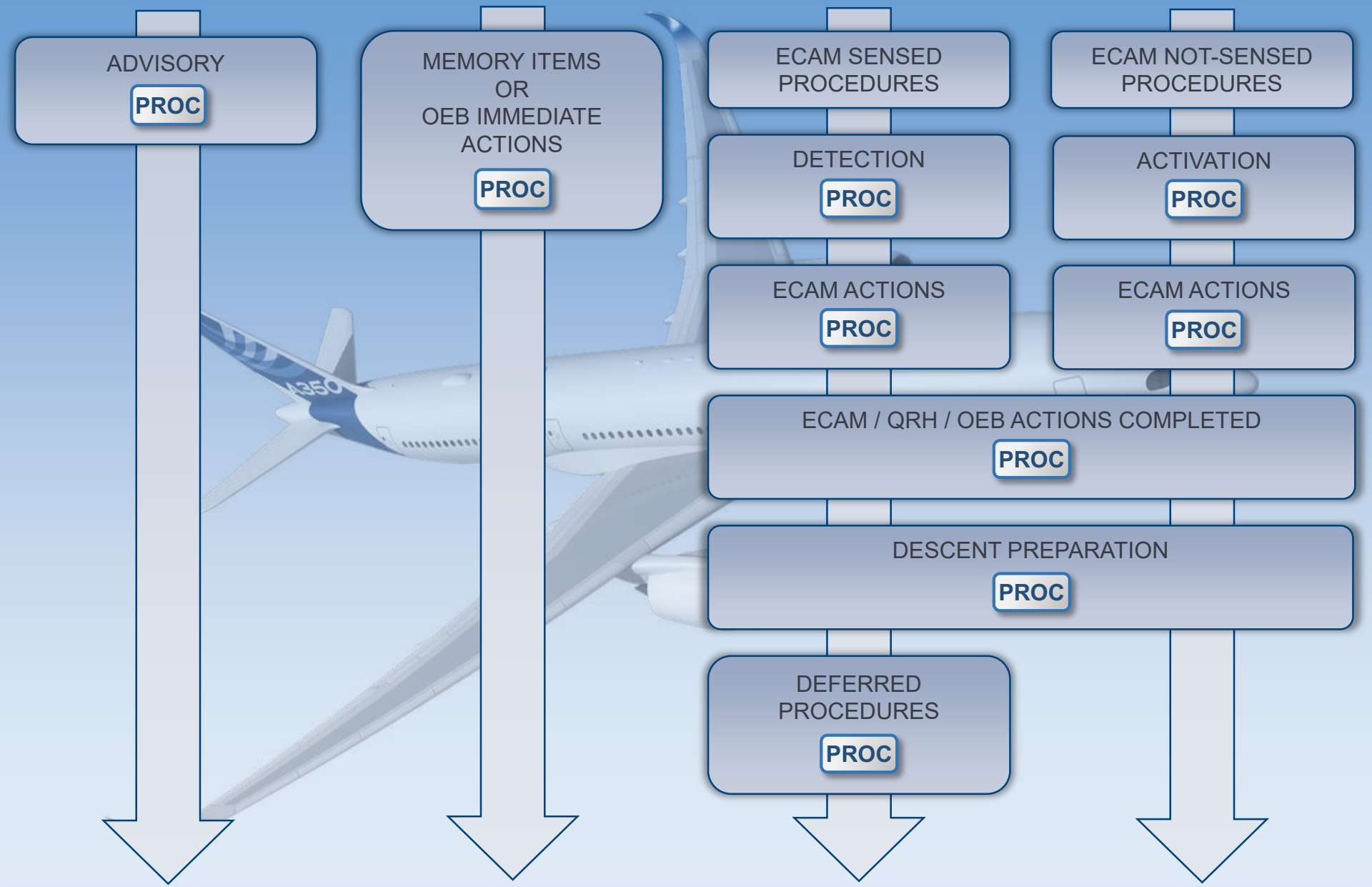
VISUAL APPROACH

BACK

Manage trajectory and altitude to reach downwind, base leg, or long final, in CONF 1 at S speed and continue with standard visual circuit actions.

MANAGEMENT OF ABNORMAL OPERATIONS

AIRBUS



ADVISORY

BACK

PF

PM

First pilot who notices an ADVISORY:

ANNOUNCE: " ADVISORY ON (TITLE on SD page) SYSTEM "

SYSTEM SD page DISPLAYED.....ANALYZE

DRIFTING PARAMETER MONITORING.....REQUEST

DRIFTING PARAMETER.....MONITOR

If time permits:

ADVISORY TRIGGERING CONDITIONS (FCOM)..CHECK

Refer to the FCOM: ★ FCOM › ★ Procedures › ★ Abnormal and Emergency Procedures › ★ [ADV] ECAM ADVISORY › ★ [ADV] ECAM ADVISORY

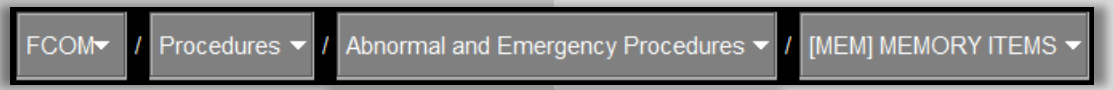
If the WD displays memos or limitations, the ADV reminder appears and pulses at the bottom right of the page.

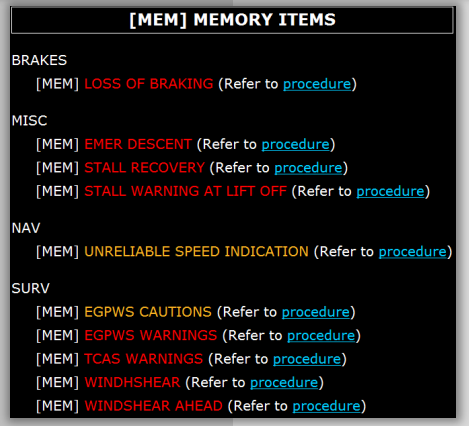
MEMORY ITEMS

BACK

In some time-critical situations, you will have no time to refer to any ECAM, FCOM or QRH procedure. Memory items are procedures or critical immediate actions of a procedure (ECAM, QRH or OEB) that you will have to apply by memory to ensure a safe flight path.

The [MEM] MEMORY ITEMS menu provides direct access to the list of memory items:





Memory items are surrounded by a box in an FCOM/QRH/OEB procedure:

Announce the appropriate procedure by calling out, in most cases, the title of the procedure. This will allow the flight crew to be aware of the situation and be prepared to properly react (crew coordination, tasksharing and communication).

ANNOUNCE.....APPROPRIATE CALLOUT
e.g. "EMERGENCY DESCENT"

DETECTION

BACK

PF

PM

Reminder: Tasksharing for normal operations:

FLY THE AIRCRAFT

NAVIGATE

MONITOR: FLIGHT PATH / NAVIGATION / A/C SYSTEMS

COMMUNICATE

First pilot who notices MASTER WARNING / MASTER CAUTION:

Or

MASTER WARNING / MASTER CAUTION ..... RESET

The first priority is to maintain a safe flight path before performing any READ & DO actions (FLY, NAVIGATE, COMMUNICATE).

For takeoff or go around, you should delay READ & DO actions until the aircraft reaches a minimum of 400 ft AGL (appropriate compromise between stabilization of the aircraft and a delay in the actions)

However, you may initiate READ & DO actions below 400 ft AGL, provided that the flight path is safe.

ECAM ACTIONS

NEXT

PF	PM
Repeat for each ECAM procedure:	
	ANNOUNCE……..……"Title of the failure"
	AIR APU BLEED FAULT *Here: "AIR APU BLEED FAULT"*
	ECAM …….. CONFIRM with SD page and OVHD panel
	OEB …….. CONSIDER
ORDER ……..."ECAM ACTIONS" i	
Now apply the tasksharing for abnormal operations:	
FLY THE AIRCRAFT	MONITOR: FLIGHT PATH / NAVIGATION
NAVIGATE	
COMMUNICATE	
	ECAM / OEB ACTIONS …….. PERFORM
	REQUEST ……. "CLEAR (name of the SYSTEM)?"
	AIR APU BLEED FAULT *Here: "CLEAR AIR ?"*
ECAM ACTIONS PERFORMED ……..…. CHECK	
CONFIRM ……..…. "CLEAR (name of the SYSTEM)"	
Here: "CLEAR AIR"	
	CLR pb …….. PRESS CLEAR
	or ticks the CLEAR action line of the ECAM procedure
	CLEAR

Actions to be confirmed by both pilots: i

SYSTEM DISPLAY

PREV NEXT

PF **PM**

For each System Display (SD) page:

SYSTEM DISPLAY (SD) page……..ANALYZE

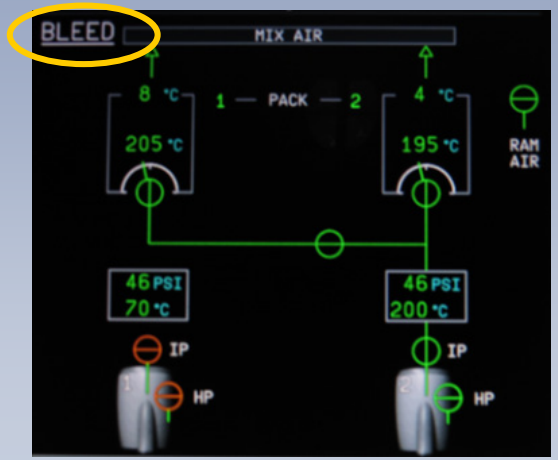
REQUEST……..“CLEAR (name of SYS)?”

CONFIRM……..“CLEAR (name of SYS)”

CLR pb ……..…… PRESS 

or validate the CLEAR action line of the secondary failure

Repeat the same sequence for each secondary failure displayed on the ECAM SD page.



PM: “CLEAR BLEED?”

PF: “CLEAR BLEED”

STATUS PAGE

PREV BACK

PF PM

When the STATUS page appears:

ANNOUNCE ..... "STATUS"

ORDER ..... "STOP ECAM"

ECAM ACTIONS ..... STOP

Consider the ACCELERATION flow pattern, any normal check-list, system reset, or any additional procedure (e.g. Engine relight in flight procedure), as applicable

ORDER ..... "CONTINUE ECAM"

STATUS ..... READ

REQUEST ..... "REMOVE STATUS?"

CONFIRM ..... "REMOVE STATUS"

STS pb ..... PRESS

ANNOUNCE....."ECAM ACTIONS COMPLETED"

Return to the tasksharing for normal operations:

FLY THE AIRCRAFT

NAVIGATE

MONITOR: FLIGHT PATH / NAVIGATION / A/C SYSTEMS

COMMUNICATE

If time permits, review the FCOM for additional information on the applicable procedure(s)

System reset: refer to FCOM

FCOM > Procedures > Abnormal and Emergency Procedures > [RESET] SYSTEM RESET > [RESET] SYSTEM RESET TABLE

ACTIVATION

BACK

PF	PM
Reminder: Tasksharing for normal operations:	
FLY THE AIRCRAFT NAVIGATE	MONITOR: FLIGHT PATH / NAVIGATION / A/C SYSTEMS COMMUNICATE
When you need to activate a not-sensed procedure that is not requested by an ECAM procedure:	
ORDER ……..…….. "CHECK ECAM NOT-SENSED" *or* ORDER ….. "SELECT (Title) ABNORMAL PROCEDURE"	
	ABN pb ……..…. PRESS  APPLICABLE ABN PROC ……. SEARCH and SELECT REQUEST ……. "ACTIVATE (Name of the procedure)?"
ORDER ……..……... "ACTIVATE"	
	ABN PROC …….. ACTIVATE
Now apply the tasksharing for abnormal operations:	
FLY THE AIRCRAFT NAVIGATE COMMUNICATE	MONITOR: FLIGHT PATH / NAVIGATION

If you need to review, or discuss a not-sensed procedure, you must use the FCOM.
Do not activate a not-sensed procedure to review or discuss a procedure for the following reasons:
- If limitations or memos are associated with this procedure, they will appear on the WD or on the PFD
- If the ECAM not-sensed procedure is unduly activated without intention to apply it, avionics systems (including FWS alerting system) will reconfigure their system behavior in accordance with the activated not-sensed procedure.

ECAM ACTIONS

BACK

PF

PM

ECAM ACTIONS PERFORMED …….. CHECK

CONFIRM …….. "CLEAR (Name of the procedure)"

ECAM ACTIONS …….. PERFORM

REQUEST …….. "CLEAR (Name of the procedure)?"

CLR pb …….. PRESS

(or ticks the CLEAR action line of the ECAM procedure)

If the STATUS page appears:

Proceed as per ECAM Sensed Procedure ("When the STATUS page appears")

If the STATUS page does not appear:

ANNOUNCE…"(Name of the procedure) COMPLETED"

Return to the tasksharing for normal operations

ECAM / QRH / OEB ACTIONS COMPLETED

BACK

PF

PM

ASSESS THE SITUATION

STATUS ..... RECALL AND REVIEW

OPERATIONAL ASPECTS ..... CONSIDER

LAND ASAP or LAND ANSA

For destination or diversion airports:

WEATHER AND LANDING INFORMATION ..... OBTAIN

In the case of failures affecting flight control surfaces, slats, flaps, landing gear or landing gear doors:

FUEL PENALTY FACTOR ..... CHECK

REMAIN FOB AT DESTINATION AND DIVERSION AIRPORTS.....CHECK

When necessary: LANDING PERFORMANCE ..... COMPUTE

RVSM, RNP, APPROACH AND LANDING CAPABILITY ..... CHECK

DISPATCH AND COMMERCIAL ASPECTS.... CONSIDER

MAKE THE DECISION

After the situation assessment:

FLY TO DESTINATION, DIVERT, RETURN.....DECIDE

INFORM

When the decision is taken:

ATC, CABIN CREW, PAX, AIRLINE OPERATIONS.....INFORM

DESCENT PREPARATION

BACK

PF

NAV CHARTS CLIPBOARD ..... PREPARE

BARO METRIC REFERENCE ..... PRESET

PM

WEATHER AND LANDING INFORMATION ..... OBTAIN

NAV CHARTS CLIPBOARD ..... PREPARE

BARO METRIC REFERENCE ..... PRESET

STATUS page / STATUS MORE page ..... CHECK

- Check the STATUS page before completing the arrival briefing. Review the active **DEFERRED PROCs** (i.e. ALL PHASES, APPR and LDG) and **LIMITATIONS**, and take particular note of any degradation in landing capability, or any other aspect affecting the approach and landing
- Check ALERTS IMPACTING LDG PERF are taken into account by the Landing Performance Application
- Review STATUS MORE page (if available) for any additional information.

SYNCHRO ECAM button ..... CLICK

SYNCHRO ECAM button ..... CLICK

Click on the SYNCHRO ECAM button in order to update the last ECAM alerts that occurred during the flight.

LANDING CONDITIONS ..... CONFIRM

LANDING CONDITIONS ..... CONFIRM

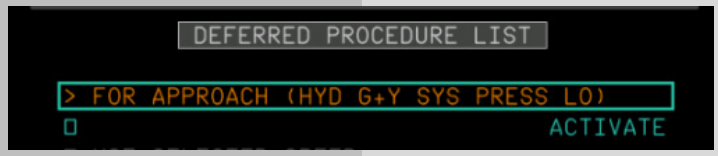
Perform an in-flight landing performance assessment if applicable

FMS ..... PREPARE

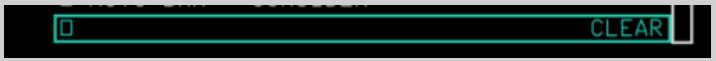
APPR panel of the ACTIVE / PERF page:
- Check or modify the landing configuration (e.g. **FOR LDG: FLAP LVR 2**)
- In the case of an in-flight failure that increases the VAPP, modify it

DEFERRED PROCEDURES

BACK

PF	PM
ORDER …….. "CHECK DEFERRED"	
	DEFRD pb (on ECP) …….. PRESS 
	Pending Deferred procedure(s) title(s) …….. READ
	
	REQUEST …….. "ACTIVATE (Name of the procedure)?"
ORDER …….. "ACTIVATE"	
	ACCORDING DEFERRED PROCEDURE …….. ACTIVATE

Now apply the tasksharing for abnormal operations:

FLY THE AIRCRAFT	MONITOR: FLIGHT PATH / NAVIGATION
NAVIGATE	
COMMUNICATE	
	ECAM ACTIONS …….. PERFORM
	REQUEST …….. "CLEAR DEFERRED?"
ECAM ACTIONS PERFORMED …….. CHECK	
CONFIRM …….. "CLEAR DEFERRED"	CLR pb …….. PRESS 
	or ticks the CLEAR action line of the ECAM procedure
	
	ANNOUNCE…"DEFERRED PROCEDURE COMPLETED"

Proceed as per ECAM Sensed Procedure ("When the STATUS page appears")

ORDER …… ECAM ACTIONS

BACK

NOTE:

When the ECAM displays several failures,
the PF calls out "ECAM ACTIONS" for the first ECAM only.

WHEN TO STOP ECAM ACTIONS?

The flight crew may stop the ECAM actions when they need to perform actions which require acknowledgement, check or crosscheck from both flight crewmembers (e.g. communication to ATC, request of configuration change, baro metric setting).

PF: “STOP ECAM”

...

PF: “CONTINUE ECAM”

Then, they should continue with ECAM actions.

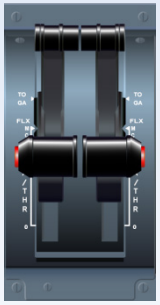
ACTIONS TO BE CONFIRMED BY BOTH PILOTS

BACK

In flight, the PF and PM must crosscheck before any action on guarded controls, ENG MASTER levers, IR MODE selectors, computer reset or thrust levers. This doesn't apply when on ground.

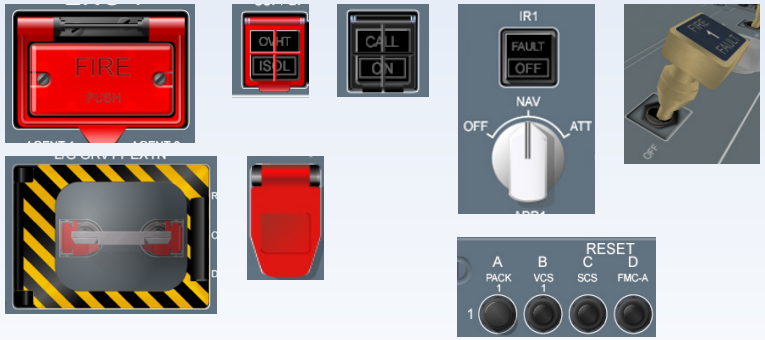
PF actions with PM confirmation:

Any action on the thrust levers



PM actions with PF confirmation:

All guarded controls, IR MODE selectors, ENG MASTER levers, RESET/POWER SUPPLY buttons



ENG 1 FAIL
-ENG MASTER 1 . . . . . .OFF

PF	PM
	READ ON ECAM..... " ENGINE MASTER 1 OFF "
	Indicates the related control:
RELATED CONTROL.....VERIFY	REQUEST......" CONFIRM ? "
ANSWER..... " CONFIRMED "	
	ACTION.....PERFORM

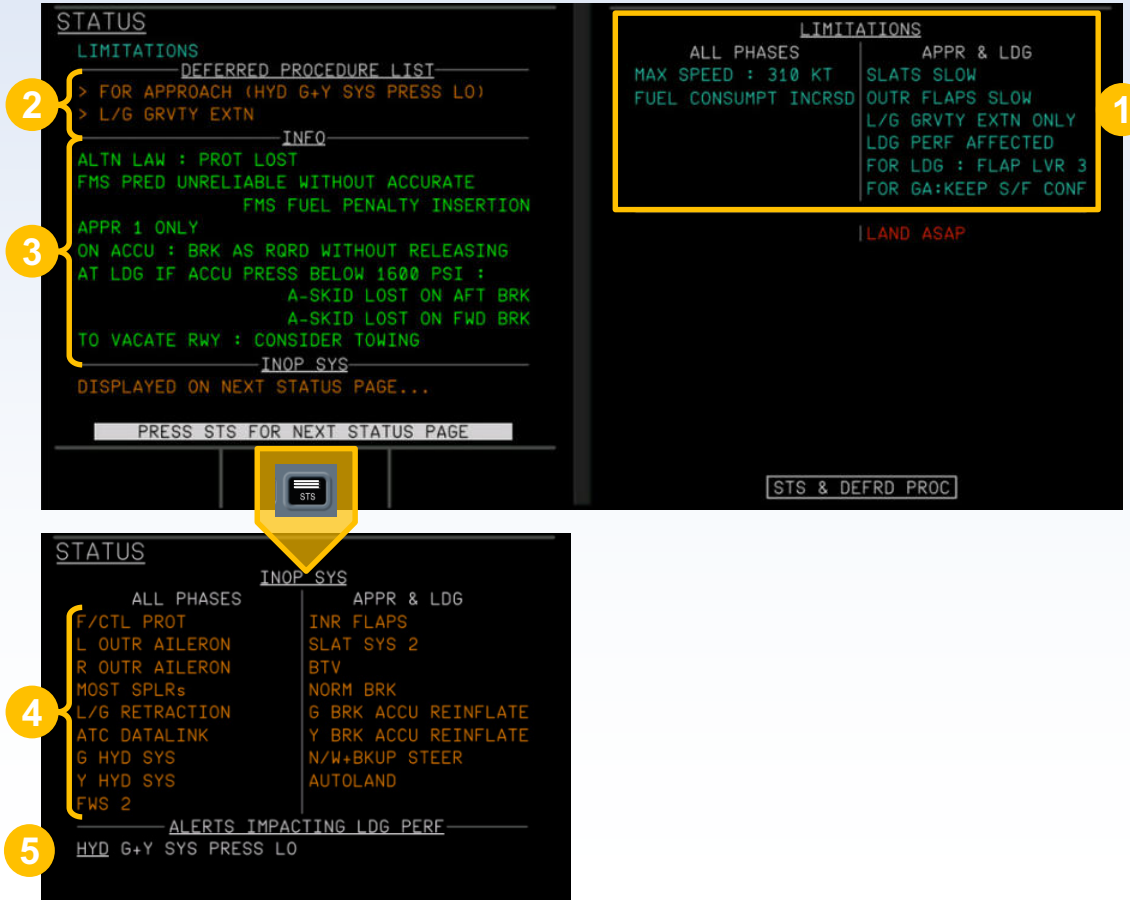
STATUS … READ

BACK

The purpose of the STATUS page is to provide an overview of the technical status of the aircraft in all flight phases.
Therefore, it is important to check the whole STATUS page information,
in order to correctly assess the situation and subsequently make appropriate decision.

1. Read the limitations: ALL PHASES and APPR & LDG
2. Preview of DEFERRED PROC LIST 


3. Read the INFO field
4. Read the INOP SYS: ALL PHASES and APPR & LDG
5. Read the ALERTS IMPACTING LDG PERF



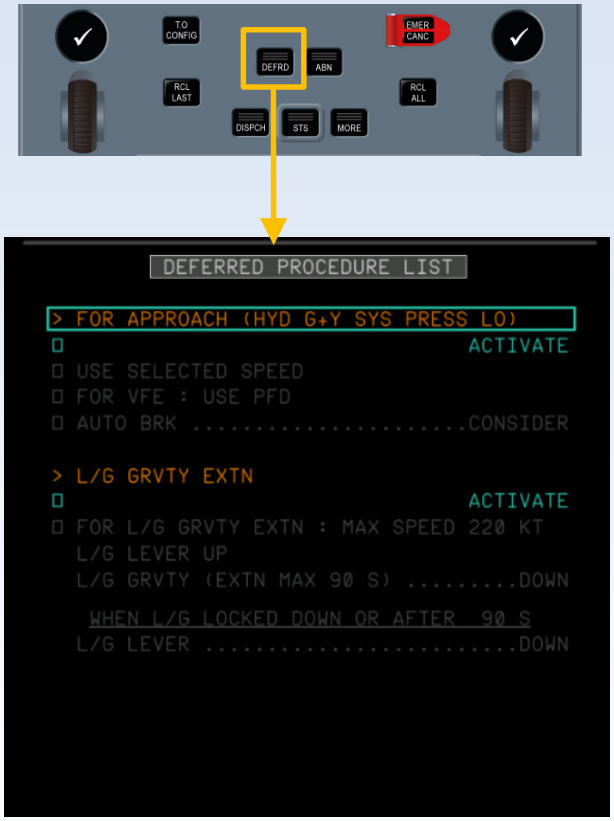
PREVIEW OF DEFERRED PROCEDURES LIST

BACK

2 Display the DEFERRED PROCEDURE LIST for a QUICK REVIEW ONLY to evaluate the workload for each flight phase.

DO NOT PERFORM THEM AT THAT TIME:
The DEFERRED PROCEDURES shall only be activated at the appropriate time.

Note: If there is no DEFERRED PROC for the given failure, the DEFERRED PROC field is not displayed in the STATUS page.



LAND ASAP AND LAND ANSA

BACK

LAND ASAP (LAND As Soon As Possible). Land as soon as possible at the nearest airport at which a safe landing can be made.

Note: LAND ASAP information refers to a time critical situation.

LAND ANSA (LAND At Nearest Suitable Airport). Consider landing at the nearest suitable airport.

Note: The suitability criteria should be defined in accordance with the Operator's policy.

AIRBUS

PF

PM

FUEL PENALTY FACTOR ..... CHECK

BACK

When an ECAM procedure displays:

FUEL CONSUMPT INCRSD

Refer to the FCOM > PERFORMANCE > IN-FLIGHT > FUEL PENALTY

ALERTS IMPACTING THE LANDING PERFORMANCE

BACK

LDG DIST AFFECTED + **ON DRY RWY ONLY: LDG DIST AFFECTED < 15%**

- Single failure – **No VAPP increase**
- **LD** computation **not necessary**.
- **IFLD < IFLD** WITH FAILURE **< FACTORED LD** WITHOUT FAILURE
- LD computation to only assess the stop margin

LDG DIST AFFECTED

- **LD penalty**
- **LD** computation is **required**

LDG PERF AFFECTED

- **VAPP increase + LD penalty**
- **LD and VAPP** computation is **required**

DEFERRED PROCEDURES

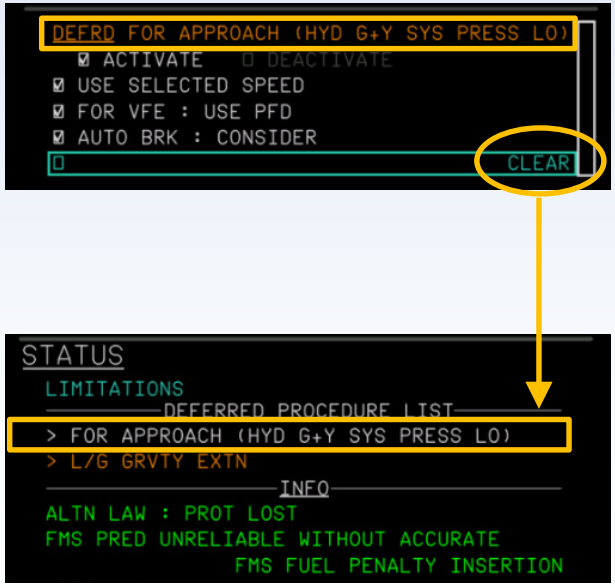
PF

PM

DEFERRED PROCEDURE COMPLETED

BACK

Once the deferred procedure is completed and cleared,
the STATUS page appears, and displays the title of the procedure in white.



ALL ENGINES FAILURE

ENG ALL ENGINES FAILURE

MAX GLIDING DIST (NO WIND):
- CLEAN : 2.5 NM / 1000 FT
- LDG CONG : 1.5 NM / 1000 FT

RAT: Automatic deployment
APU: Automatic start
ENG: Auto Relight in Progress
AP1/FD: Available when RAT is out
AP2: Available when APU avail
Alternate law: Protections lost

TIME PERMITS FOR FULL PROCEDURE?

NO

TYPE OF LDG ANTICIPATED?

DITCHING

FORCED LANDING

YES

i

ALL ENGINES FAILURE

FULL PROCEDURE

BACK

GOLDEN RULE #1 — Fly, Navigate, Communicate
In that order, with the appropriate tasksharing.

ENG ALL ENGINES FAILURE

" ECAM ACTIONS "

ECAM, above FL 250:

Automatic relight only

FL 250

ECAM, below FL 250:

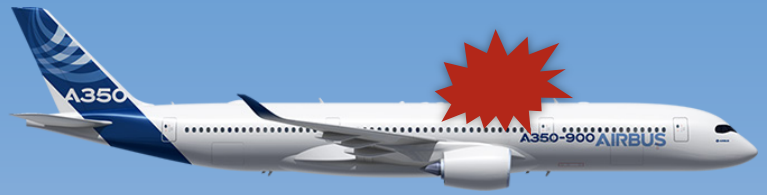
Automatic relight

Then, if not successful:
Manual windmilling relight

Then, if not successful:
Starter assisted relight

At any time, if one engine relight is successful, apply ENG 1(2) FAIL

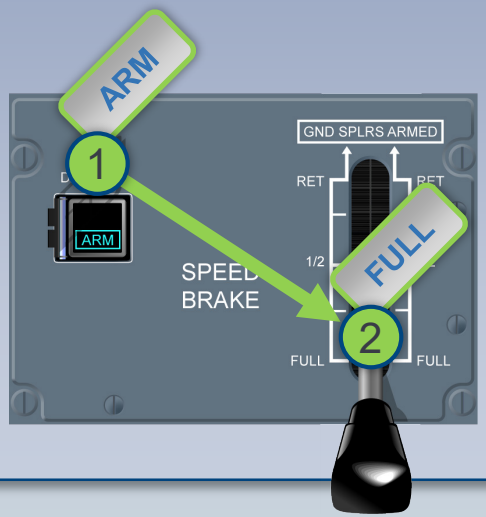
EMERGENCY DESCENT



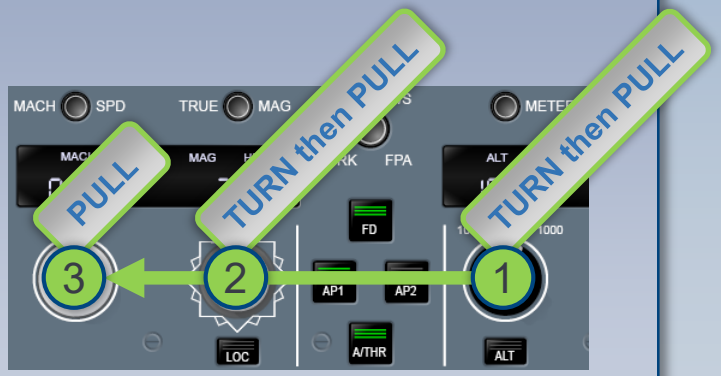
DECOMPRESSION

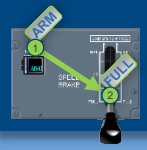
To initiate the emergency descent, two techniques are available, depending on system availability and PF's discretion:

Use of AUTO EMER DESCENT function



Use of Selected Guidance on AFS CP





EMERGENCY DESCENT – AUTO EMER DESCENT

BACK

MEMORY ITEM

1st STEP: MEMORY ITEMS

PROTECT

PROC FLOW

INIT DESCENT with Manual Engagement

PROC FLOW

2nd STEP: ECAM or ABN NOT SENSED PROC "EMER DESCENT"

PROC

REACHING FL100/MEA-MORA

PROC

DESCENT INITIATION with Automatic Engagement

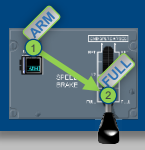
i

DECOMPRESSION

THR IDLE	EMER DES ALT	HDG		AP1 1FD2 A/THR

SPEED	ALT*	HDG

FL 100 / MEA - MORA



1ST STEP: PROTECT

BACK

PF | **MEMORY ITEM** | **PM**

" EMERGENCY DESCENT "

If pressure altitude is above 10 000 ft :

CREW OXY MASKS.....USE

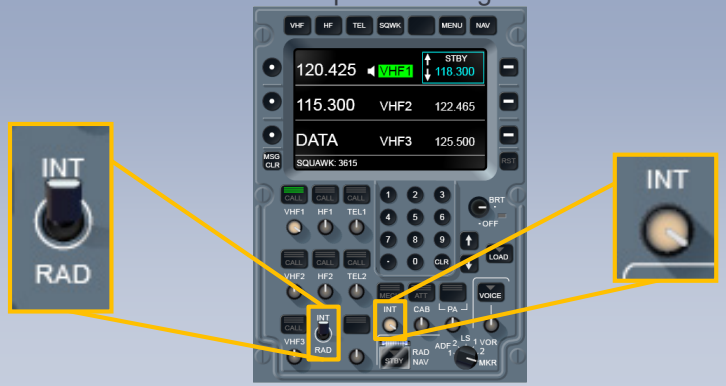
COMMUNICATION.....ESTABLISH

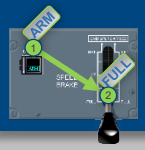
CREW OXY MASKS.....USE

COMMUNICATION.....ESTABLISH

SIGNS (ALL).....ON

Interphone setting:





1ST STEP: INITIATE DESCENT

BACK

PF | **MEMORY ITEM** | **PM**

EMER DESCENT ..... INITIATE

EMER DESCENT pb ..... ARM

SPEED BRAKES LEVER ..... FULL

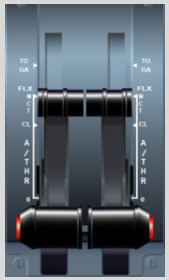
Note: Set the speed brakes lever to at least 1/3 position.

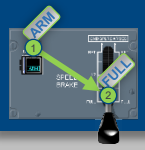
“ THRUST IDLE, EMER DESCENT, HEADING ”

“ CHECKED ”

If A/THR is not active:

ALL THR LEVERS.....IDLE





2ND STEP: PROCEDURE

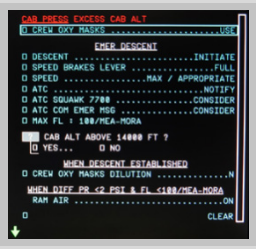
BACK

PF

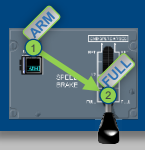
PM

The flight crew performs the ECAM actions when Memory Items are completed.

“ ECAM ACTIONS ”



Apply the Tasksharing for Abnormal Operations



PROCEDURE HIGHLIGHT

BACK

PF

PM

Caution: The following actions are not an extensive presentation of the ECAM CAB PRESS EXCESS CAB ALT but just highlights on some specific steps.

SPEED.....MAX / APPROPRIATE i

ATC.....NOTIFY i

ANNOUNCE (PA) .....“EMERGENCY DESCENT”

ATC SQUAWK.....7700

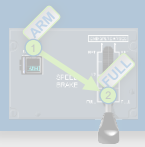
MAX FL.....FL100/MEA-MORA i

If CAB ALT above 14 000 ft:

PAX OXY MASK MAN ON.....PRESS i

When descent is established

CREW OXY MASKS DILUTION.....NORM i



2ND STEP: PROCEDURE

PF

PM

BACK

If no structural damaged suspected (Loud bang, high cabin V/S, airflow…) :

SPD knob ..... SET MMO/VMO

If structural damage confirmed or suspected (loud bang, high cabin V/S, air flow):

SPD/MACH pb ..... PRESS

PF

PM

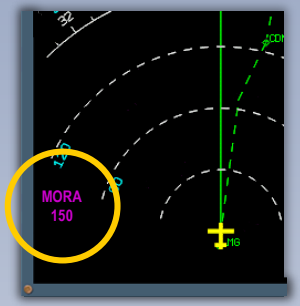
BACK

MAX FL.....FL100/MEA - MORA

MORA is displayed when:

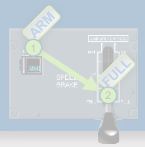
- *CSTR selected*
- *ND range is 40 nm or more.*

Caution: The MORA displayed on ND is the highest MORA within a radius of 40NM around the aircraft.



The AUTO EMER DESCENT function targets an altitude which is referred to as $MORA_{dISA/dP}$.

$MORA_{dISA/dP}$ is equivalent to MORA plus an envelop margin (between 3 000 and 6 000ft). This margin takes into account potential large deviation of temperature below standard and low atmospheric barometric pressure.



2ND STEP: PROCEDURE

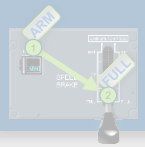
PF

PM

BACK

ATC……NOTIFY

- *Transmit the distress message* **"MAYDAY, MAYDAY, MAYDAY"** *on the current frequency.*
- *If no contact with ATC, use one of the appropriate frequencies.*



2ND STEP: PROCEDURE

PF

PM

BACK

PAX OXY MASKS …… MAN ON

- *The passenger oxygen masks drop automatically when the cabin altitude exceeds 14000 ft.*
- *This action confirms that the passenger oxygen masks are released.*

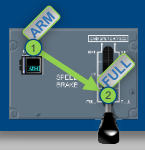
2ND STEP: PROCEDURE

PF

PM

BACK

- *To save oxygen, set the oxygen diluter selector to N position*



REACHING FL100 / MEA - MORA

BACK

PF

PM

*When **ALT***:*

SPEED BRAKE lever.....RETRACT i

SPD.....AS RQRD i

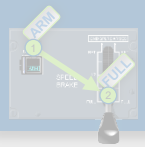
Once Oxy masks are removed:

OXY stowage masks compartment.....CLOSE

OXY control slide.....RESET

FURTHER DESCENT

- V/S target = - 500 ft/min (for passenger comfort)
- V/S max = **- 1000 ft/min**



REACHING FL100 / MEA - MORA

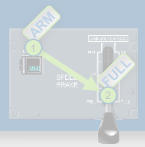
PF

PM

SPEED BRAKE lever

BACK

When the **EMER DES** *disengages, the speed brakes automatically return to the current speed brake lever position.*



REACHING FL100 / MEA - MORA

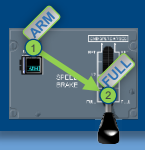
PF

PM

SPEED

BACK

When the EMER DES disengages, the aircraft automatically decelerates down to Green Dot speed computed with speed brakes extended (13 kt above Green Dot speed in clean configuration).

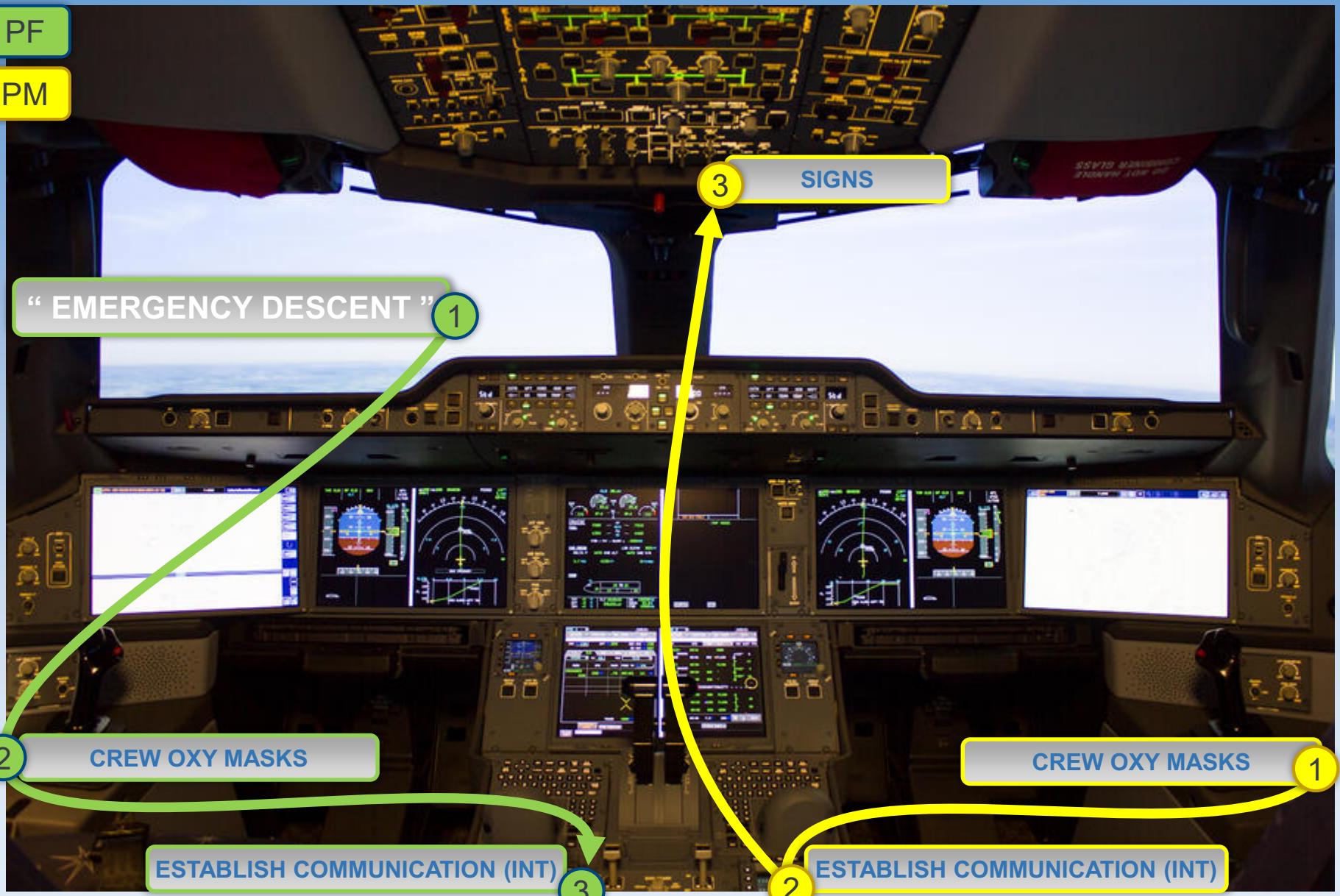


MEMORY ITEMS: PROTECT - FLOW

BACK

PF

PM



MEMORY ITEMS: INITIATE DESCENT - FLOW

BACK

PF

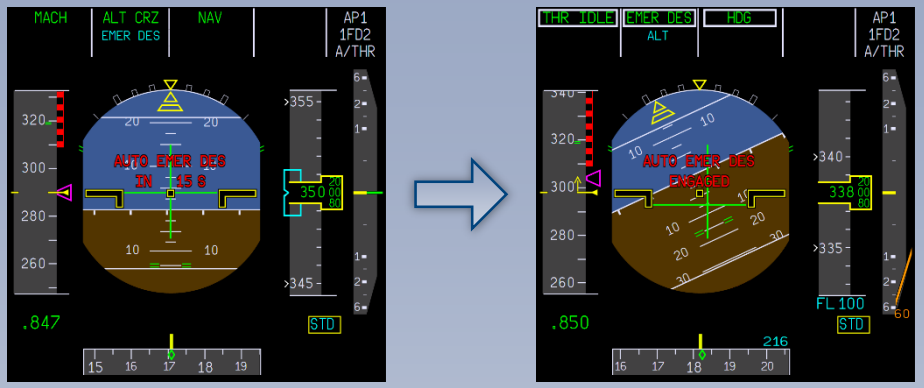
PM

EMERGENCY DESCENT – AUTO EMER DESCENT

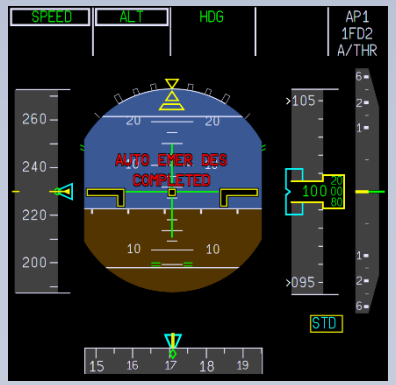
DESCENT INITIATION with Automatic Engagement

BACK

To cover a possible flight crew incapacitation situation, the AUTO EMER DESCENT function automatically engages at the end of the 15 seconds countdown.



At the end of the emergency descent, the function automatically retracts the speed brakes, decelerates down to Green Dot speed + 13 kts (with speed brake extended) and displays the AUTO EMER DES COMPLETED message on the PFD and HUD.



EMERGENCY DESCENT – SELECTED GUIDANCE

BACK

MEMORY ITEM

1st STEP: MEMORY ITEMS

PROTECT

PROC FLOW

INIT DESCENT

PROC FLOW

2nd STEP: ECAM or ABN NOT SENSED
PROC "EMER DESCENT"

PROC

REACHING
FL100/MEA-MORA

PROC

THR IDLE | OP DES / ALT | HDG

DECOMPRESSION

SPEED | ALT* | HDG

FL 100 / MEA - MORA

1ST STEP: PROTECT

BACK

PF | **MEMORY ITEM** | **PM**

" EMERGENCY DESCENT "

If pressure altitude is above 10 000 ft :

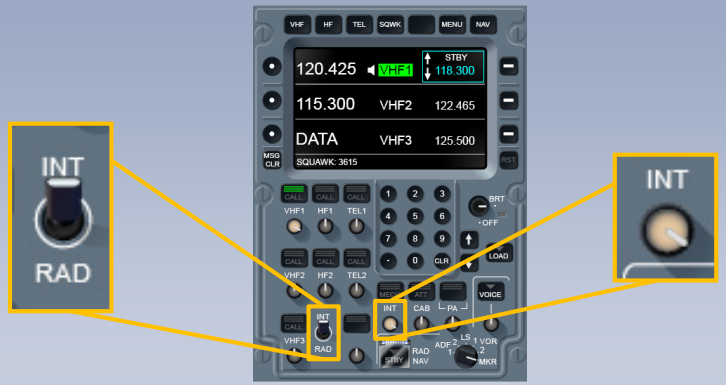
CREW OXY MASKS.....USE | **CREW OXY MASKS.....USE**

COMMUNICATION.....ESTABLISH | **COMMUNICATION.....ESTABLISH**

INT

SIGNS.....ON

Interphone setting:



1ST STEP: INITIATE DESCENT

BACK

PF | **MEMORY ITEM** | **PM**

EMER DESCENT ..... INITIATE

ALT knob.....TURN then PULL

Select a lower flight level to engage the Open Descent mode

HDG knob.....TURN then PULL

Leave the airway, away from obstacles…

ALT knob.....PULL

“ THRUST IDLE, OPEN DESCENT, HEADING ”

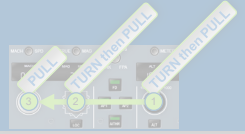
“ CHECKED ”

If A/THR is not active:

ALL THR LEVERS.....IDLE

When the aircraft correctly established in descent:

SPEED BRAKE lever.....FULL



1ST STEP: INITIATE DESCENT

PF

PM

AFS CP

BACK

ALT KNOB…… TURN then PULL

Action on the altitude knob-selector is TURN, then PULL.

If you PULL first, then TURN the altitude knob-selector, the aircraft will not descent.

1ST STEP: INITIATE DESCENT

PF

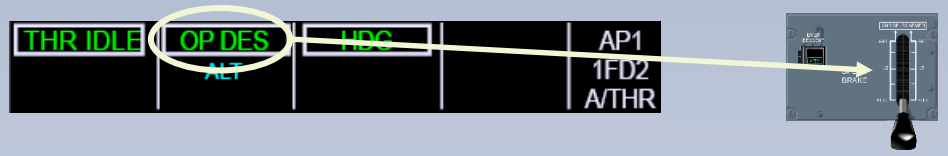
PM

FMA

BACK

- If structural damage: Maneuver with care.

- Insure aircraft is descending before extend speed brake



2ND STEP: PROCEDURE

BACK

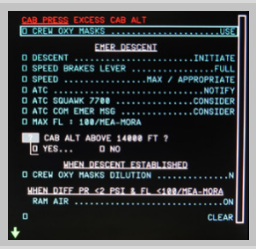
PF

PM

The flight crew performs the ECAM actions when Memory Items are completed.

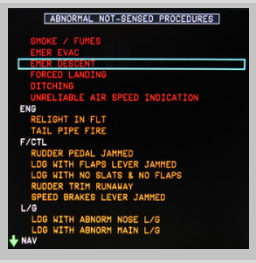
If an ECAM alert is displayed:

“ ECAM ACTIONS ”



If no ECAM alert is displayed:

“ EMERGENCY DESCENT NOT-SENSED PROCEDURE ”



Apply the Tasksharing for Abnormal Operations

PROCEDURE HIGHLIGHT

BACK

PF

PM

Caution: The following actions are not an extensive presentation of the ECAM / ABN Not sensed procedure EMER DESCENT but just highlights on some specific steps.

SPEED.....MAX / APPROPRIATE i

ATC.....NOTIFY i

ANNOUNCE (PA) .....“EMERGENCY DESCENT”

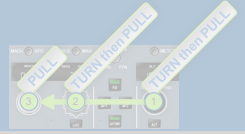
ATC SQUAWK.....7700

MAX FL.....FL100/MEA-MORA i

If CAB ALT above 14 000 ft:

PAX OXY MASK MAN ON.....PRESS i

CREW OXY MASKS DILUTION.....NORM i



2ND STEP: PROCEDURE

PF

PM

BACK

➢ *If no structural damaged suspected (Loud bang, high cabin V/S, airflow…) :*

SPD knob ..... SET MMO/VMO

If structural damage confirmed or suspected (loud bang, high cabin V/S, air flow):

SPD/MACH pb ..... PRESS

2ND STEP: PROCEDURE

PF

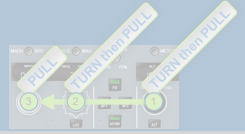
PM

BACK

MAX FL.....FL100/MEA-MORA

- *MORA is displayed when:*
  - *CSTR selected*
  - *ND range is 40 nm or more.*

Caution: The MORA displayed on ND is the highest MORA within a radius of 40NM around the aircraft.



2ND STEP: PROCEDURE

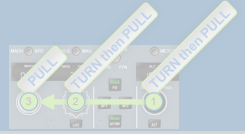
PF

PM

BACK

ATC……..NOTIFY

- *Transmit the distress message* **"MAYDAY, MAYDAY, MAYDAY"** *on the current frequency.*
- *If no contact with ATC, use one of the appropriate frequencies.*



2ND STEP: PROCEDURE

PF

PM

BACK

PAX OXY MASKS …… MAN ON

- *The passenger oxygen masks drop automatically when the cabin altitude exceeds 14000 ft.*
- *This action confirms that the passenger oxygen masks are released.*

2ND STEP: PROCEDURE

PF

PM

BACK

- *To save oxygen, set the oxygen diluter selector to N position*

REACHING FL100 / MEA - MORA

BACK

PF

PM

*When **ALT***:*

SPEED BRAKE lever.....RETRACT

SPD.....AS RQRD

Once Oxy masks are removed:

OXY stowage masks compartment.....CLOSE

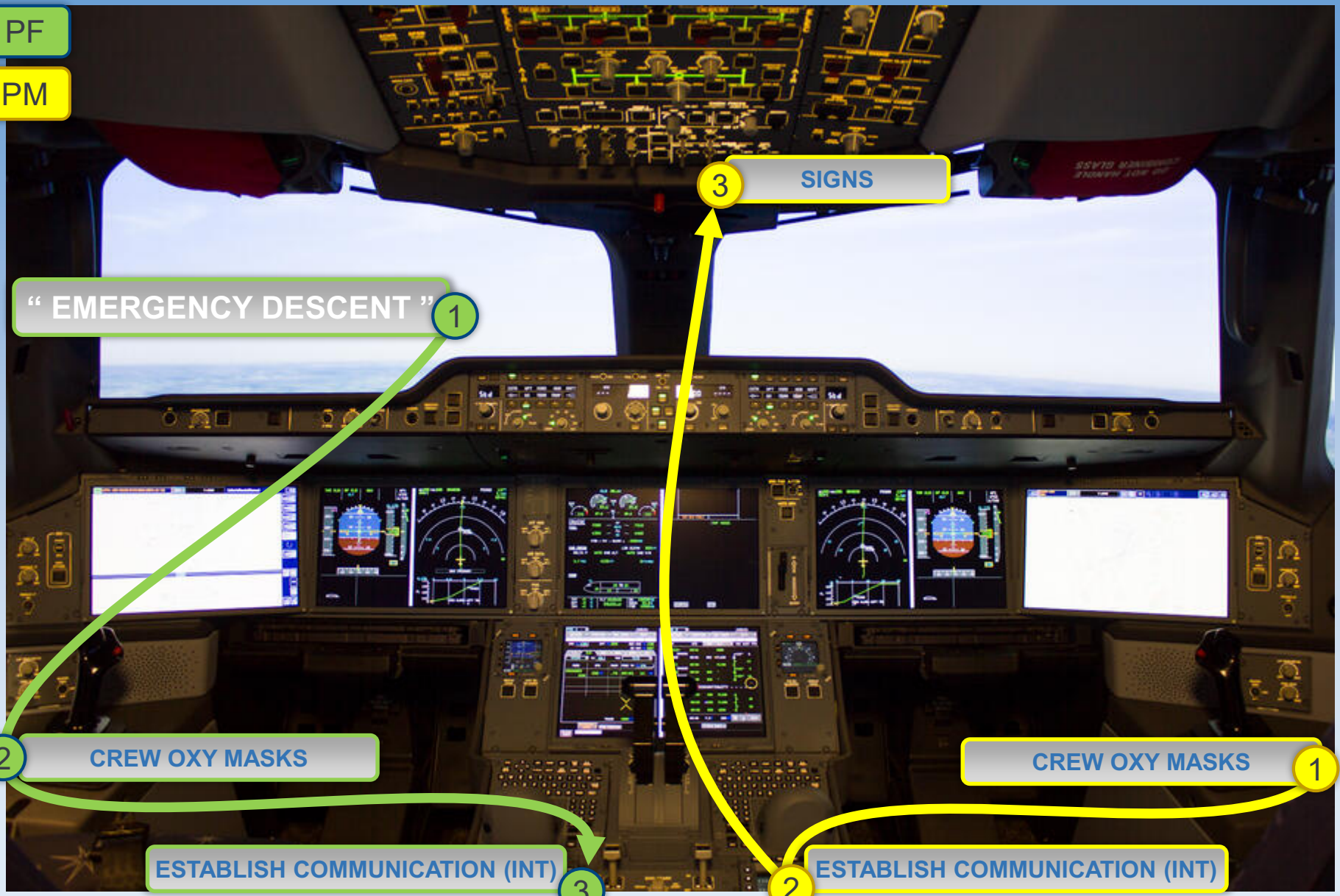
OXY control slide.....RESET

FURTHER DESCENT

- V/S target = - 500 ft/min (for passenger comfort)
- V/S max = **- 1000 ft/min**

MEMORY ITEMS: PROTECT - FLOW

BACK

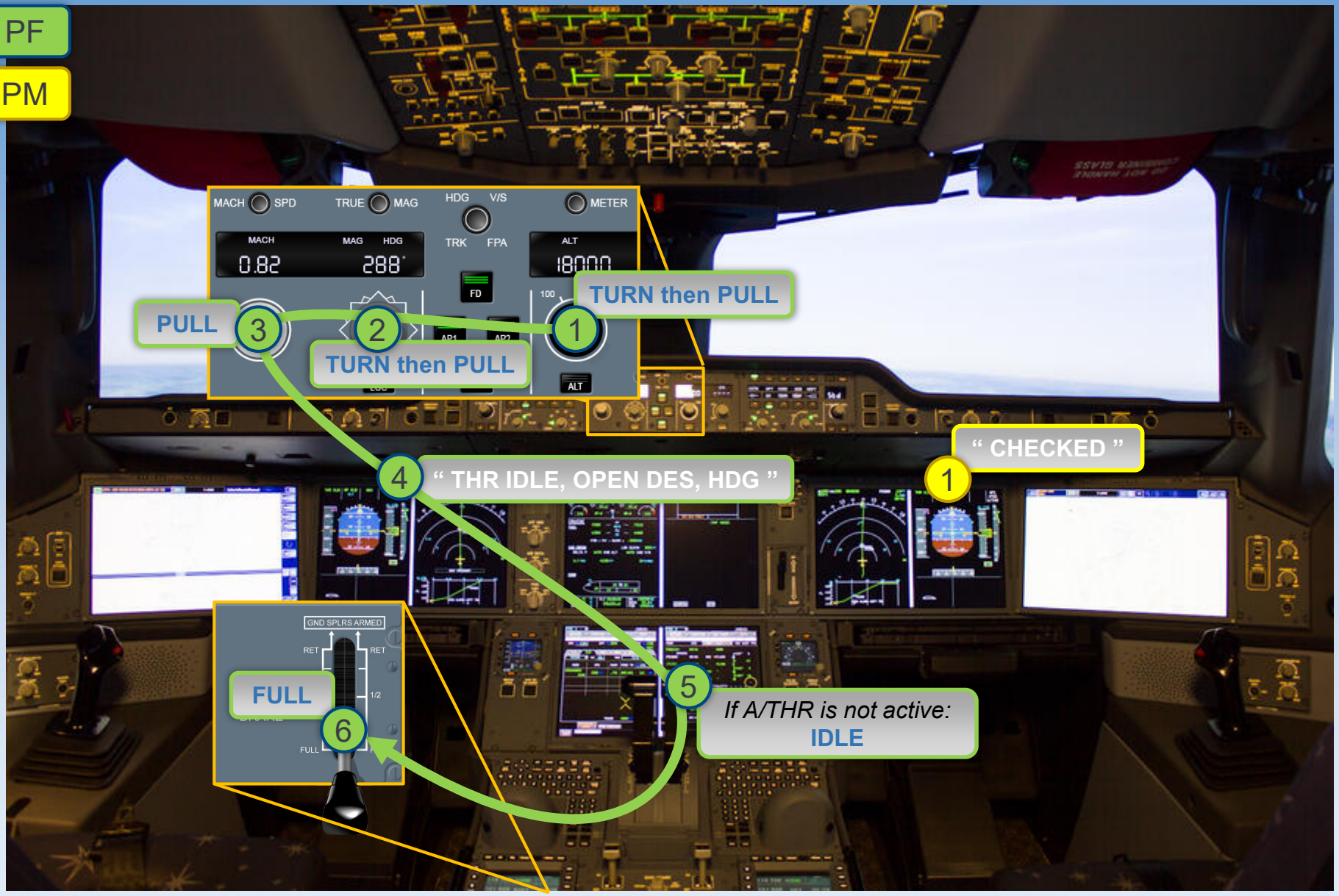


MEMORY ITEMS: INITIATE DESCENT - FLOW

BACK

PF

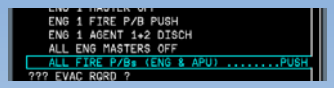
PM



EMERGENCY EVACUATION

There are three different ways to access to the Emergency Evacuation procedure.

The procedure is:



Included in
ECAM ACTIONS

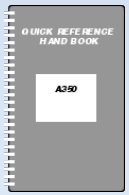
PROC

or,

In
ABN not-sensed procedure

PROC

or,



In
QRH paper procedure

PROC

INCLUDED IN ECAM ACTIONS

BACK

CAPT

F/O

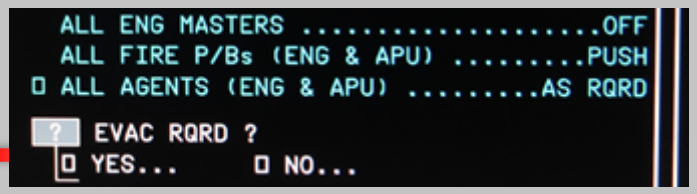
When the aircraft is stopped:

PA **" ATTENTION CREW AT STATIONS "**

" ECAM ACTIONS "

The Captain is building his decision.

ECAM ACTIONS.....PERFORM



Evacuation required?

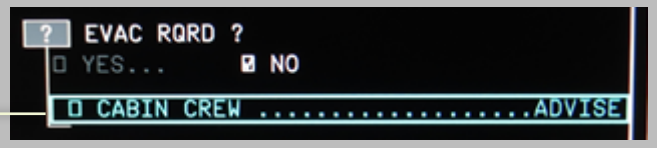
NO

YES

PA **" EVACUATE, EVACUATE, EVACUATE "**

ATC **ATC.....NOTIFY**

PA **" CABIN CREW AND PASSENGERS REMAIN SEATED "**



EMERGENCY EVACUATION – ABN NOT-SENSED PROCEDURE

BACK

CAPT

F/O

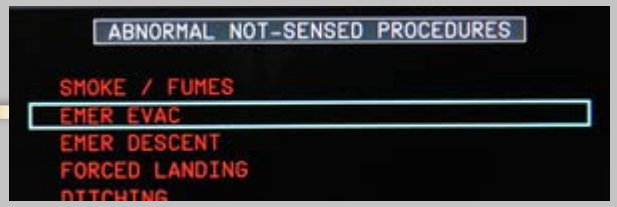
When the aircraft is stopped:

PA **“ ATTENTION CREW AT STATIONS ”**

“ EMERGENCY EVACUATION PROCEDURE ”

ABN

EMER EVAC PROC.....PERFORM



The Captain is building his decision.

Evacuation required?

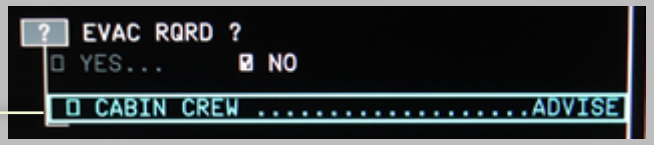
NO

YES

PA **“ EVACUATE, EVACUATE, EVACUATE ”**

ATC **ATC.....NOTIFY**

PA **“ CABIN CREW AND PASSENGERS REMAIN SEATED ”**



EMERGENCY EVACUATION - QRH PAPER PROCEDURE

BACK

CAPT

F/O

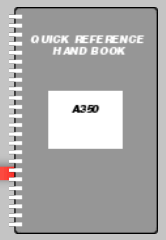
When the aircraft is stopped:

PA

“ ATTENTION CREW AT STATIONS ”

“ EMERGENCY EVACUATION PROCEDURE ”

EMER EVAC PROC.....PERFORM



The Captain is building his decision.

Evacuation required?

NO

YES

PA

“ EVACUATE, EVACUATE, EVACUATE ”

ATC

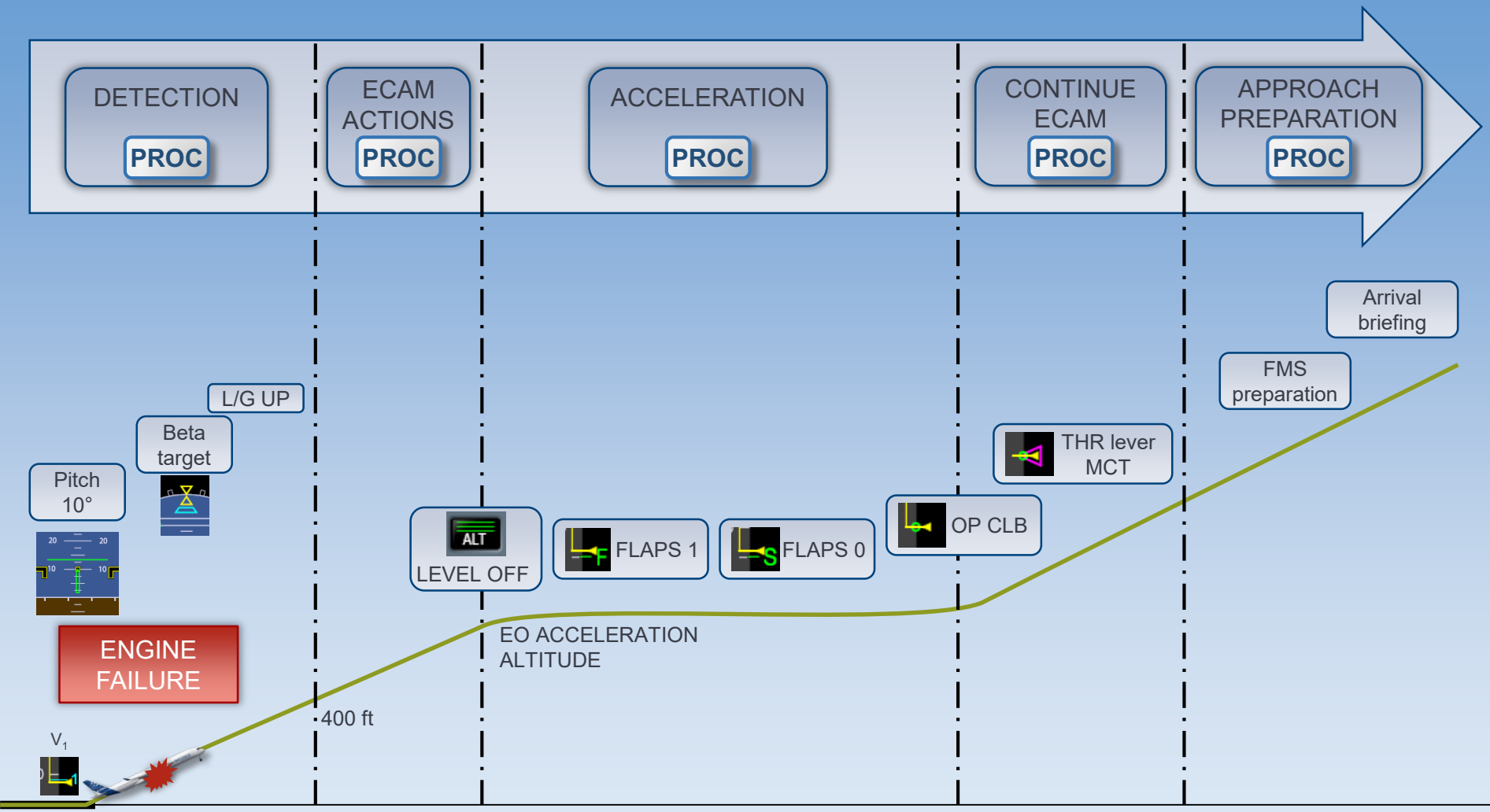
ATC.....NOTIFY

PA

“ CABIN CREW AND PASSENGERS REMAIN SEATED ”

Note: when all batteries are off, public announce and cabin communication are available via cockpit handset only.

ENGINE FAILURE AFTER V1



DETECTION

BACK

PF **PM**

ENG 2 FAIL

GOLDEN RULE #1 — Fly, Navigate, Communicate
In that order, with the appropriate tasksharing.

FLY

- *Pitch 10°, then follow FD bars*
- *Consider TOGA*
- *Gear UP*
- *Beta target*
- *Consider automation*

No READ & DO actions until the aircraft reaches a minimum of **400 ft AGL**.

NAVIGATE

LAND ANSA

If applicable, consider EO SID.

COMMUNICATE

ATC **PAN PAN** *or* **MAYDAY** *message*

PF

PM

THRUST MANAGEMENT

BACK

- TOGA thrust can be selected at pilot's discretion, keeping in mind that TOGA requires more rudder input
- T.O thrust (TOGA or FLEX) must be kept until reaching GREEN DOT 
- T.O thrust is limited to **10 minutes** with one engine out.

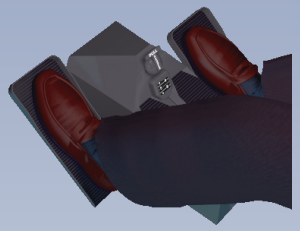
DETECTION

PF

PM

BETA TARGET AND RUDDER TRIM

BACK



When centered:
Trim the aircraft

The RUD TRIM indication appears on the PFD as soon as the engine failure is detected

ECAM ACTIONS

BACK

PF

PM

Once the PF has stabilized the flight path, and above 400 ft AGL:

“ ECAM ACTIONS ”

ECAM ACTIONS.....PERFORM

ECAM actions can be stopped at any time on PF request for trajectory, configuration, etc...

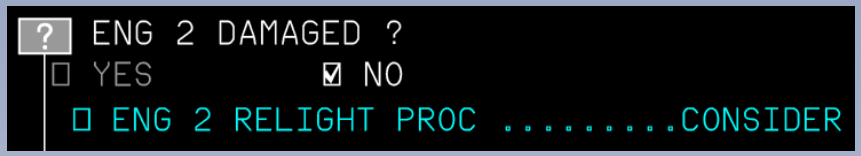
DAMAGE OR NO DAMAGE ?

DAMAGE

- High vibration prior to flame out
- Loud noise, explosion
- Repeated and uncontrollable engine stalls
- Abnormal engine indications on ECAM (such as N1, N2 or N3 ~ 0)
- Damage visually detected by the crew.

No Attempt of Relight

NO DAMAGE



The crew may decide to attempt an engine relight in flight at this step, but **it is recommended** to:

- Perform all ECAM actions and
- Consider engine relight when reaching the STATUS page.

ACCELERATION

BACK

PF | **PM**

Before EO ACC ALT:

“ STOP ECAM ”

i ECAM ACTIONS.....STOP

Engine secured and above EO ACC ALT:

ALT pb on AFS CP.....PRESS 

“ ALT ”

“ CHECKED ”

Retract SLAT/FLAPS as usual.

At FLAPS 0 and green dot speed:

ALT knob.....PULL

THRUST lever.....MCT **i**

“ THR MCT, OP CLB, A/THR”

“ CHECKED ”

SECURE THE ENGINE

BACK

The flight crew should delay the acceleration until the **engine is secured**. However, the acceleration must be performed within 10 minutes of takeoff.

An engine (e.g. ENGINE 2) is considered as secured when:

- ENG 2 MASTER is OFF, for an engine failure **without** damage

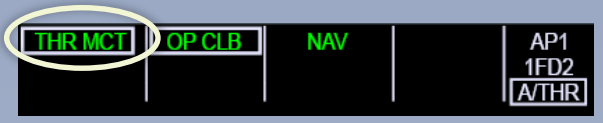
- ENG 2 AGENT 1 is discharged, for an engine failure **with** damage

- ENG 2 AGENT 2 is discharged or fire extinguished, for an engine fire

ACCELERATION

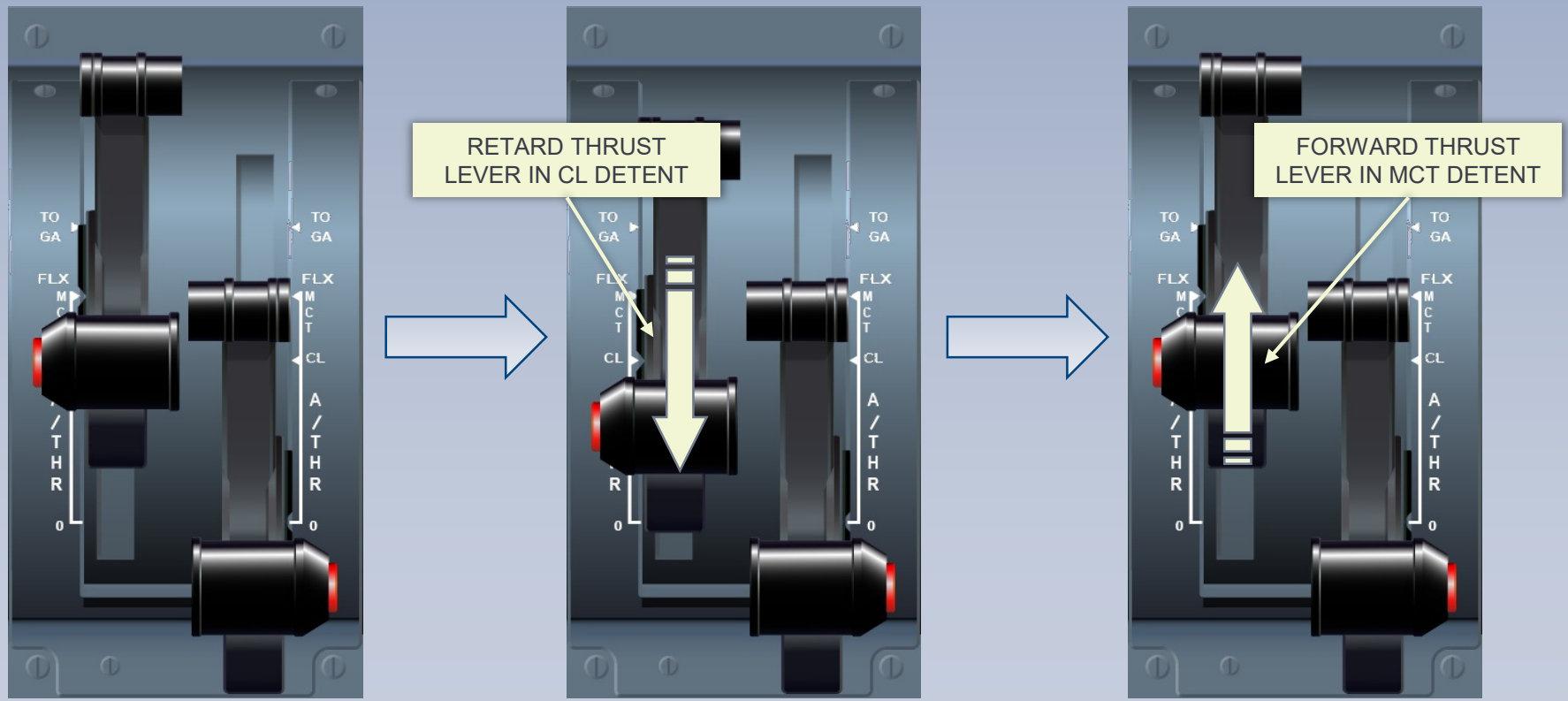
IF TAKEOFF IN FLEX

BACK



Retard thrust lever in CL detent

Forward thrust lever in MCT detent



CONTINUE ECAM

BACK

PF

PM

“ CONTINUE ECAM ”

ECAM ACTIONS.....CONTINUE

Before reading STATUS page, consider:

- ACCELERATION flow pattern

APPROACH PREPARATION

BACK

PF

PM

FMS.....PREPARE

ARRIVAL BRIEFING .....PERFORM

FMS preparation:
Standard (Consider diversion)

Arrival briefing:
Consider overweight landing

Note: No SOFT GO AROUND in the case of one engine inoperative (Set TOGA)

ENGINE FAILURE IN CRUISE

AIRBUS

Detection and Initial Actions

PROC

Strategy? i

Obstacle Strategy

PROC

Standard Strategy

PROC

ECAM Actions

Flight Continuation:

•LRC

•ECON

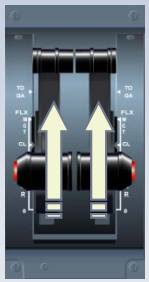
i

ENGINE FAILURE

Deceleration to green dot

OBSTACLE STRATEGY

THR levers MCT



A/THR OFF

ATC

M.85/300KT

OP DES

ALT CRZ

STANDARD STRATEGY

EO MAX FL

Engine Failure below EO MAX FL i

ENG FAILURE IN CRUISE

ENG FAILURE BELOW EO MAX FL

BACK

If the engine failure occurs **below** EO MAX FL, keep A/THR **ON**.

DETECTION

BACK

PF **PM**

GOLDEN RULE #1	**Fly, Navigate, Communicate** In that order, with the appropriate tasksharing.
GOLDEN RULE #2	**Use the appropriate level of automation at all times.**

FLY

Consider keeping automation.

THRUST levers……MCT

A/THR……OFF

Set A/THR to OFF in order to freeze MCT

NAVIGATE

LAND ANSA
LAND ASAP

If appropriate to leave the airway:

STRATEGY……DETERMINE i **STRATEGY……DETERMINE**

COMMUNICATE

ATC **PAN PAN** *or* **MAYDAY** *message*

STRATEGY?

BACK

STANDARD Strategy:

M0.85 / 300 kt is selected as the descent speed.

The EO MAX FL (=LRC with ANTI-ICE off) is displayed on the MFD ACTIVE/PERF page and should be set on the AFS CP.

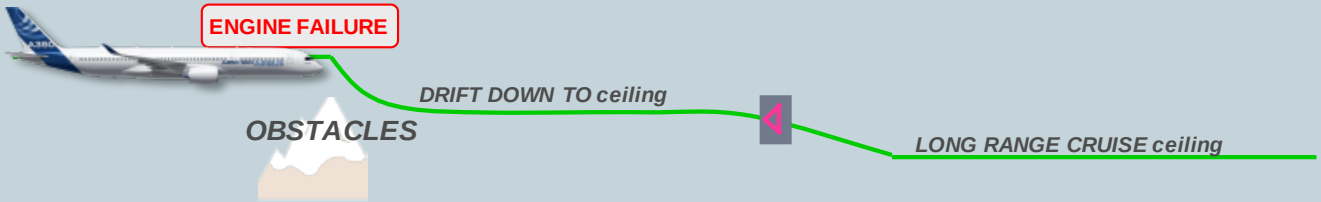
When V/S becomes less than 500 ft/min in descent, select V/S –500 ft/min and A/THR on.

Once established at EO MAX FL, the EO LRC speed may be flown in managed mode.

Note: *The EO LRC speed is computed with CI=30*
The EO ECON speed is computed with the all engines operative CI
The EO ECON speed exceeds the EO LRC speed and may be flown at a lower FL if fuel permits.

STRATEGY? Decision

OBSTACLE Strategy:



To maintain the highest possible level due to terrain, the drift down procedure must be adopted.

The procedure is similar to the standard strategy, but as the speed target is now green dot, the rate of descent is lower.

The MFD ACTIVE/PERF/CRZ page in EO condition displays the DRIFT DOWN TO ceiling. The green dot speed must be flown in managed mode.

When clear of obstacles, **revert to STANDARD strategy**.

Note: *The EO ECON speed may be flown at a lower FL if fuel permits.*

STANDARD STRATEGY

BACK

PF

PM

As appropriate,

HDG.....SET AND PULL

- **To keep clear of the airway**
- **Towards an alternate**

In accordance with the strategy:

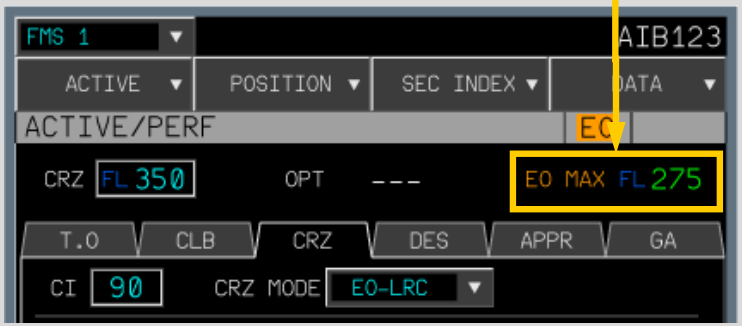
SPEED.....SET M0.85 / 300 kt AND PULL

Extracted from ACTIVE/PERF/CRZ page

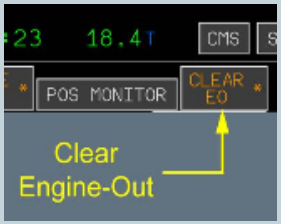
ALT.....SET AND PULL

- **Standard.....EO MAX FL (LRC ceiling)**

EO MAX FL = LRC ceiling



- Clearing EO CLR prompt on the FMS page restores predictions and performances for ALL ENGINES OPERATIVE
- Once selected: Reverting to ONE ENGINE-OUT conditions is not possible.



OBSTACLE STRATEGY

BACK

PF

As appropriate,

HDG.....SET AND PULL

- To keep clear of the airway
- Towards an alternate

In accordance with the strategy:

SPEED.....KEEP MANAGED SPEED

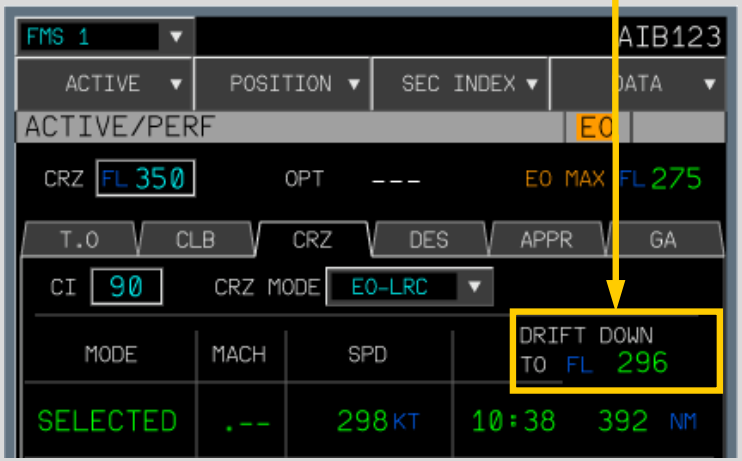
Extracted from ACTIVE/PERF/CRZ page

ALT.....SET AND PULL

- Obstacle.....DRIFT DOWN TO ceiling

PM

DRIFT DOWN TO ceiling



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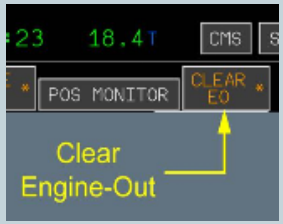


FLIGHT CONTINUATION

BACK

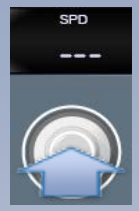
SPEED STRATEGY

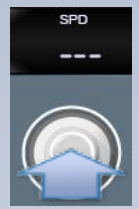
PERF/CRZ

EO-ECON

EO-LRC

EO-ECON





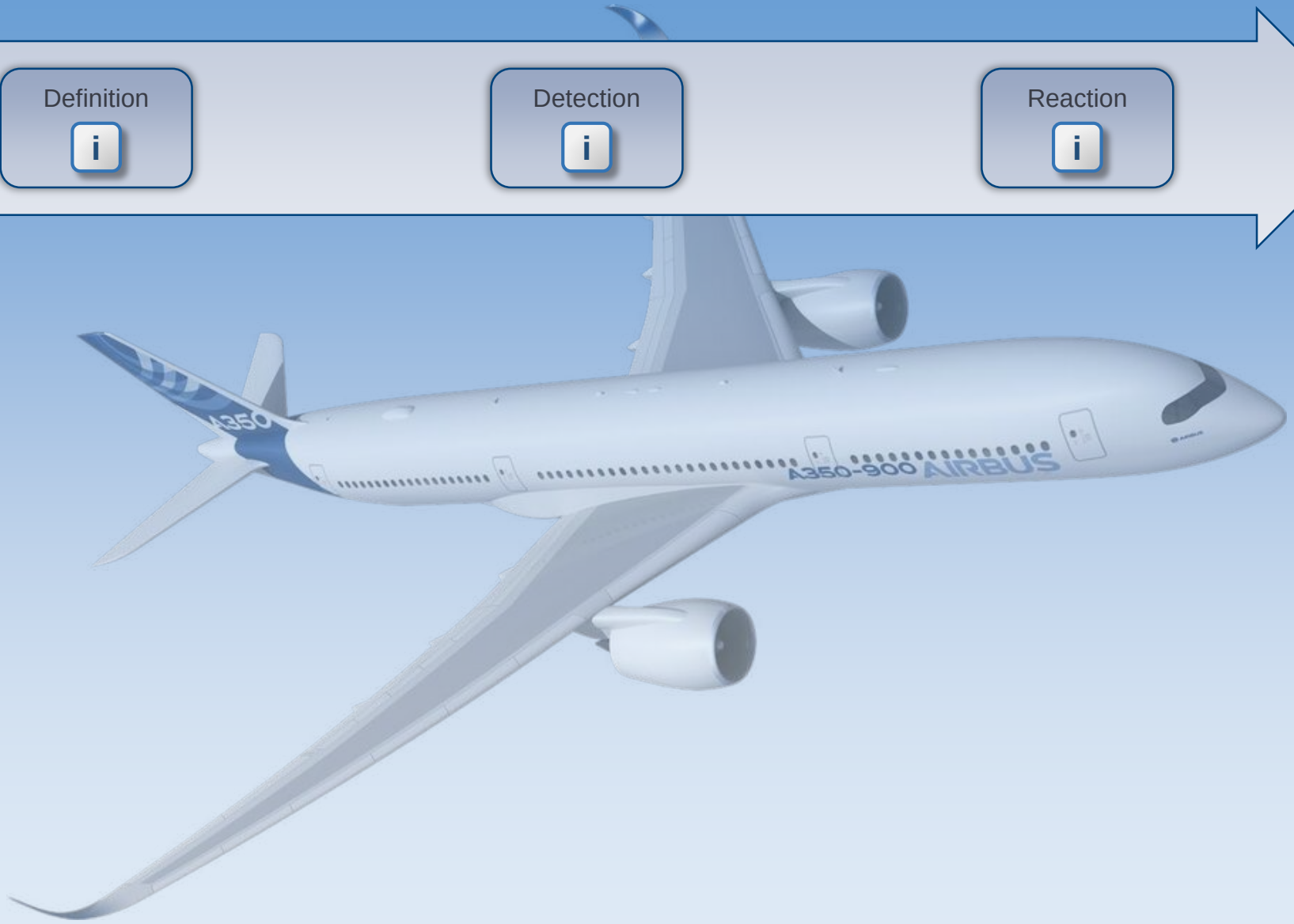
FLIGHT CREW INCAPACITATION

AIRBUS

Definition

Detection

Reaction



DEFINITION

BACK

“Any condition which affects the health of a crew member during the performance of duties which renders him incapable of performing the assigned duties.”

- It occurs **more frequently than many of the other emergencies**, which are the subject of routine training.

- It occurs in **all age groups** and during **all phases** of flight.

DETECTION

BACK

- Incapacitation can occur in many forms, from subtle partial loss of function to obvious loss of consciousness or sudden death.

- Symptoms for early detection of the incapacitation:

  - No standard callouts, particularly during critical flight phases
  - High number of clues of “subtle incapacitation” (e.g. no appropriate response to a verbal communication)
  - Incoherent speech
  - Strange behavior
  - Irregular breathing
  - Pale and fixed facial expression
  - Jerky motions, either delayed or too rapid.

REACTION 1/2

NEXT BACK

The fit pilot must :

- ❑ Take over and ensure a safe flight path:
  - Announce “I HAVE CONTROL”,
  - If the incapacitated flight crewmember interferes with aircraft handling, press and keep pressed the sidestick pushbutton for at least 40 seconds: i
  - Keep or engage AP as required,
  - Perform callout and checklist aloud,
- ❑ Declare an Emergency to ATC: ATC “ MAYDAY, MAYDAY, MAYDAY ”
- ❑ Take any steps possible to contain the incapacitated flight crewmember. These steps may involve cabin crew: PA “ATTENTION, PURSER TO COCKPIT PLEASE”

REACTION 2/2

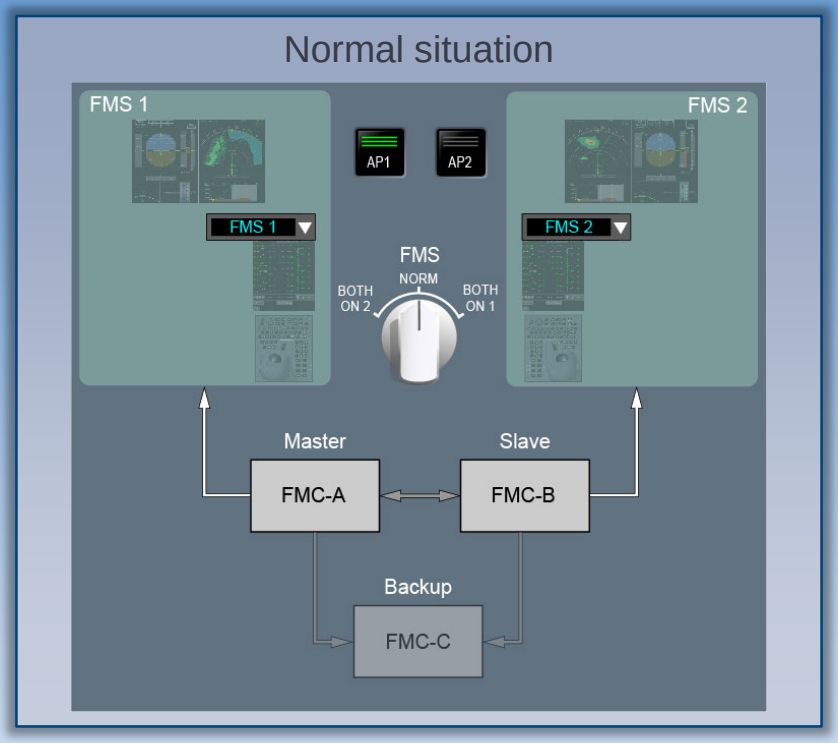
The fit pilot must :

- Consider:
  - Early approach preparation and checklist reading,
  - Automatic landing,
  - Use of radar vectoring and long approach.
- Land At the Nearest Suitable Airport (LAND ANSA).
- Arrange medical assistance onboard and after landing (e.g.: request assistance from any medically qualified passenger).

REACTION

BACK

FMS FAILURE



If 1 FMC failed:

No impact on FMS 1 or 2

If 2 FMCs failed:

AUTO FLT FMS 1(2) FAULT

AUTO FLT FMS 1 FAULT i

If all FMCs failed:

AUTO FLT FMS 1+2 FAULT

AUTO FLT FMS 1+2 FAULT i

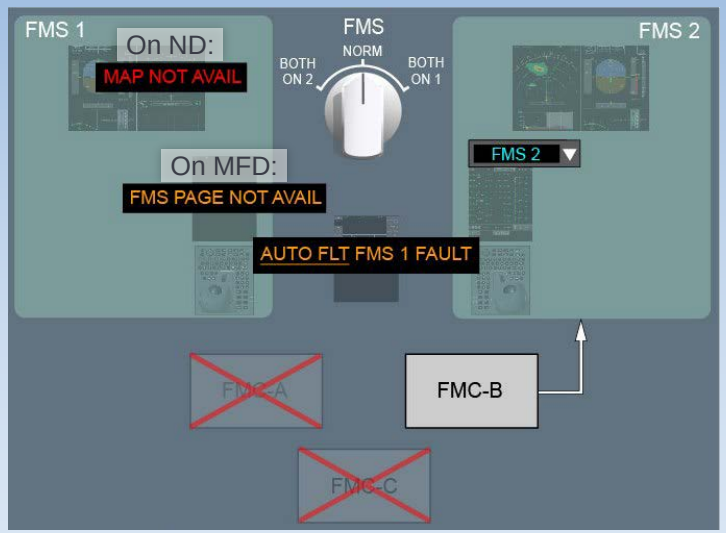
AUTO FLT FMS 1 FAULT

BACK

AUTO FLT FMS 1 FAULT

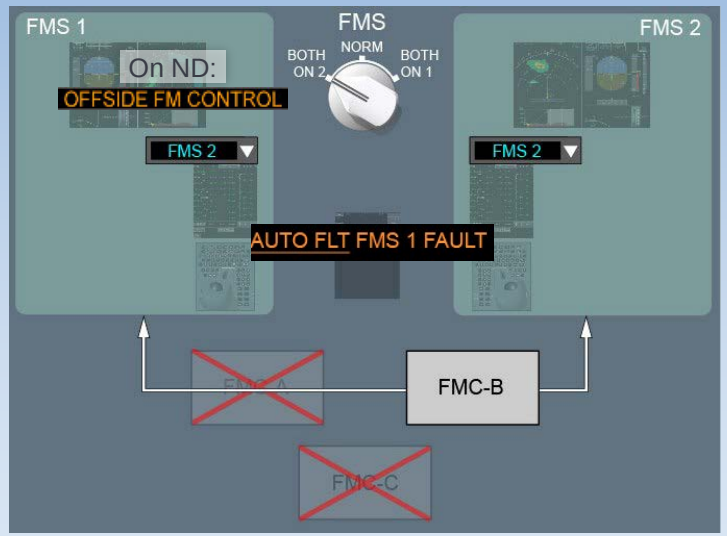
Both APs and the A/THR remain available.

FMS 1 is failed



BOTH ON 2

FMC-B controls FMS 1 and FMS 2



EFIS CP

AUTO FLT FMS 1 FAULT

EFIS CP

BACK

In case of FMS 1(2) fault, most functions of the CAPT(F/O) EFIS CP are lost.

AUTO FLT FMS 1+2 FAULT

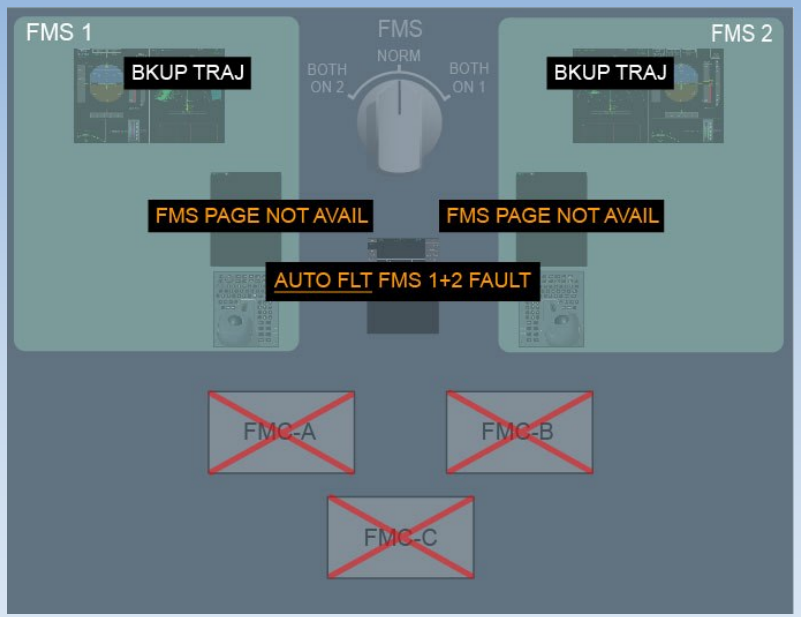
BACK

AUTO FLT FMS 1+2 FAULT

Both APs and the A/THR remain available.

However, the AP reverts to **HDG** / **V/S** (**TRK** / **FPA**).

FMS 1 and FMS 2 are failed



ISIS SND is available.

Use the STBY RAD NAV on the RMP to manually tune the NAVAIDS.

EFIS CP
and
BACKUP TRAJ

AUTO FLT FMS 1+2 FAULT

BACK

EFIS CP

In case of FMS 1+2 fault, most functions of both EFIS CP are lost.

CAPT EFIS CP

F/O EFIS CP

BACKUP TRAJ

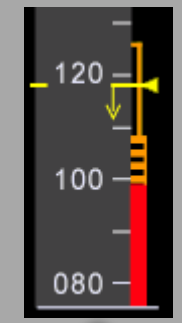
LOW ENERGY AURAL ALERT

PF

PM

“ SPEED SPEED SPEED ”

(NO ECAM MESSAGE)



THRUST……INCREASE

PITCH ATTITUDE……ADJUST, AS RQRD

Alert Availability and Triggering

ALERT AVAILABILITY AND TRIGGERING

BACK

ALERT AVAILABILITY

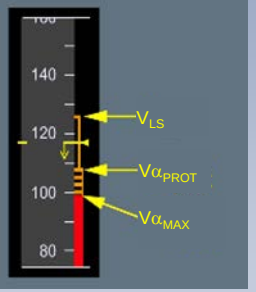
The low energy aural alert is available:

- In manual flight:
  - In all flight control laws
  - In CONF 2, 3 and FULL
  - Between 200 ft and 2 500 ft RA for takeoff, or between 2 500 ft and 100 ft RA for landing.
- If the autopilot is engaged (normal or alternate law), whatever the aircraft altitude and slat/flaps position.

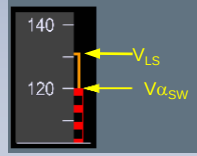
Note: If the slats or flaps are jammed, the low energy aural alert is available when the aircraft is not in clean configuration.

ALERT TRIGGERING CONDITIONS

NORMAL LAW



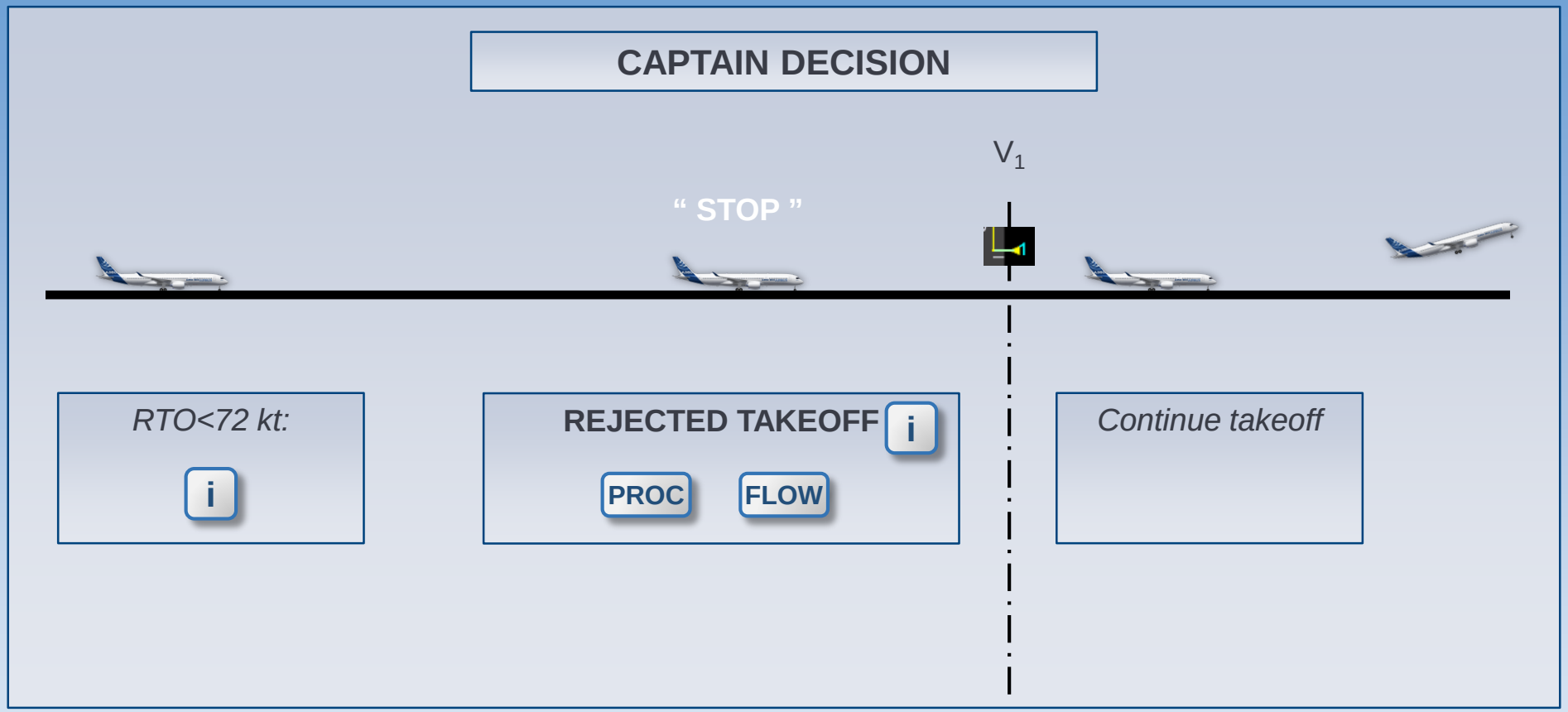
ALTN LAW
DIRECT LAW



The low energy aural alert is triggered:

- Between V_{LS} and $V\alpha_{PROT}$ in normal law
- Between V_{LS} and V_{SW} in alternate and direct law.

REJECTED TAKEOFF



REJECTED TAKEOFF

RTO below 72 kt

BACK

In the case of a RTO below 72 kt:

- No ground spoilers deployment
- No autobrake activation.

Use manual braking.
Use nosewheel steering and differential braking if needed.

REJECTED TAKEOFF

BACK

DECISION MANAGEMENT

The ECAM inhibits some alerts, in order to enable the flight crew to focus on their takeoff tasks.

T.O INHIBIT

Therefore, any Master Warning or Master Caution during this period **must** be considered as significant.

Note: any non-ECAM event (Tire burst, bird hazard, …):

- *Below 100 kt: reject the takeoff,*
- *Above 100 kt: consider continue takeoff (GO-MINDED).*

REJECTED TAKEOFF - PROC

BACK

PF | **PM**

CAPTAIN DECISION:
“ STOP ”
The CAPTAIN is now PF.

Simultaneously:

ALL THRUST LEVERS.....IDLE

REVERSE THRUST.....MAX AVAIL

“ REVERSE GREEN ”
“ DECEL ”

ANY AUDIO CAUTION OR WARNING....CANCEL

When the aircraft stopped:

REVERSE.....STOWED

PARKING BRAKE.....SET

PA **“ ATTENTION CREW AT STATIONS”**

ATC **“ AIRBUS 101 STOPPING ”**

If required, consider:

ECAM ACTIONS

EVACUATION PROCEDURE

REJECTED TAKEOFF - FLOW

BACK

RUNWAY OVERRUN WARNING (ROW)
RUNWAY OVERRUN PROTECTION (ROP)

AIRBUS

Descent Preparation

PREDICTIVE ROW

SOP

In flight

REACTIVE ROW

PROC

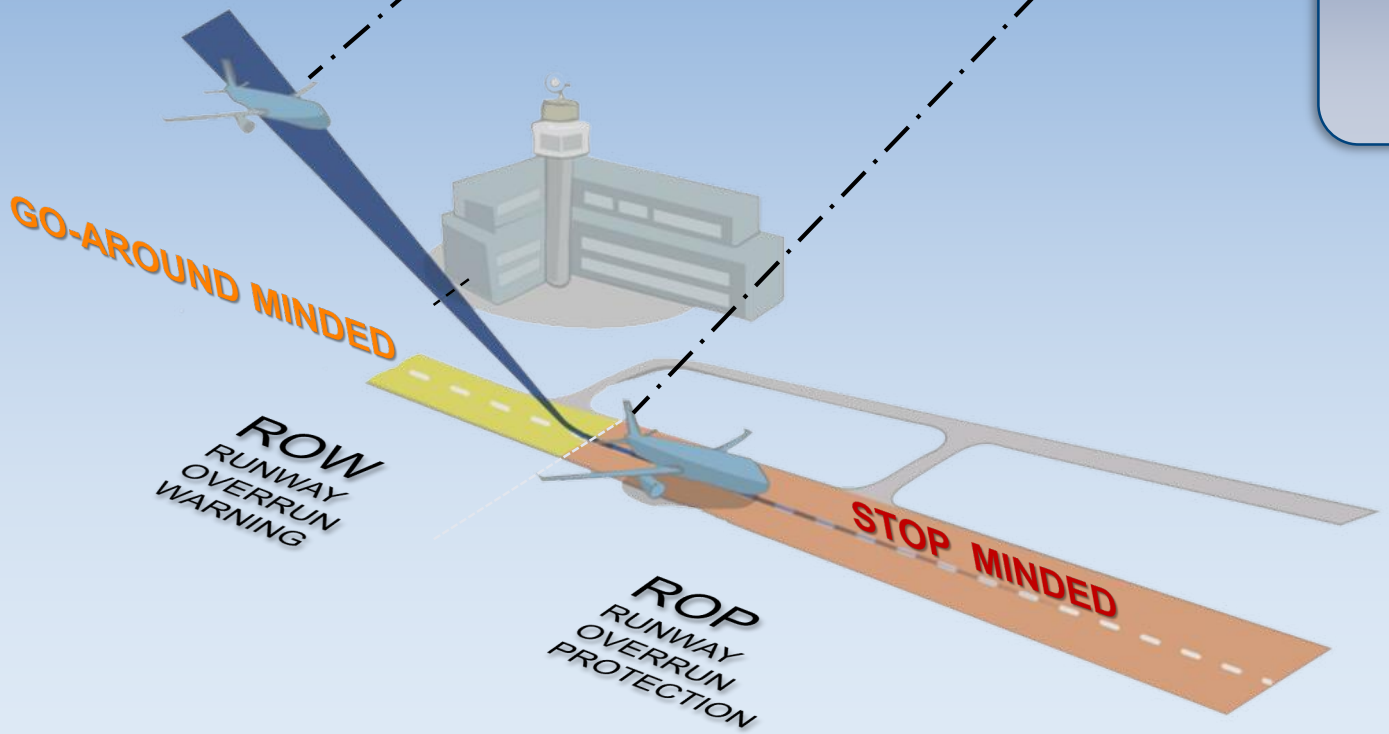
On ground

ROP

PROC

Landing with failure affecting landing performance

i



DESCENT PREPARATION – PREDICTIVE ROW

BACK

PF

PM

RWY COND / BRK ACTION.....SET i

If the LDA must be modified:

ND MODE SELECTOR.....PLAN

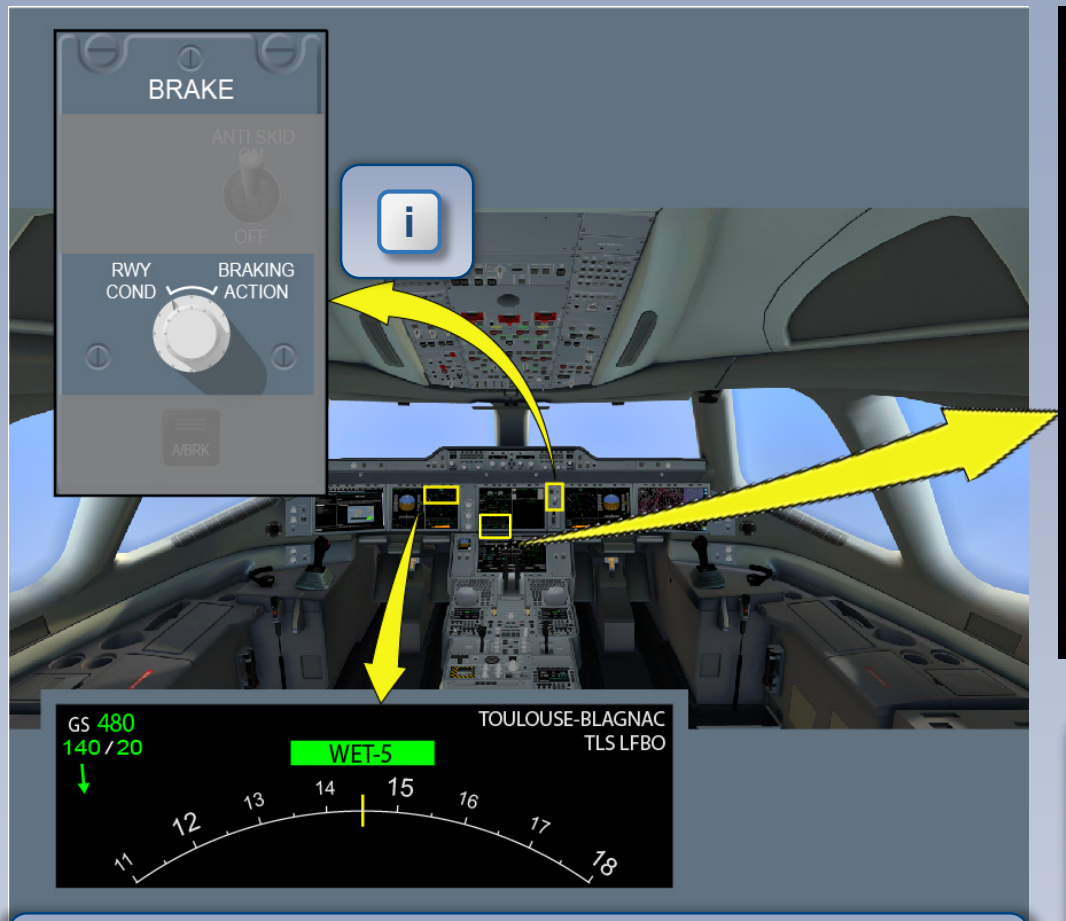
ND RANGE SELECTOR.....ZOOM

RUNWAY SHIFT.....ENTER

DESCENT PREPARATION

SET RWY CONDITION / BRAKING ACTION

BACK



The selected runway condition is used by ROW/ROP and BTV.

WHEEL

RWY CONDITION / BRAKING ACTION

LFLL 18L QNH 1004 OAT 15°C
VAPP 145 KT CONF FULL WIND 187° / 16 KT

RWY CONDITION	BRAKING ACTION	LDG PERF CODE
DRY	DRY	6
WET	GOOD	5
COMPACTED SNOW & OAT AT OR BLW -15°C	GOOD TO MEDIUM	4
SNOW OR SLIPPERY WHEN WET	MEDIUM	3
STANDING WATER OR SLUSH	MEDIUM TO POOR	2
ICE (COLD & DRY)	POOR	1

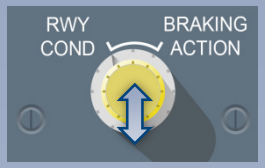
If the selected runway is too short:

- The ND and the RWY COND/BRAKING ACTION Matrix display amber indications and messages.
- Select another landing runway.

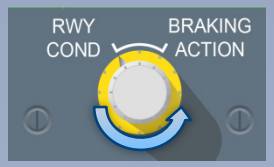
DESCENT PREPARATION

How to use the RWY COND / BRAKING ACTION selector

BACK



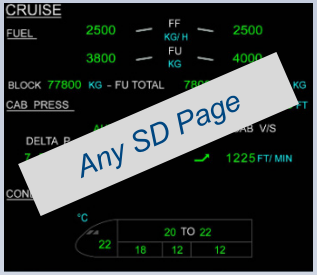
Push/Pull Inner Ring



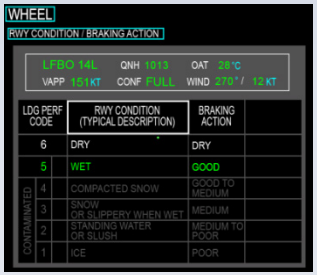
Rotate Outer Ring

Rotate Inner Ring

Display/ Hide the matrix

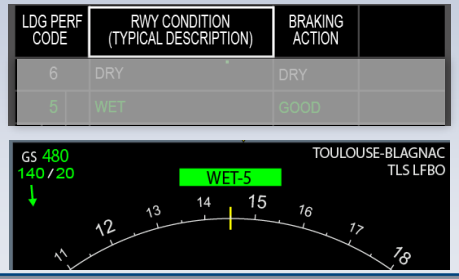


Push ⇧ ⇩ *Pull*

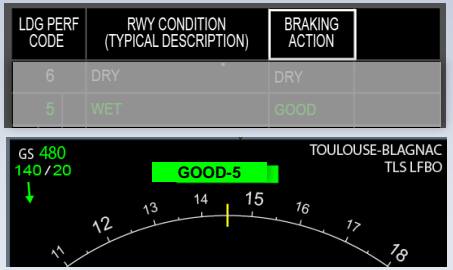


Select the mode

RWY CONDITION

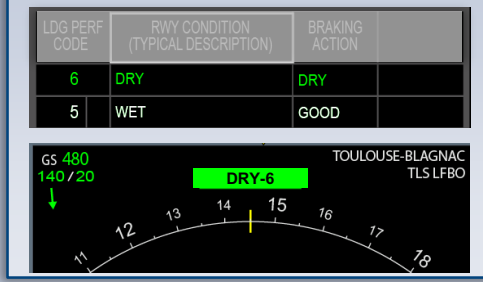


BRAKING ACTION

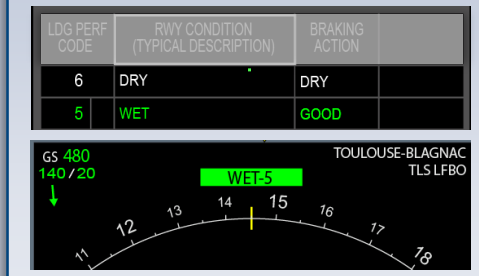


Select the LDG PERF CODE

Selection DRY



Selection WET



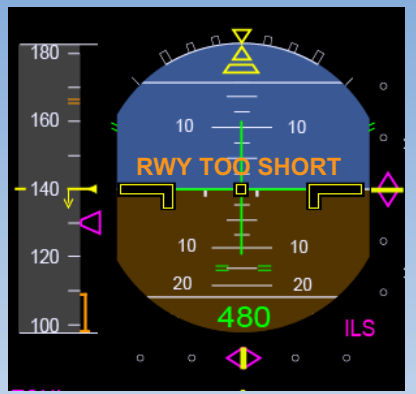
REACTIVE ROW

BACK

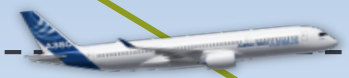
Below approx.
400 ft AAL

The ROW computes the prediction
from real time data (wind, temperature, VAPP, landing conf, …)

CONSIDER GO-AROUND

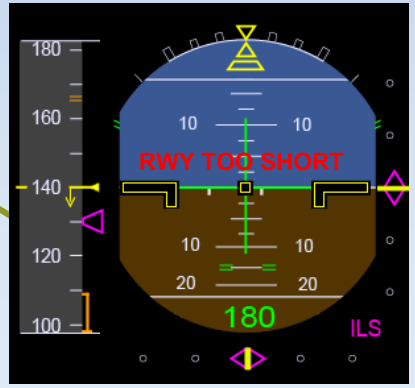


200 ft



"RUNWAY TOO SHORT
RUNWAY TOO SHORT […]"

GO-AROUND



Ground

ROP

BACK

The ROP is automatically armed on ground.

ROP
With manual braking

i

ROP
With autobrake
(BTV or BRK MED)

i

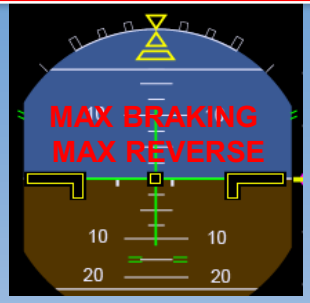
ROP – MANUAL BRAKING

BACK

Overrun hazard detected

ROP ACTIVE

End of overrun hazard



Below MAX BRAKING

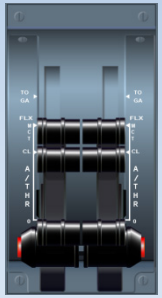
Apply and maintain MAX PEDAL BRAKING

"BRAKE, MAX BRAKING, MAX BRAKING"

"SET MAX REVERSE"

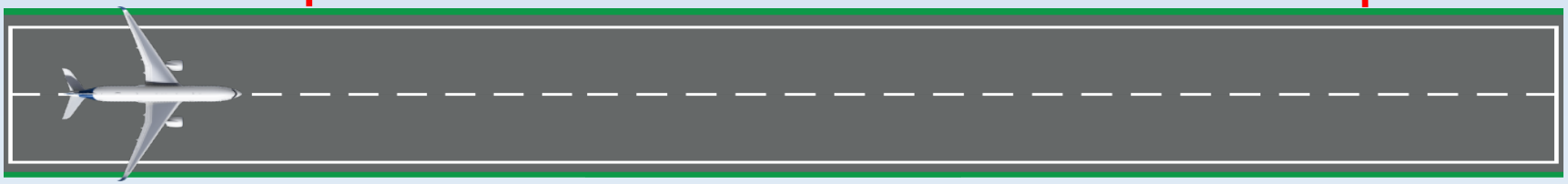
At 80

"KEEP MAX REVERSE"



Below MAX REVERSE

Set and keep MAX REVERSE



Touch Down

A/C STOP

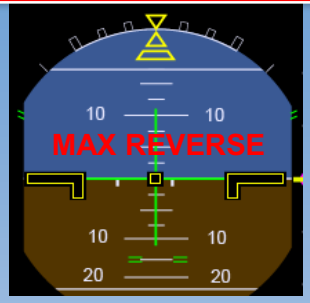
ROP – AUTOMATIC BRAKING (BTV OR BRK MED)

BACK

Overrun hazard detected

ROP ACTIVE

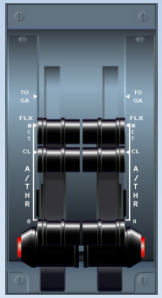
End of overrun hazard



A/BRK

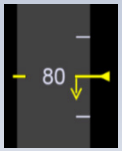
System automatically applies MAXIMUM BRAKING

A/BRK



"SET MAX REVERSE"

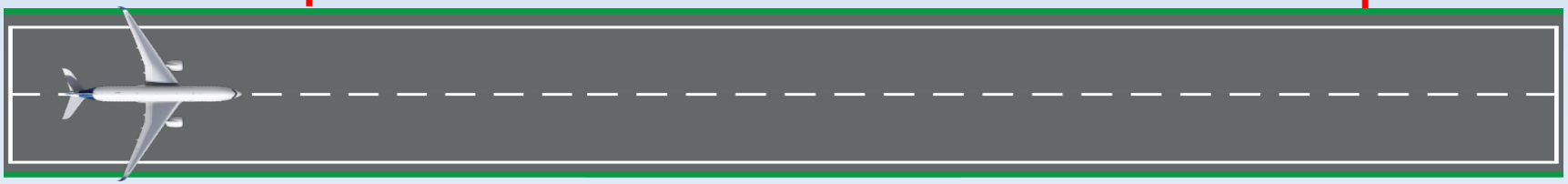
At



"KEEP MAX REVERSE"

Below MAX REVERSE

Set and keep MAX REVERSE



Touch Down

A/C STOP

LANDING WITH FAILURE AFFECTING LANDING PERFORMANCE

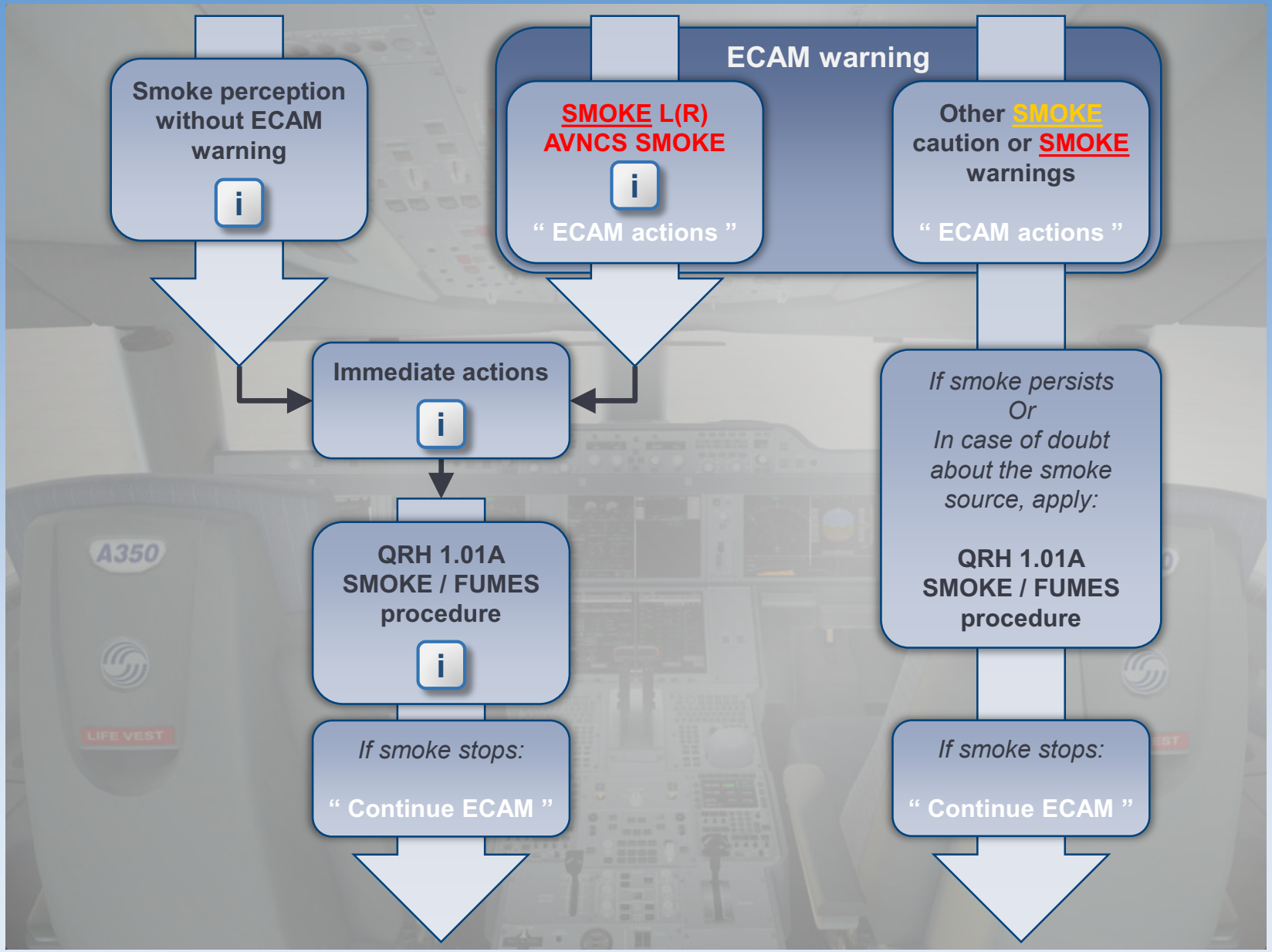
BACK

In the case of a failure affecting the landing performance:

- There is no more feedback on the ND (no ROW line, no TOO SHORT message,...)
- The ROW/ROP remains armed, and alerts may be triggered based on the landing distance computed without failure.

→ **The flight crew must always follow the ROW/ROP alerts**.

SMOKE / FUMES

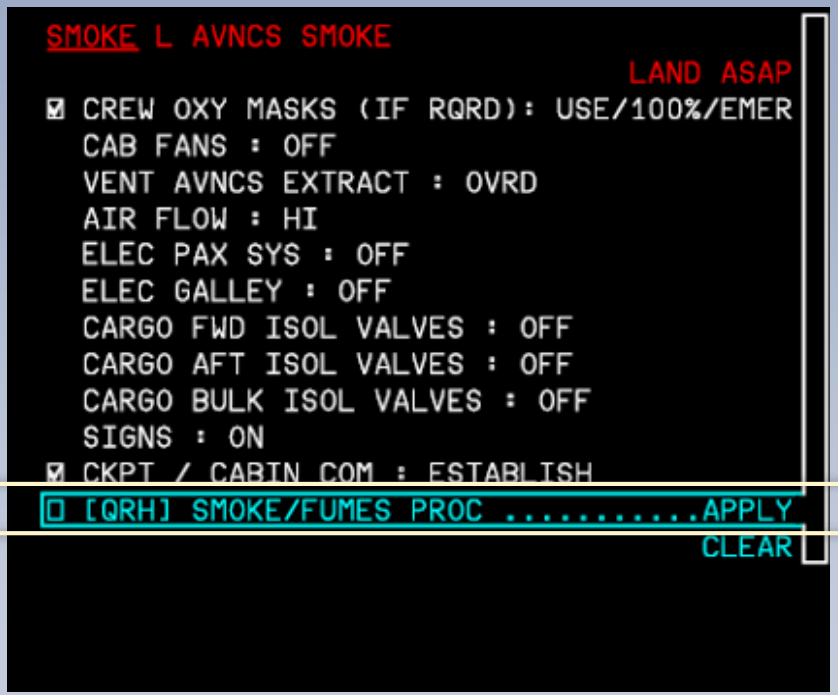


SMOKE / FUMES

SMOKE L(R) AVNCS SMOKE

BACK

Perform ECAM actions and go to QRH when requested by the ECAM procedure.



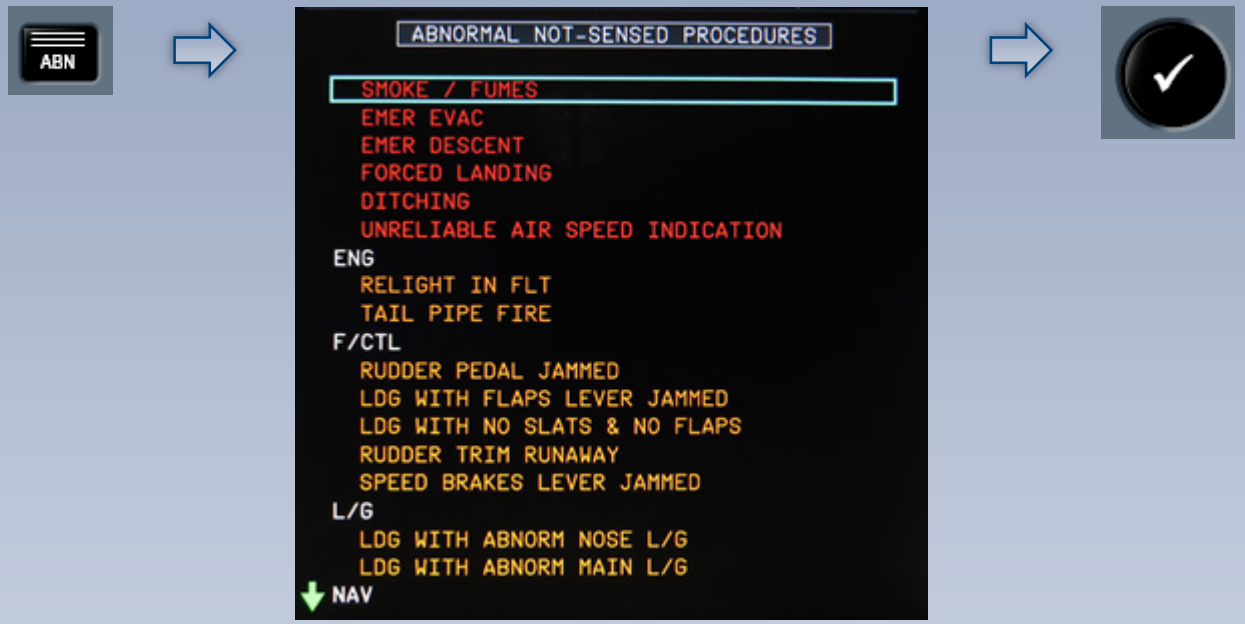
→ QRH

SMOKE / FUMES

SMOKE PERCEPTION WITHOUT ECAM WARNING

BACK

When smoke appears without ECAM warning, the flight crew must activate the ABN not-sensed **SMOKE / FUMES** procedure.



If the visibility in the cockpit is too low to read the ABN not-sensed, the flight crew can use the QRH **SMOKE / FUMES** procedure.

SMOKE / FUMES QRH PROCEDURE

BACK

SMOKE / FUMES

LAND ASAP

→ **LAND ASAP**

APPLY IMMEDIATELY
- CREW OXY MASKS (if required).....USE/100%/EMER
- CAB FANS..... OFF
- VENT AVNCS EXTRACT..... OVRD
- AIR FLOW ..... HI
- ELEC PAX SYS..... OFF
- ELEC GALLEY..... OFF
- CARGO FWD ISOL VALVES ..... OFF
- CARGO AFT ISOL VALVES ..... OFF
- CARGO BULK ISOL VALVES ..... OFF
- SIGNS..... ON
- CKPT/CABIN COM..... ESTABLISH

→ Protect the crew and the pax
→ Start smoke removal
→ Establish communication with cabin crew.

● **IF SMOKE SOURCE IMMEDIATELY OBVIOUS ACCESSIBLE AND EXTINGUISHABLE:**
SMOKE SOURCE.....ISOLATE

● **IF SMOKE SOURCE NOT IMMEDIATELY ISOLATED:**
DIVERSION.....INITIATE
DESCENT TO FL100/MEA-MORA.....INITIATE

→ Short term decision.

At ANY TIME of the procedure, if situation becomes UNMANAGEABLE:
IMMEDIATE LANDING.....CONSIDER

→ At any time procedure.

● **If the source of smoke is suspected from AIR COND or CABIN:**
To isolate AIR COND..... APPLY QRH 01.03A
To isolate CABIN EQPT..... APPLY QRH 01.03A

● **If the source of smoke is detected from AVNCS with ECAM alert:**
SMOKE L AVNCS SMOKE..... APPLY QRH 01.04A
SMOKE R AVNCS SMOKE..... APPLY QRH 01.05A

● **If the source of smoke cannot be identified:**
To isolate AIR COND and CABIN EQPT.....
..... APPLY QRH 01.03A

● **If smoke continues**
To isolate SIDE 1 THEN SIDE 2 .....
..... APPLY QRH 01.04A

→ Investigate the source of smoke.

SMOKE / FUMES

AIRBUS

BACK

LAND ASAP

An immediate diversion should be considered as soon as the smoke is detected. If the smoke source is not immediatly obvious, accessible and extinguishable, it should be initiated without delay.

IMMEDIATE ACTIONS

BACK

The immediate actions are <u>common</u> to:

- *QRH 1.01A*
- *ABN not-sensed* **SMOKE/FUMES**
- *ECAM* **<u>SMOKE</u> L(R) AVNCS SMOKE**.

→ Protect the crew
→ Protect the pax
→ Start smoke removal
→ Establish communication with cabin crew.

QRH 1.01A

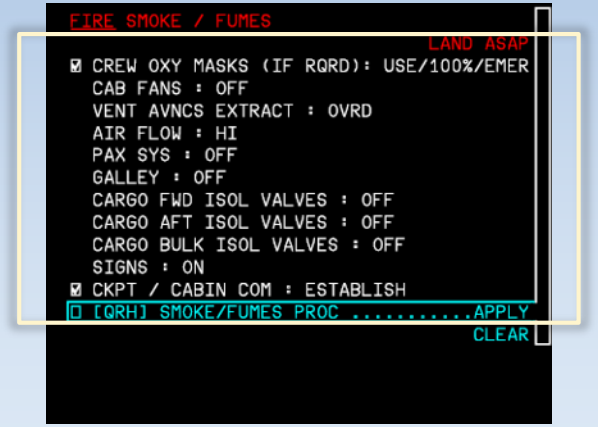
SMOKE / FUMES

LAND ASAP

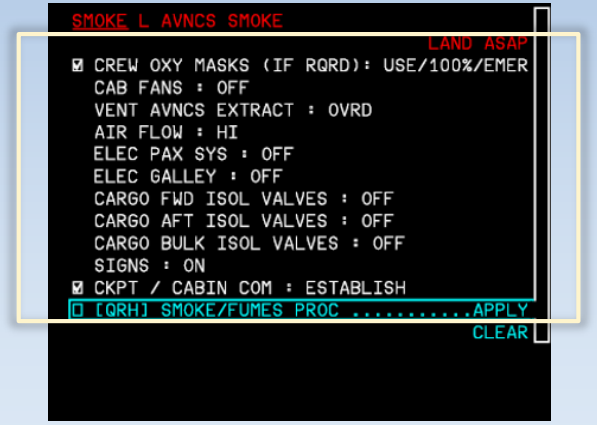
APPLY IMMEDIATELY

- CREW OXY MASKS (if required).....USE/100%/EMER
- CAB FANS..... OFF
- VENT AVNCS EXTRACT..... OVRD
- AIR FLOW ..... HI
- ELEC PAX SYS..... OFF
- ELEC GALLEY..... OFF
- CARGO FWD ISOL VALVES ..... OFF
- CARGO AFT ISOL VALVES ..... OFF
- CARGO BULK ISOL VALVES ..... OFF
- SIGNS..... ON
- CKPT/CABIN COM..... ESTABLISH

ABN not-sensed
SMOKE / FUMES



ECAM warning
SMOKE L(R) AVNCS SMOKE



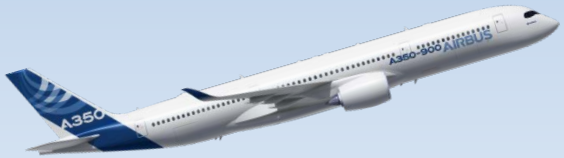
LAND ASAP i

STALL RECOVERY

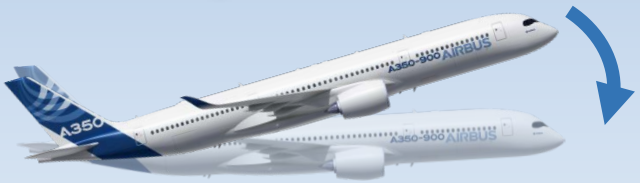
MEMORY ITEM

Detection i

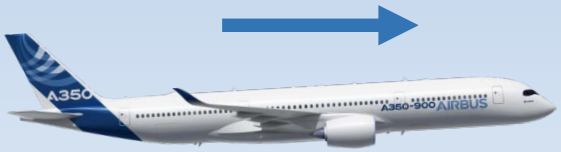
Recovery PROC



1 Reduce AOA



2 Increase Thrust

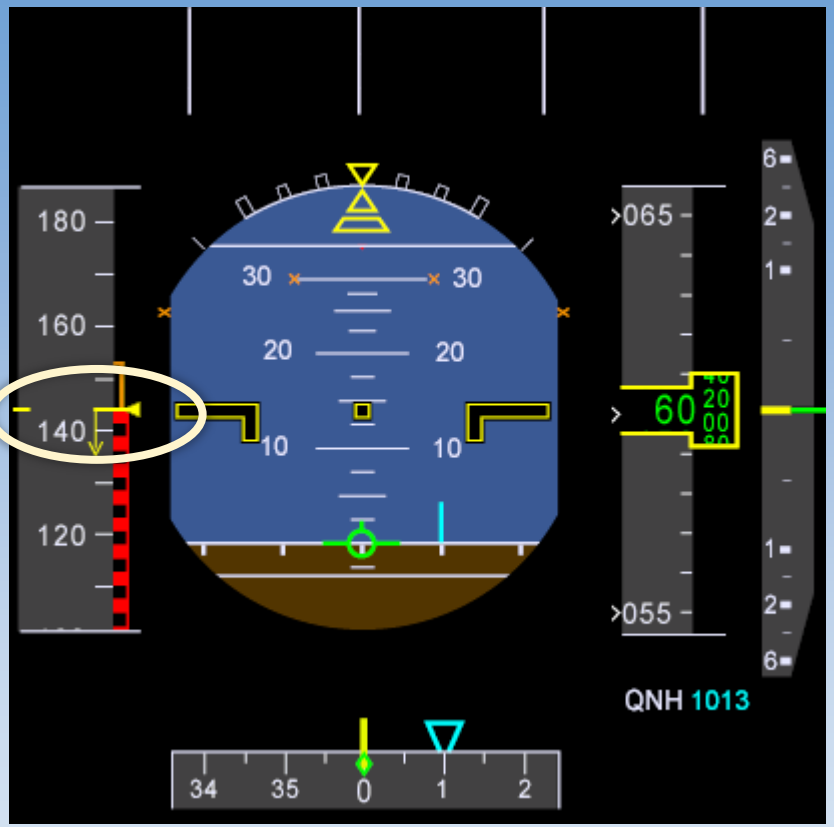


DETECTION

-  “ STALL, STALL ”

And / Or

- Buffeting of a magnitude and severity that is strong and deterrent to further speed reduction
- A nose pitch movement that cannot be easily arrested
- The pitch control reaches the aft stop (no further increase in pitch attitude even when the control is held full aft).



REQUIRES AN IMMEDIATE ACTION

PROCEDURE

BACK

PF

PM

AOA must be reduced.

“ STALL, I HAVE CONTROL ”

NOSE DOWN PITCH CONTROL……APPLY

BANK……WINGS LEVEL

Increase energy.

When stall warning and buffet have stopped:

THRUST……INCREASE SMOOTHLY AS NEEDED

SPEED BRAKES……CHECK RETRACTED

FLIGHT PATH……RECOVER SMOOTHLY

If below 20 000 ft and clean configuration:

“ FLAPS 1 ”

“ FLAPS 1 ”

If not in clean, keep current configuration.

PROCEDURE

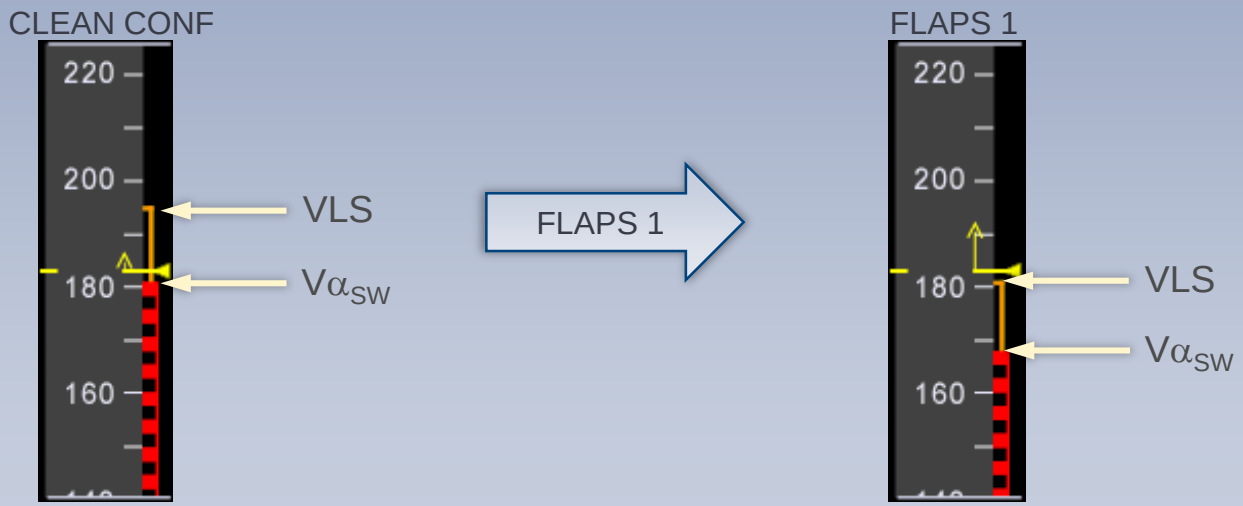
PF

PM

SELECTION OF FLAPS 1

BACK

During flight path recovery, the flight crew must select FLAPS 1 in order to increase the margin with the AOA_{STALL}.



PROCEDURE

PF

PM

NOSE DOWN

BACK

Note: In the case of lack of pitch down authority, reducing thrust may be necessary

TAWS

AIRBUS

MEMORY ITEM

TAWS on ND i

CAUTION alerts PROC

WARNING alerts PROC

GPWS

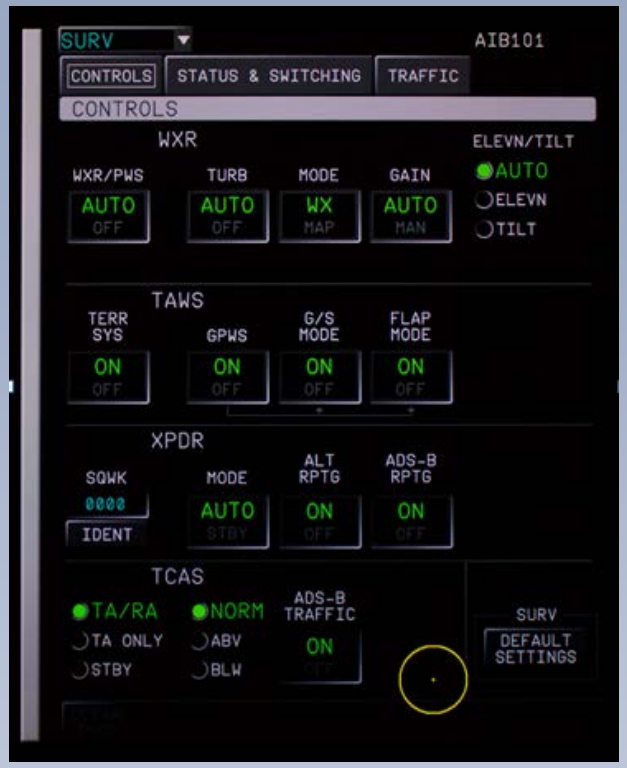
“ SINK RATE, SINK RATE ”	“ PULL UP ”
“ TERRAIN TERRAIN ”	“ PULL UP ”
“ DON’T SINK, DON’T SINK ”	
“ GLIDE SLOPE, GLIDE SLOPE ”	
“ TOO LOW TERRAIN ”	
“ TOO LOW FLAPS ”	
“ TOO LOW GEAR ”	

Terrain function

i

“ TERRAIN AHEAD ”	“ TERRAIN AHEAD, PULL UP ”
	“ AVOID TERRAIN ”
“ OBSTACLE AHEAD ”	“ OBSTACLE AHEAD, PULL UP ”
	“ AVOID OBSTACLE ”
“ TOO LOW TERRAIN ”	

TAWS



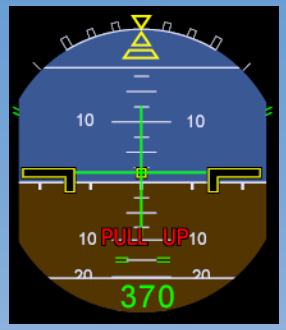
TERRAIN FUNCTION

Terrain is displayed on the ND for terrain awareness only. Terrain display must not be used for navigation.

If the NAV accuracy is low, the TERR function is automatically deactivated.
The **TERR STBY** memo appears on the WD, and **TERR INOP** appears on ND.

WARNING ALERTS

BACK



“ PULL UP ”

“ TERRAIN AHEAD, PULL UP ”

“ AVOID TERRAIN ”

“ OBSTACLE AHEAD, PULL UP ”

“ AVOID OBSTACLE ”

In case of a warning alert, **immediately**, **simultaneously** and with **no arguments**:

- **“ PULL UP TOGA ”**
  - AP……OFF
  - PITCH……..PULL UP
  - Pull full backstick and maintain in that position
  - THRUST LEVER……TOGA
  - SPEED BRAKES…….CHECK RETRACTED
  - BANK……..WING LEVEL or ADJUST

  A turning manoeuver can be initiated if the flight crew concludes that turning is the safest action.

DO NOT CHANGE CONFIGURATION (SLATS/FLAPS, GEAR) UNTIL CLEAR OF OBSTACLE

Terrain Ahead and Obstacle Ahead Warning alerts are triggered approximately 30 s away from the conflict terrain.

CAUTION ALERTS

NEXT

During Night or IMC

- “ TERRAIN TERRAIN ”
- “ TERRAIN AHEAD ”
- “ TOO LOW TERRAIN ”
- “ OBSTACLE AHEAD ”

In case of a warning alert, **immediately**, **simultaneously** and with **no arguments**:

- **“ PULL UP TOGA ”**
  - AP……..OFF
  - PITCH……..PULL UP
  - Pull full backstick and maintain in that position
  - THRUST LEVER……TOGA
  - SPEED BRAKES…….CHECK RETRACTED
  - BANK……WING LEVEL or ADJUST

  A turning manoeuver can be initiated if the flight crew concludes that turning is the safest action.

DO NOT CHANGE CONFIGURATION (SLATS/FLAPS, GEAR) UNTIL CLEAR OF OBSTACLE

Note: Terrain Ahead and Obstacle Ahead caution alerts are triggered approximately 60 s away from the conflict terrain.
Note: For some airports the operator may define a specific procedure.

CAUTION ALERTS

NEXT

During Daylight and VMC,
and obstacle clearly in sight

“ TERRAIN TERRAIN ”

“ TERRAIN AHEAD ”

- FLIGHT PATH…….ADJUST

Adjust pitch, bank and thrust to silent the alert.

“ TOO LOW TERRAIN ”

“ OBSTACLE AHEAD ”

Note: Terrain Ahead and Obstacle Ahead caution alerts are triggered approximately 60 s away from the conflict terrain.
Note: For some airports the operator may define a specific procedure.

CAUTION ALERTS

BACK

" SINK RATE, SINK RATE "

- ***Above 1 000 ft AAL in IMC or above 500 ft in VMC:***
  - *FLIGHT…… PATH ADJUST*
    - *Adjust pitch and thrust to silent the alert.*
- ***Below 1 000 ft AAL in IMC or below 500 ft in VMC:***
  - *GO-AROUND……CONSIDER*

" DON'T SINK, DON'T SINK "

- *FLIGHT…… PATH ADJUST*
  - *Adjust pitch and thrust to silent the alert.*

" TOO LOW GEAR "

" TOO LOW FLAPS "

- *GO-AROUND…… PERFORM*
  - *Adjust pitch and thrust to silent the alert.*

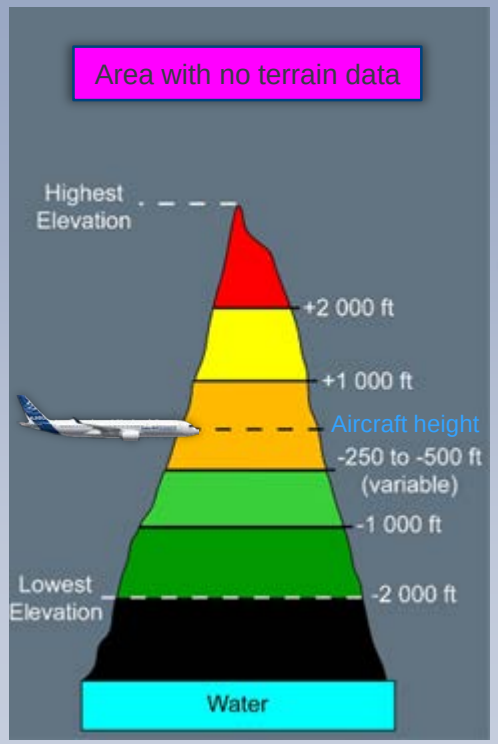
" GLIDE SLOPE, GLIDE SLOPE "

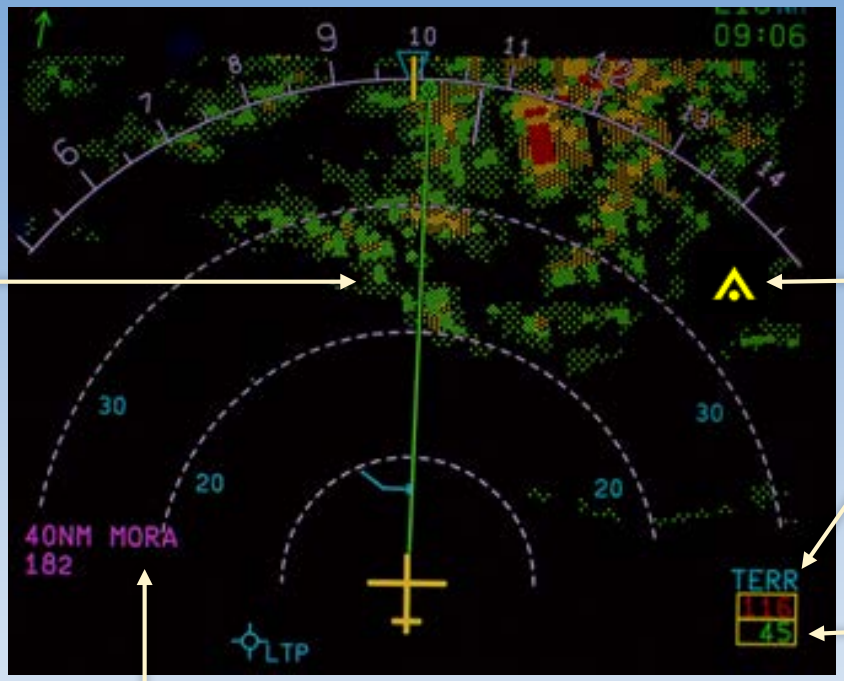
- ***Above 1 000 ft AAL in IMC or above 500 ft in VMC:***
  - *FLIGHT…… PATH ADJUST*
    - *Adjust pitch and thrust to silent the alert.*
  - ❑ ***When conditions require a deliberate approach below G/S:***
    - *G/S MODE…….. OFF*
- ***Below 1 000 ft AAL in IMC or below 500 ft in VMC:***
  - *GO-AROUND……CONSIDER*

TAWS ON ND

BACK

COLOR CODING





Obstacle

TAWS message

Lowest and highest elevations in selected range. The color coding is the same as the terrain display.

MORA

Appears if the flight crew :

- Presses the CSTR pb on EFIS CP, and
- Selects a range of 40 nm or more on EFIS CP.

For more info on the display of TAWS on the ND, refer to: FCOM → Aircraft Systems → 34 – Surveillance → TAWS → Controls and Indicators → ND

TCAS

AIRBUS

MEMORY ITEM

Intruders, TCAS modes

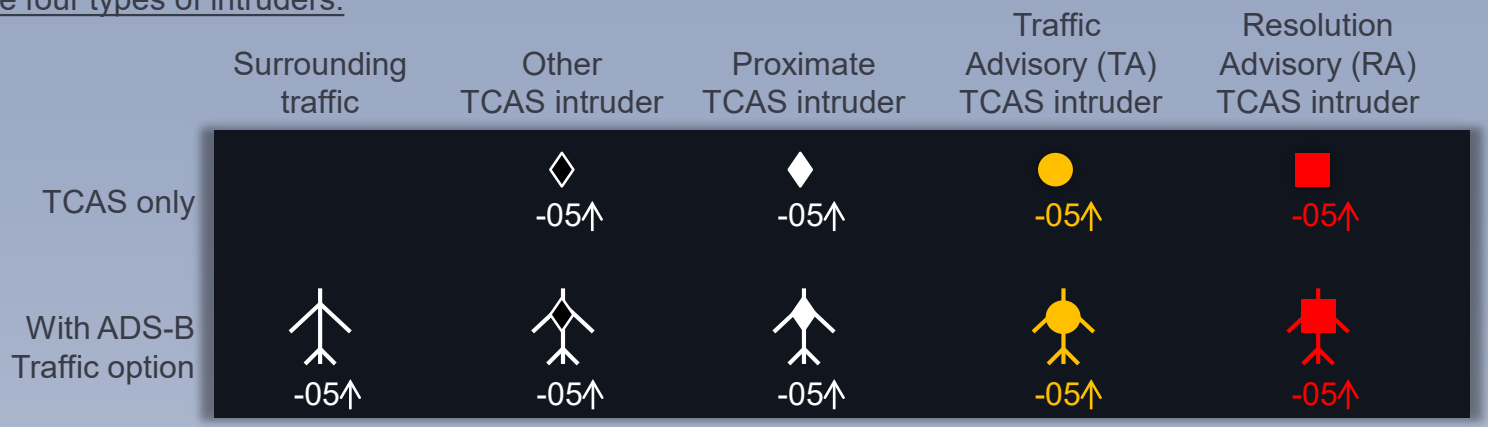
Always follow TCAS RA orders.
Disregard ATC orders during RA.

Do not try to acquire visual on the intruders during TA or RA.

INTRUDERS, TCAS MODES

BACK

There are four types of intruders:



There are two TCAS modes:

TA/RA mode:
- Displays all intruders
- Issues TA and RA.

TA ONLY mode (Automatically or manually selected):
- Displays all intruders
- Only issues TA (RA are inhibited).

FLIGHT WARNING SYSTEM: ALERT PRIORITY

TAWS, WINDSHEAR and STALL alerts have priority over TCAS alerts.

For more info on TCAS, refer to FCOM → Aircraft Systems → 34 Surveillance → TCAS

TRAFFIC ADVISORY (TA)

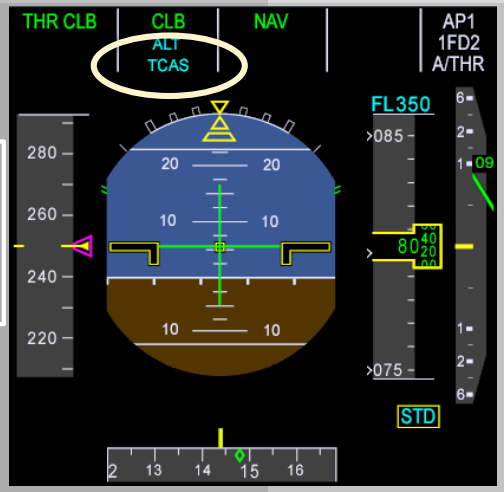
+05

BACK

PF

PM

"TRAFFIC TRAFFIC"



TCAS mode……CHECK ARMED

" TCAS blue "

" Checked "

If AP/FD TCAS not avail:

If A/THR available:

AUTOTHRUST……ON

ND range and mode are automatically adjusted.

ND range and mode are automatically adjusted.

<u>Do not</u> perform a maneuver based on a TA alone.

TRAFFIC ADVISORY (TA)

+05↓

BACK

PF

PM

"TRAFFIC TRAFFIC"

BACK

"TRAFFIC TRAFFIC"

If the AP/FD **TCAS** mode does not immediately arm, the flight crew must be prepared to disconnect the AP and FD in case of an RA and manually follow the TCAS guidance.

PF: "TCAS, I HAVE CONTROL"

TCAS mode.....

" TCAS

cked "

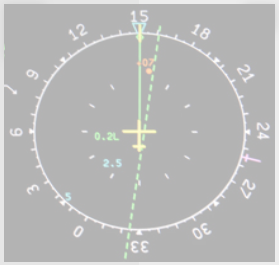
If AP/FD TCAS n

If A/THR av

AUTOTHRUST.....ON

A/THR

ND range and mode are automatically adjusted.



ND range and mode are automatically adjusted.

Do not perform a maneuver based on a TA alone.

HANDLING

RESOLUTION ADVISORY (RA)

+05↓

BACK

PF

PM

"DESCEND DESCEND"

If crew uses HUD: i

" TCAS"

If AP is OFF:

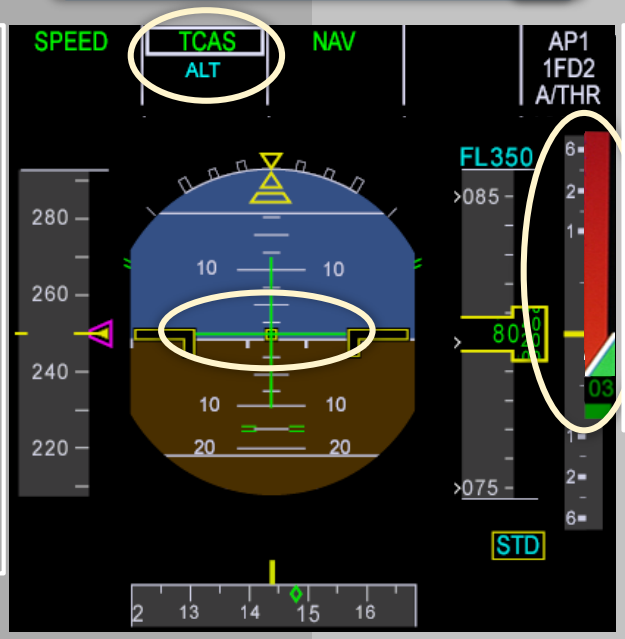
FD orders.....FOLLOW

AP can be engaged.

Then, whatever AP:

V/S.....MONITOR

- *Fly the green area*
- *Respect Stall, TAWS, Windshear warnings*



" CHECKED"

ATC **" AIRBUS xxx TCAS RA"**

V/S.....MONITOR

HANDLING

i

If AP/FD TCAS not avail: i

MANUAL RESOLUTION ADVISORY (RA)

+05↓

BACK

PF

PM

If AP/FD TCAS is not available:

"DESCEND DESCEND"

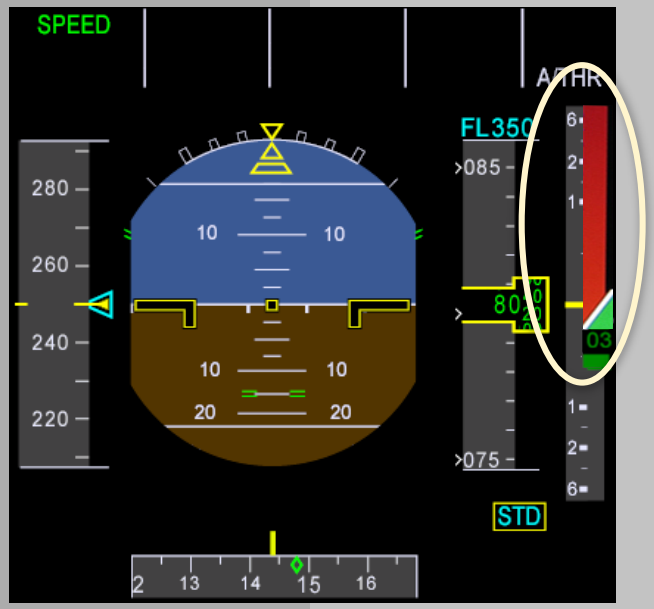
AP.....OFF

" FD OFF"

Promptly and smoothly

V/S.....ADJUST

- *Fly the green area*
- *Respect Stall, TAWS, Windshear warnings*



FD.....OFF

ATC **" AIRBUS xxx TCAS RA"**

V/S.....MONITOR

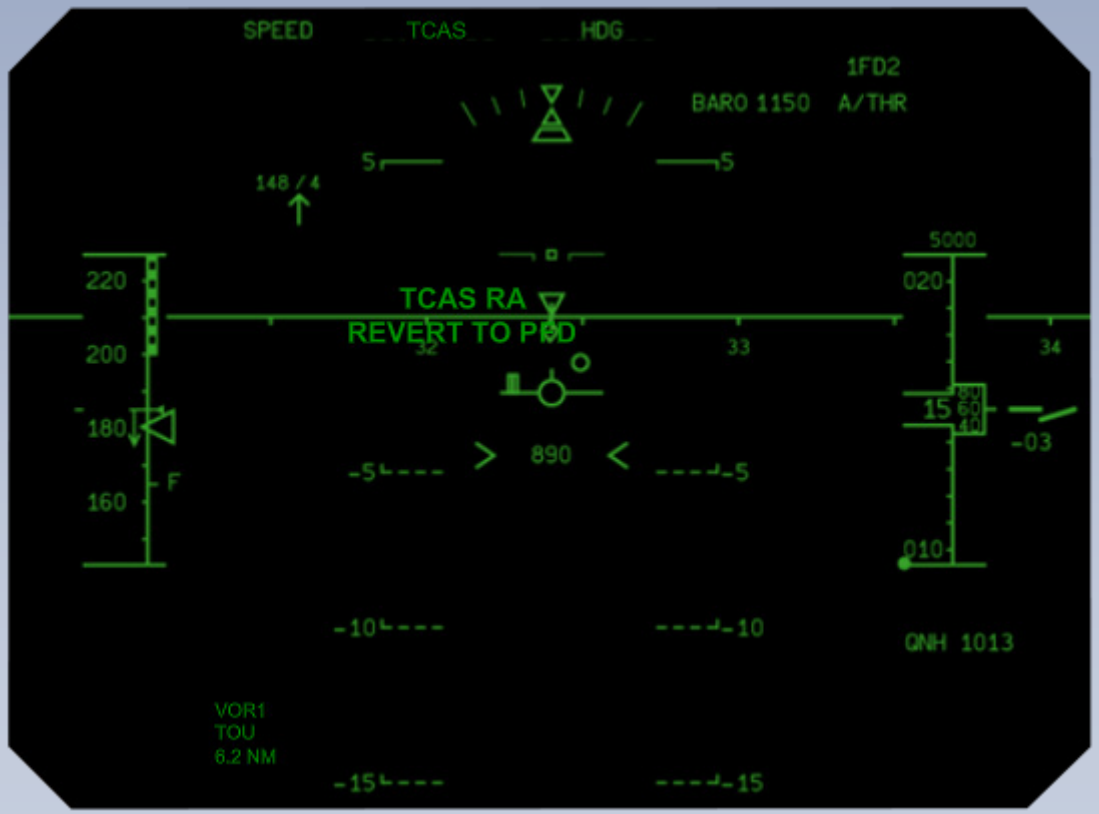
RESOLUTION ADVISORY (RA)

HUD OPTION

BACK

In case of an RA, the HUD will display the following message:

TCAS RA
REVERT TO PFD



RESOLUTION ADVISORY (RA)

BACK

PF

PM

"DESCEND DESCEND"

If crew uses HUD:

"TCAS"

If AP is O

FD orders.....

AP can be en

Then, whatev

V/S.....

- Fly the gr
- Respect S

Windshea

HECKED"

US xxx TCAS RA"

.....MONITOR

HANDLING

If AP/FD TCAS not avail:

If "CLIMB" RA in final:

BACK

If for any reason during an RA, the V/S doesn't reach the green area:

- **AP OFF**
- **Override FD orders**
- **Fly the green area**

If necessary, PF **must** use the full speed range between Vα max and Vmax.

CLEAR OF CONFLICT

BACK

PF

PM

"CLEAR OF CONFLICT"

*The AP/FD reverts to **V/S** mode.*

AP/FD…….MONITOR/FOLLOW

" VERTICAL SPEED +1000"

LAT & VERT GUIDANCE…….ADJUST

" CHECKED"

ATC

" AIRBUS xxx CLEAR OF CONFLICT "

Resume normal navigation in accordance with ATC clearance.

AFTER MANUAL TCAS RA

Reengage FD and AP as required.

UNRELIABLE AIRSPEED SITUATION

AIRBUS

MEMORY ITEM

"UNRELIABLE SPEED"

At any time, if the flight crew detects unreliable air data indication:

1) <u>If safe conduct of the flight is impacted</u>:
The flight crew must apply the memory items:

AP.....OFF

A/THR.....OFF

FD.....OFF

PITCH/THRUST:
- **Below THRUST RED ALT.....12.5°/TOGA**
- **Above THRUST RED ALT and below FL100....10°/CLB**
- **Above THRUST RED ALT and above FL100.....5°/CLB**

FLAPS:
- **If CONF 0(1)(2)(3).....MAINTAIN CURRENT CONF**
- **If CONF FULL.....SELECT CONF 3 AND MAINTAIN**

SPEEDBRAKES.....CHECK RETRACTED

L/G.....UP

Definition of the safe conduct of the flight

i

2) <u>If safe conduct of the flight is not impacted or after the memory items</u>:
The flight crew must activate the ABN <u>NAV UNRELIABLE AIR SPEED INDICATION</u>.

Automatic Air Data Switch Logic i

PFD Display i

Note: In this tutorial, the CM1 is PF in all examples.

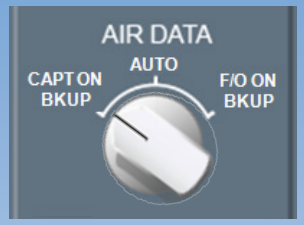
Definition of the Safe Conduct of the Flight

BACK

Safe conduct of the flight is affected when the flight crew is not sure to be able to safely fly the aircraft in the short-term, with the current parameters, i.e.:

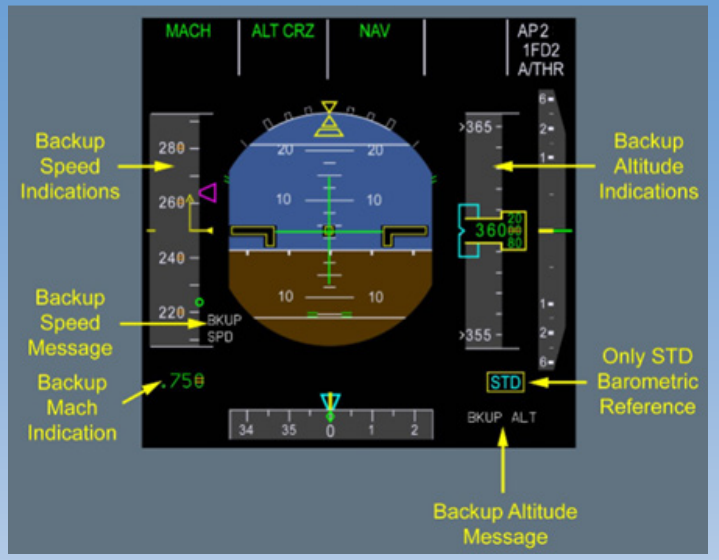
- The flight crew has lost situation awareness, or
- The current pitch and thrust settings are not appropriate for the current flight conditions, or
- The aircraft has an unexpected flight path for the current flight conditions, or
- The aircraft is in a dynamic manoeuvre.

PFD DISPLAY



On PF Side

Normal law

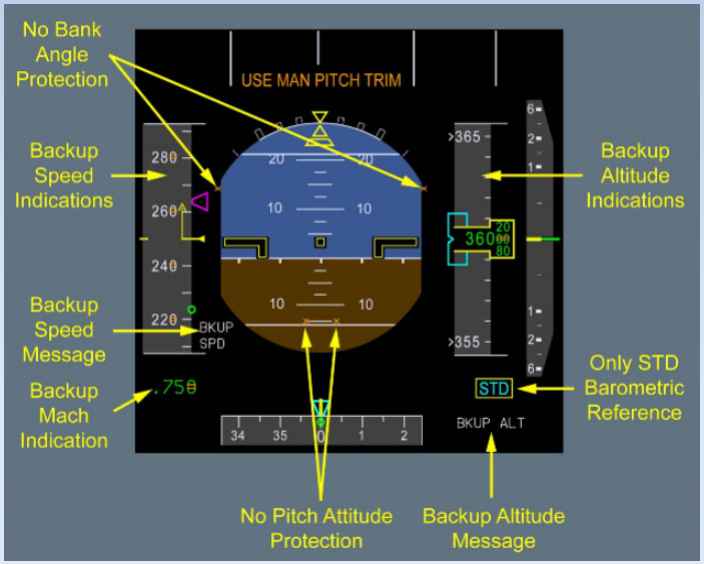


In the ECAM procedure:

If CAPT and F/O speeds disagree more than 30 Kt:

ADR 1+2+3 P/Bs.....OFF

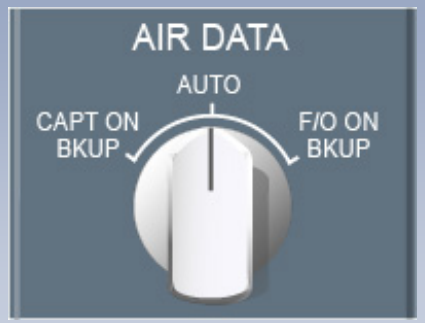
Direct law



AUTOMATIC AIR DATA SWITCH LOGIC

BACK

The PRIMs ensure the monitoring and the automatic selection of the air data sources (ADRs, ISIS, Backup from engine or AOA probes). The CDS displays the best available air data source.



Example of reconfiguration (for air data):

Air Data Sources					PFDs Display	
ADR1	ADR2	ADR3	ISIS	BKUP	CAPT	F/O
☺	☺	☺	☺	☺	ADR1	ADR2
☹	☺	☺	☺	☺	ADR3	ADR2
☺	☹	☺	☺	☺	ADR1	ADR3
☹	☹	☺	☺	☺	ADR3	ADR3
☺	☹	☹	☺	☺	ADR1	ADR1
☹	☹	☹	☺	☺	ISIS	ISIS
☹	☹	☹	☹	☺	BKUP	BKUP

Airplane Upset Prevention and Recovery Training

Elements of Active Monitoring

START

AIRBUS

OCT 2022

Active monitoring

- Pilots must preventively be always **situationally aware**. An engaged pilot will be ready to intercept, and so recognize, timely and effectively an unintentional airplane divergence.

- **Active monitoring allows you to do so.**

- Active monitoring is the critical element to ensure **awareness and avoidance** of undesired airplane states.

- Active monitoring provides the strongest countermeasure against **startle effect**.

- Active monitoring has some human barriers: complacency, fatigue, time pressure, mental workload, lack of vigilance, looking without seeing, poor workload management… but its performance can significantly be improved.

Active monitoring

- **Active monitoring is the responsibility of all crew members. The purpose is to ensure that the airplane state is understood and correct for the situation**.

- Active monitoring mitigates complacency and, therefore, helps preventing undesired aircraft states (UAS)

- Active monitoring means keeping track of:
  - The **environment**
  - The **airplane's energy state**, and
  - The **flight path**.

- Active monitoring creates expectations about future airplane state. This will help in detecting deviations and to take timely corrective actions.

Review of observable behaviors for monitoring

Competency	Observable Behaviors
Application of Procedures & Compliance with Regulations (PRO)	– Identifies where to find procedures and regulations – Applies relevant operating instructions, procedures and techniques in a timely manner – Follows Standard Operating Procedures (SOPs) unless a higher degree of safety dictates an appropriate deviation – Operates aircraft systems and associated equipment correctly – **Monitors aircraft systems status** – Complies with applicable regulations – Applies relevant procedural knowledge

Review of observable behaviors for monitoring

Competency	Observable Behaviors
Airplane flight path management, automation (FPA)	– Uses appropriate flight management, guidance systems and automation, as installed and applicable to the conditions – **Monitors and detects** deviations from the desired aircraft trajectory and takes appropriate action – Manages the flight path to achieve optimum operational performance – Maintains the desired flight path during flight using automation whilst managing other tasks and distractions – Selects appropriate level and mode of automation in a timely manner considering phase of flight and workload – Effectively **monitors** automation, including engagement and automatic mode transitions

Review of observable behaviors for monitoring

Competency	Observable Behaviors
Airplane flight path management, manual control (FPM)	– Controls the aircraft manually with accuracy and smoothness as appropriate to the situation – **Monitors and detects** deviations from the desired aircraft trajectory and takes appropriate action – Manually controls the aeroplane using the relationship between aeroplane attitude, speed and thrust, and navigation signals or visual information – Manages the flight path to achieve optimum operational performance – Maintains the desired flight path during manual flight whilst managing other tasks and distractions – Uses appropriate flight management and guidance systems, as installed and applicable to the conditions – Effectively **monitors** flight guidance systems including engagement and automatic mode transitions

Review of observable behaviors for monitoring

Competency	Observable Behaviors
Problem Solving - Decision Making (PSD)	– **Identifies, assesses** and manages threats and errors in a timely manner – Seeks accurate and adequate information from appropriate sources – Identifies and verifies what and why things have gone wrong, if appropriate – Perseveres in working through problems whilst prioritising safety – Identifies and considers appropriate options – Applies appropriate and timely decision-making techniques – **Monitors**, reviews and adapts decisions as required – Adapts when faced with situations where no guidance or procedure exists – Demonstrates resilience when encountering an unexpected event

Review of observable behaviors for monitoring

Competency	Observable Behaviors
Situation awareness & management of information (SAW)	– **Monitors** and assesses the state of the aircraft and its systems – **Monitors** and assesses the aeroplane's energy state, and its anticipated flight path – **Monitors** and assesses the general environment as it may affect the operation – Validates the accuracy of information and checks for gross errors – Maintains awareness of the people involved in or affected by the operation and their capacity to perform as expected – Develops effective contingency plans based upon potential risks associated with threats and errors – Responds to indications of reduced situation awareness

Review of observable behaviors for monitoring

Competency	Observable Behaviors
Workload management (WLM)	– Exercises self-control in all situations – Plans, prioritises and schedules appropriate tasks effectively – Manages time efficiently when carrying out tasks – Offers and gives assistance – Delegates tasks – Seeks and accepts assistance, when appropriate – **Monitors, reviews and cross-checks** actions conscientiously – Verifies that tasks are completed to the expected outcome – Manages and recovers from interruptions, distractions, variations and failures effectively while performing tasks

Airplane Upset Prevention and Recovery Training

A350 - Flight Control Laws - Summary

START

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Practical Advices

- Pay attention to the setting of your seat position and **adjust your armrest carefully**
- Longitudinal control: G-load demand and automatic pitch trim provide **longitudinal stability**
- Lateral control: Rate of roll demand, automatic turn coordination and Dutch roll damping provide **lateral stability**
- You only need to perform **minor corrections** on the sidestick when the aircraft deviates from its intended flight path
- When you sense an over control, you should **set the sidestick to the neutral position**
- Aggressive and opposite flight control inputs must not be applied. Such inputs can lead to loads higher than the limit, and can result in structural damage or failure.

Use of Rudder

The rudder should not be used:

- To induce roll
- To counter roll induced by any type of turbulence
- To complement the flight control laws for turn coordination and Dutch roll damping.

Rudder is used only during:

- Crosswind operations (takeoff roll, flare, landing roll)
- Asymmetric thrust (yaw moment compensations)
- Rudder trim runaway
- Landing with abnormal landing gear position
- Lack of roll efficiency in the case of severe damage.

Flight Control Laws - Summary

A350	Normal Law Flight Mode	Alternate Law Flight Mode	Direct Law
Pitch	G-load demand with auto-trim and full envelope protections	G-load demand with auto-trim and protections possibly less efficient	Direct law (no auto-trim)
Roll	Roll rate demand with protection	Similar to Normal law but with protection possibly less efficient	Direct law
Yaw	Sideslip demand with turn coordination and Dutch roll damping	Similar to Normal law	Direct law with limited Dutch roll damping and turn coordination

Abnormal attitude law

Due to extreme values in pitch, bank, angle of attack or speed

A350	Abnormal Attitude Law	After recovery
Pitch	Direct law with increased authority	Same as Alternate law
Roll	Direct law	Same as Alternate law
Yaw	Direct law	Same as Alternate law

Airplane Upset Prevention and Recovery Training

Elements of Aerodynamics

START

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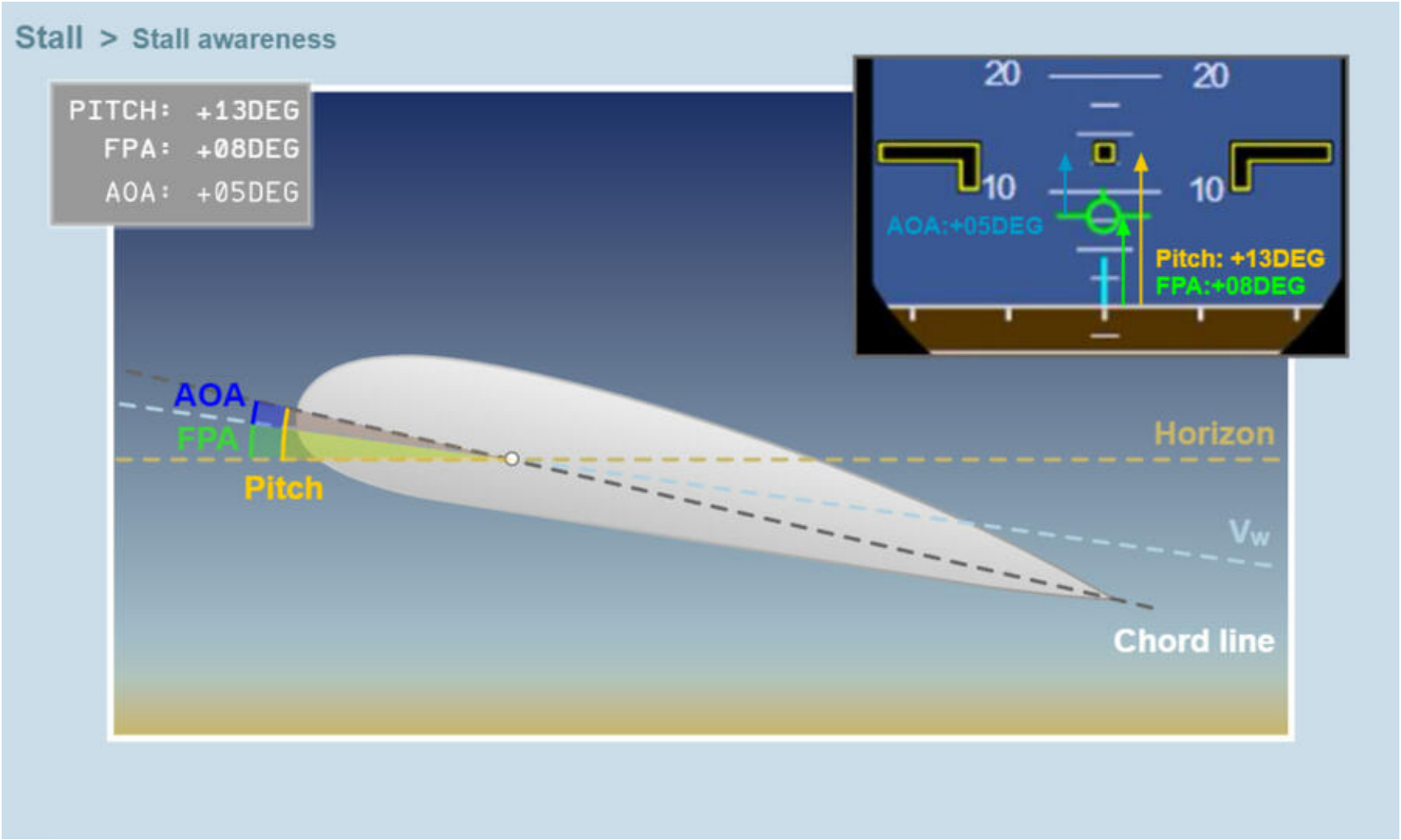
The Angle of Attack

The Angle of Attack



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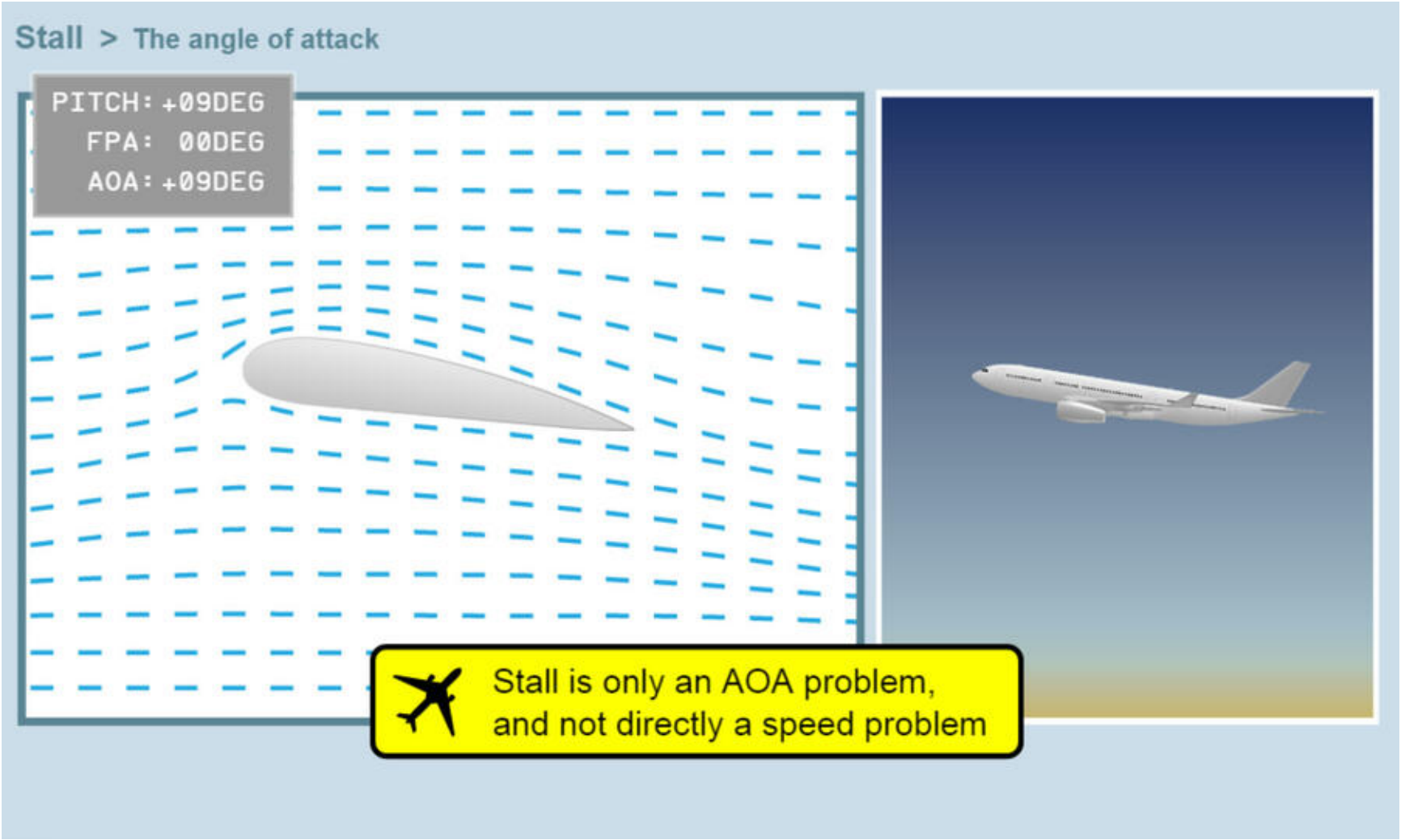
The Angle of Attack

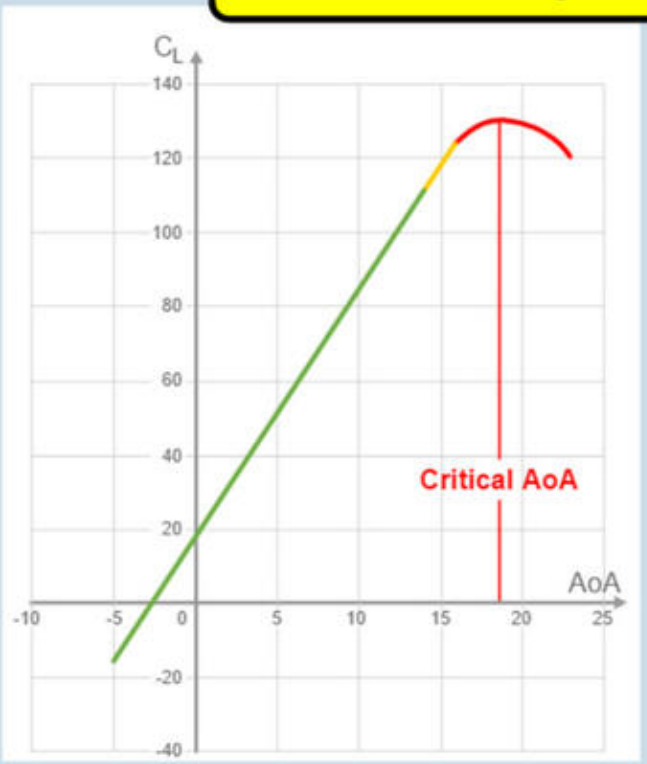


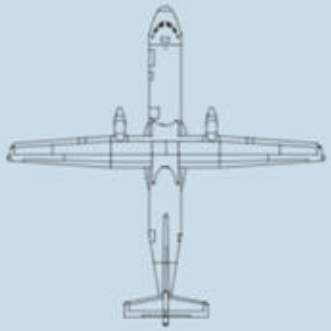
AIRBUS

The Angle of Attack

Stall recovery > Reducing the angle of attack

When you exceed the critical angle of attack, the wing will stall regardless of airspeed, attitude or wing shape





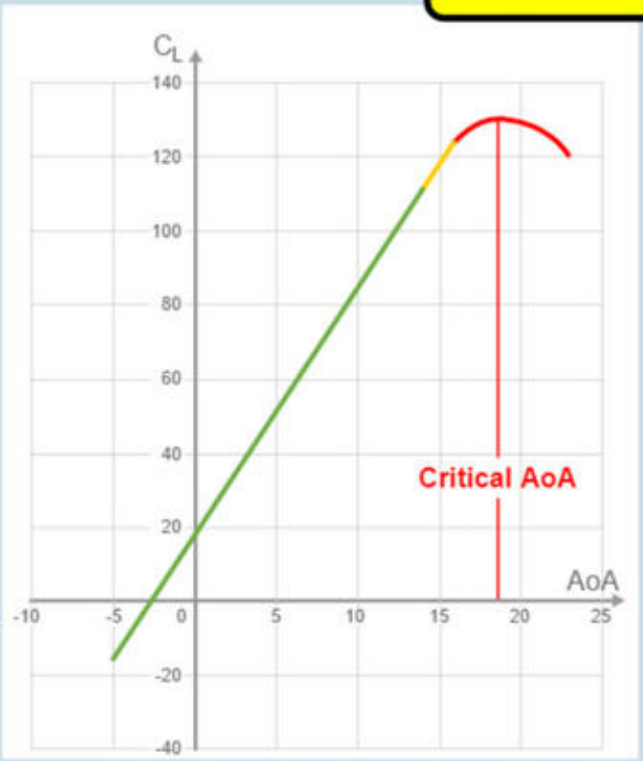
PREV NEXT

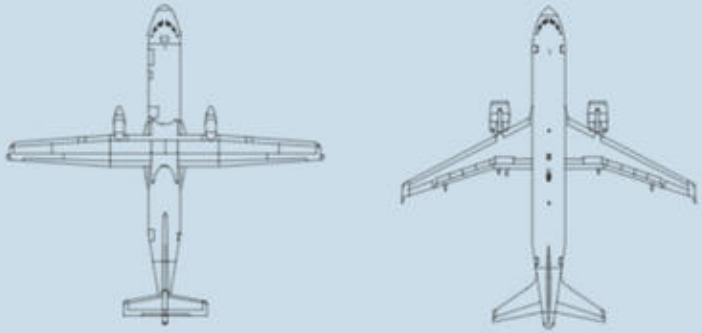
AIRBUS

The Angle of Attack

Stall recovery > Reducing the angle of attack

Altitude loss must be accepted.





AIRBUS

The Recommended Maximum Altitude

The Recommended Maximum Altitude

- The recommended maximum altitude is continuously updated in flight and based on the current gross weight and outside air temperature.

- It provides the aircraft with a 0.3 g buffet margin, a minimum rate of climb at MAX CL thrust, and level flight at MAX CRZ thrust.

- It is limited to the maximum operating altitude (Flight envelope)

The Recommended Maximum Altitude

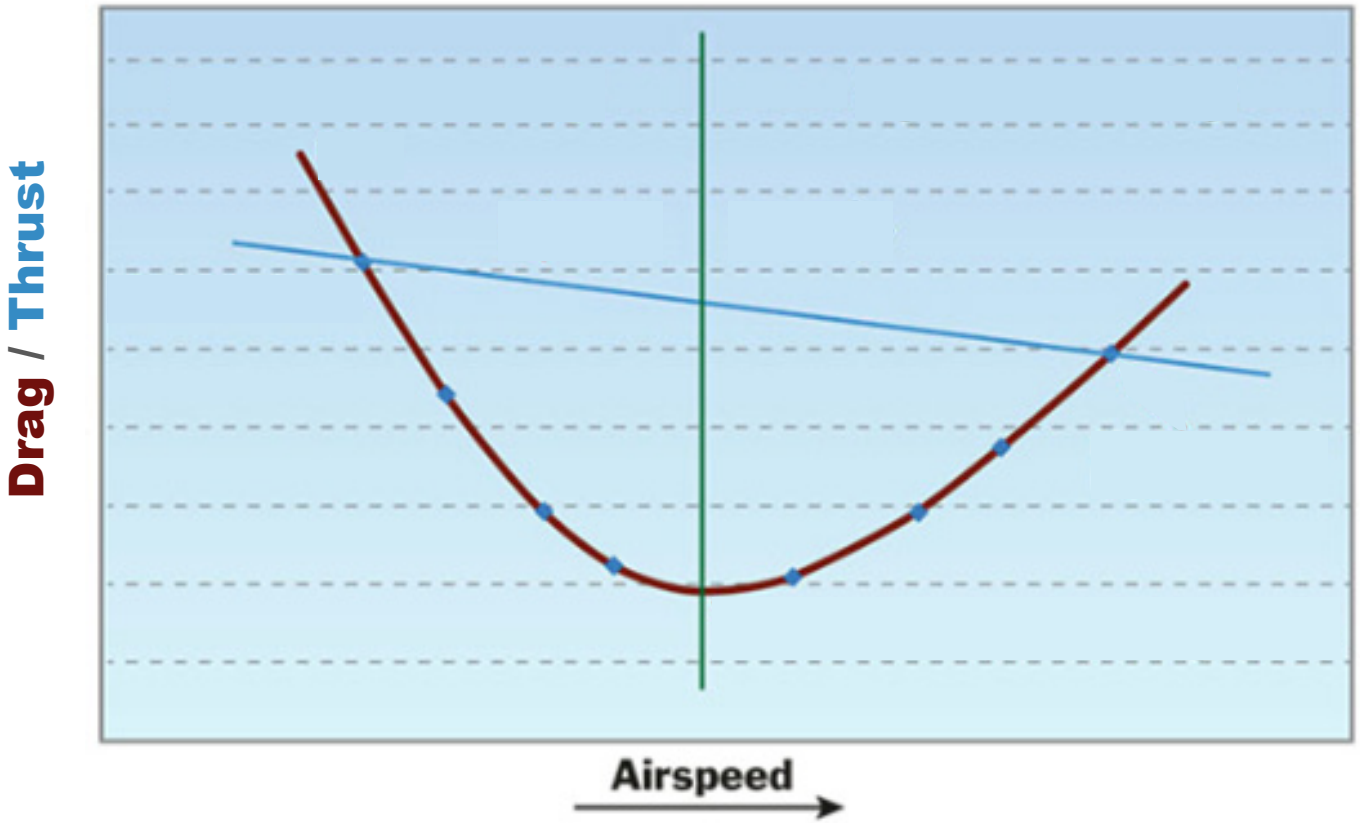
- When flying at the maximum altitude, some margins are reaching their **required minimum** in terms of:
  - Thrust
  - Airspeed
  - Buffet threshold
  - Angle of attack, and
  - Bank angle, or any other maneuvers.

Any environmental factors such as icing conditions or turbulence could rapidly lead to a **slowdown**, a **buffet onset**, a **stall condition** and, subsequently, a **high altitude upset**.

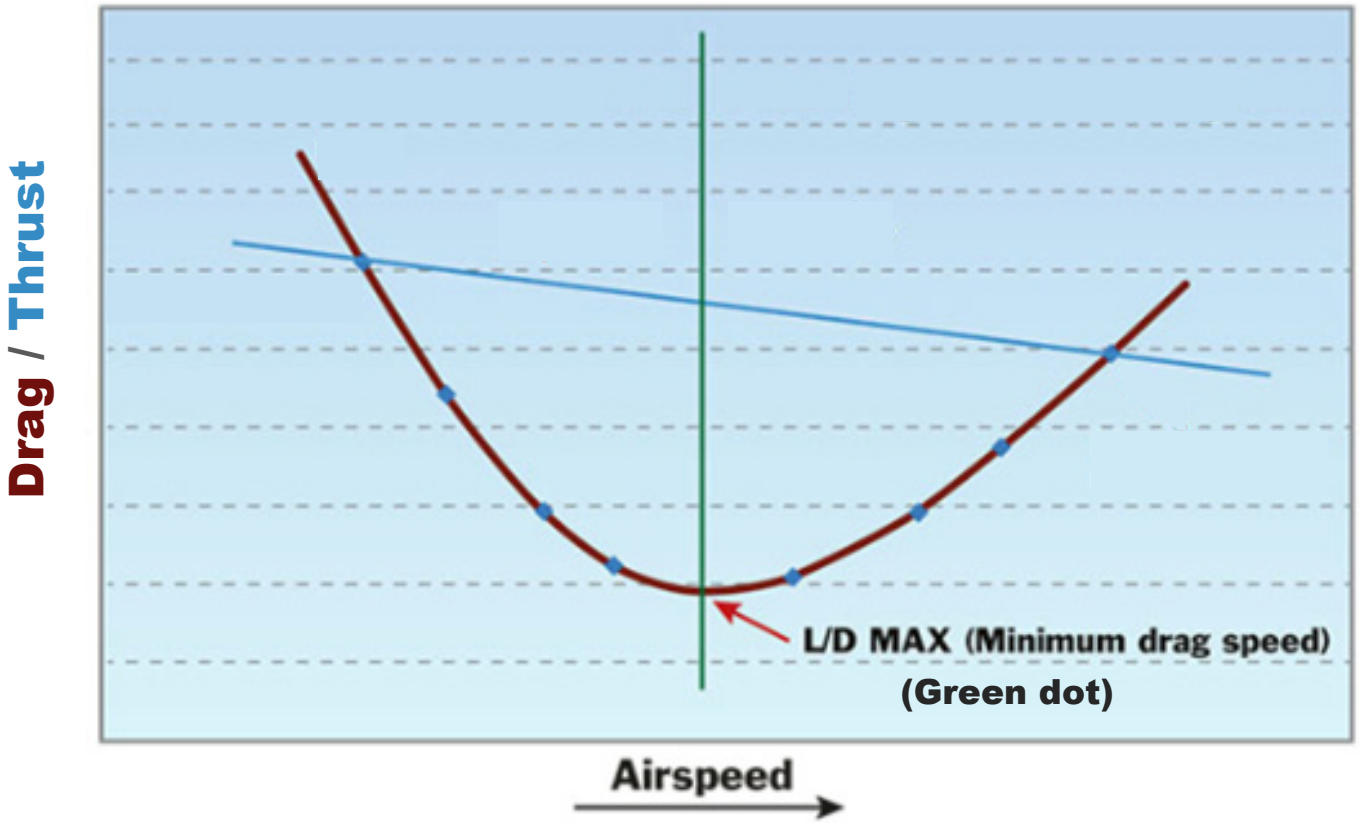
Any **increase of outside air temperature** during a flight at the maximum altitude shall be monitored as the **performances will be impacted**.

Power-Drag Curve and Airspeed Stability

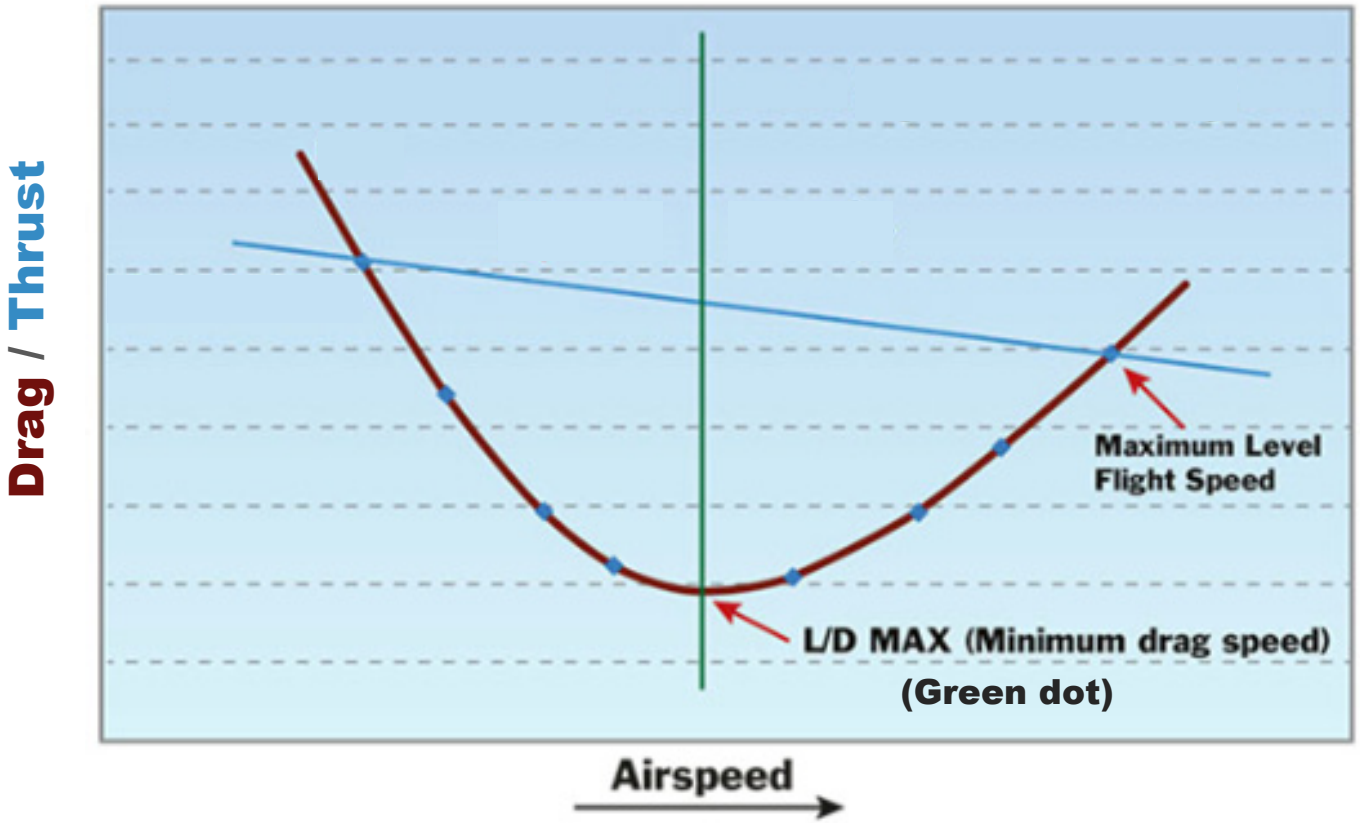
Power-Drag Curve and Airspeed Stability



Power-Drag Curve and Airspeed Stability



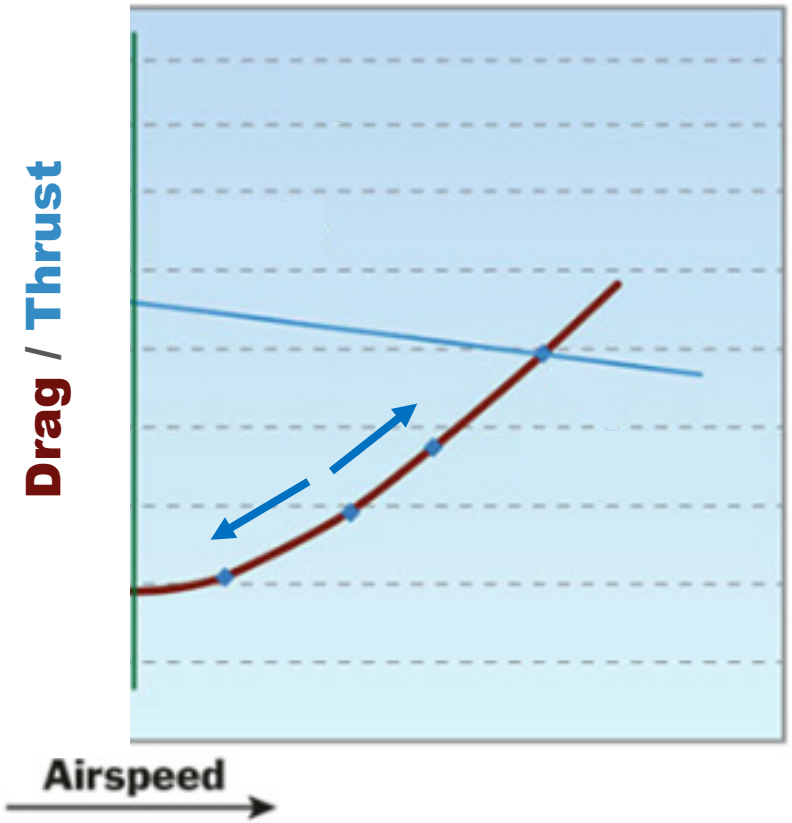
Power-Drag Curve and Airspeed Stability



AIRBUS

Power-Drag Curve and Airspeed Stability

A sudden airspeed increase (or decrease) leads to a drag increase (or decrease), helping to return to the initial airspeed

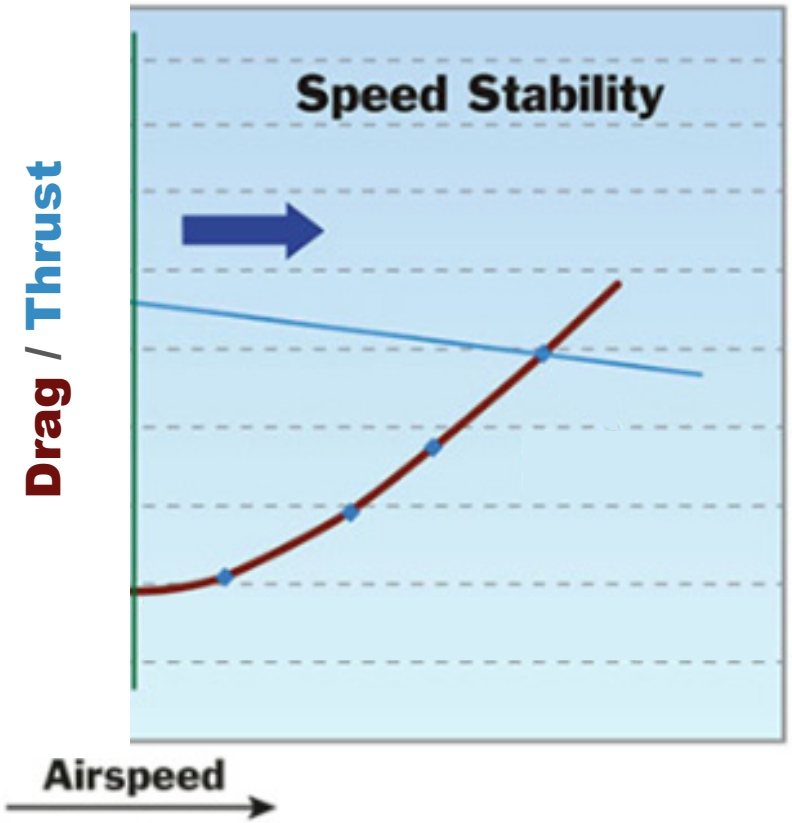


AIRBUS

Power-Drag Curve and Airspeed Stability

Normal flight, “Front side of the Power-Drag curve”, or “First regime”

A sudden airspeed increase (or decrease) leads to a drag increase (or decrease), helping to return to the initial airspeed



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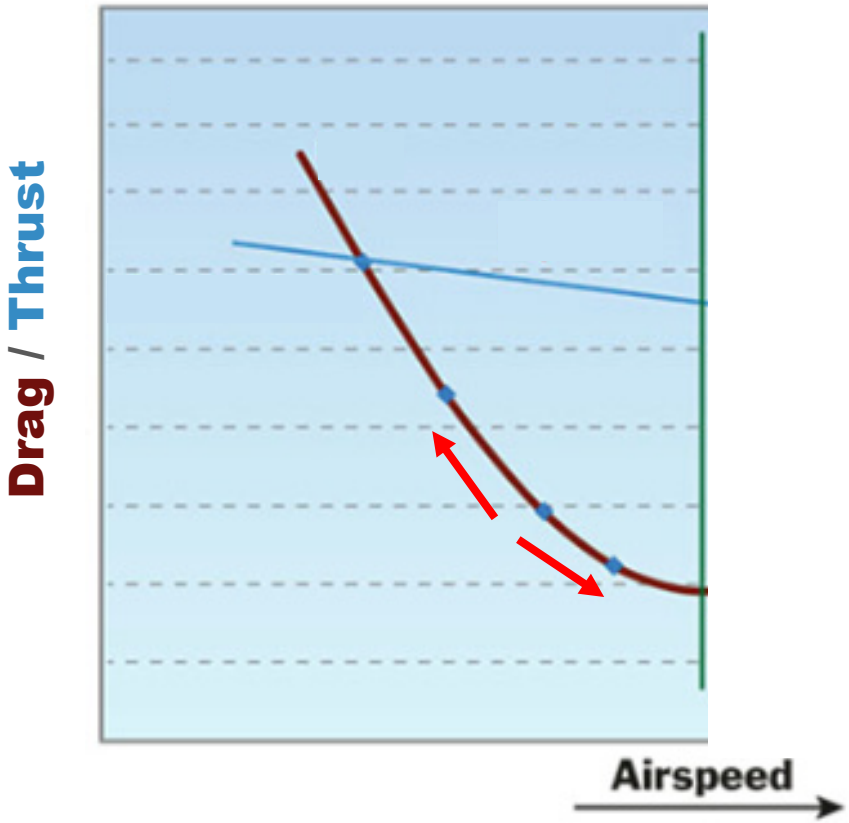
Power-Drag Curve and Airspeed Stability

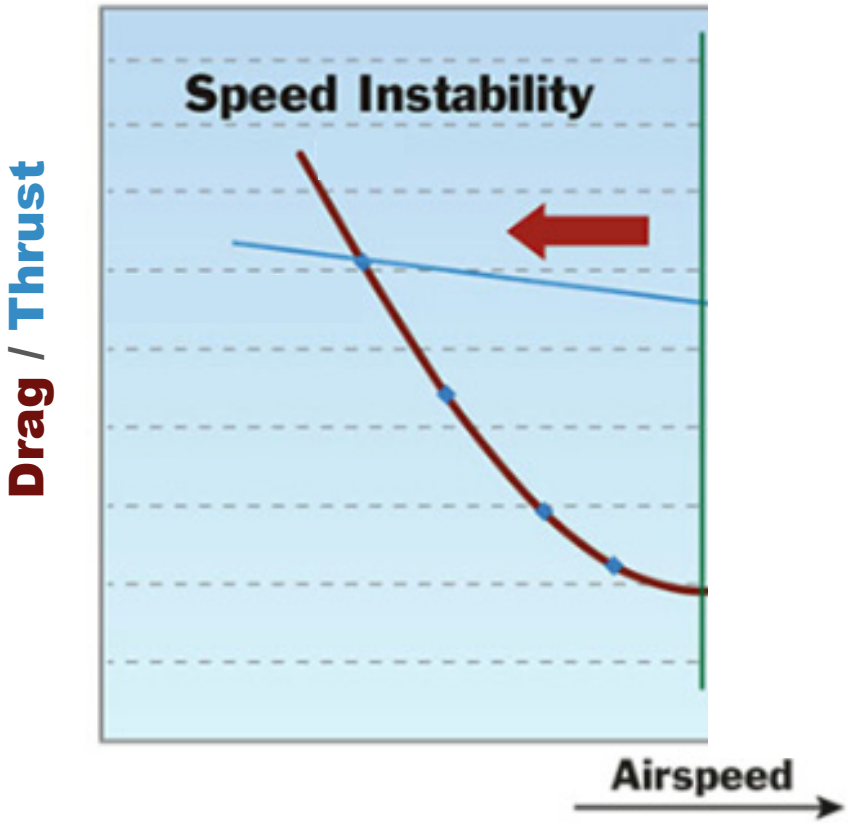


A sudden airspeed decrease (or increase) leads to a drag increase (or decrease), pushing the aircraft to decelerate (accelerate) further

AIRBUS

Power-Drag Curve and Airspeed Stability

Slow flight, “Backside of the Power-Drag curve”, or “second regime”



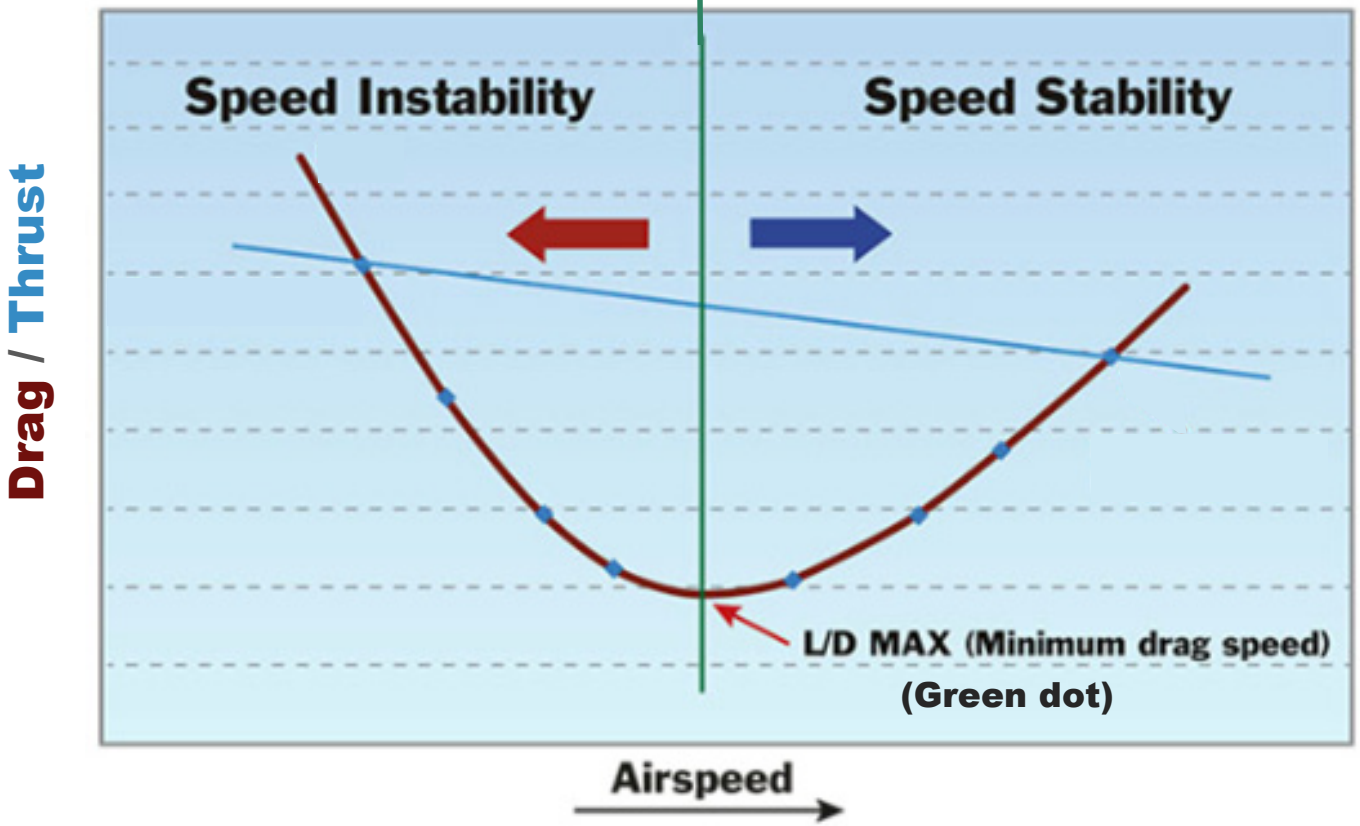
A sudden airspeed decrease (or increase) leads to a drag increase (or decrease), pushing the aircraft to decelerate (accelerate) further

AIRBUS

Power-Drag Curve and Airspeed Stability

Slow flight, “Backside of the Power-Drag curve”, or “second regime”

Normal flight, “Front side of the Power-Drag curve”, or “First regime”



AIRBUS

Maximum Design Maneuvering Speed -VA

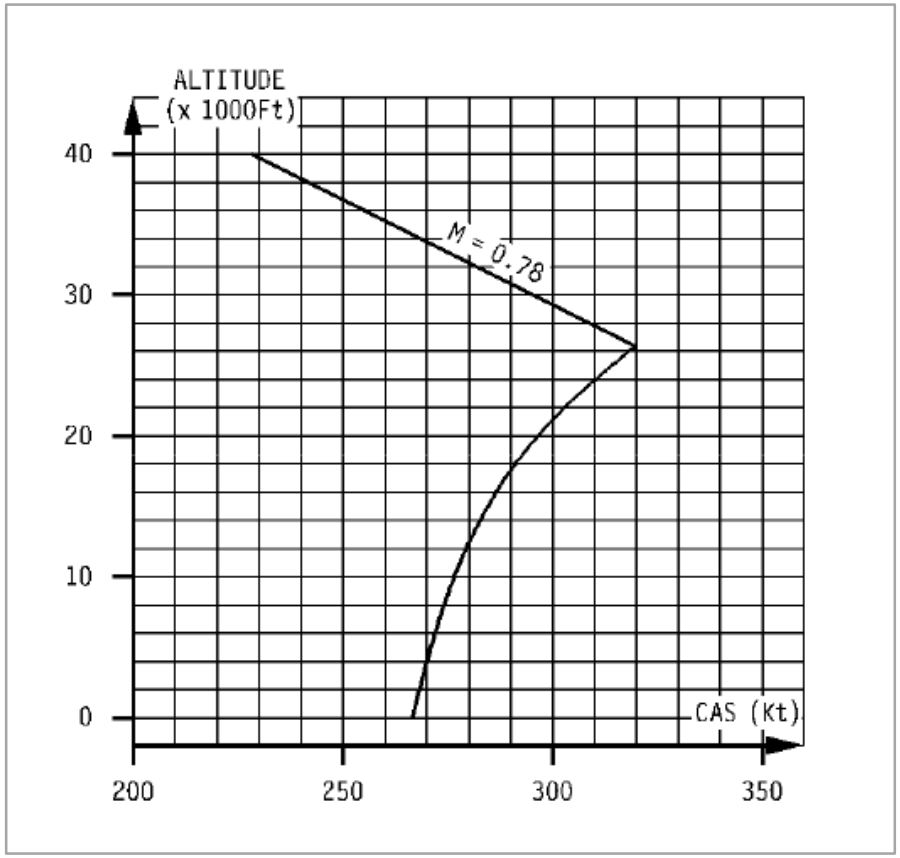
Maximum Design Maneuvering Speed -VA

- Speed above which a **single** full deflection of any flight control surface should not be attempted due to a risk of damage to the airplane structure.

- This limitation only applies in alternate or direct flight control laws.

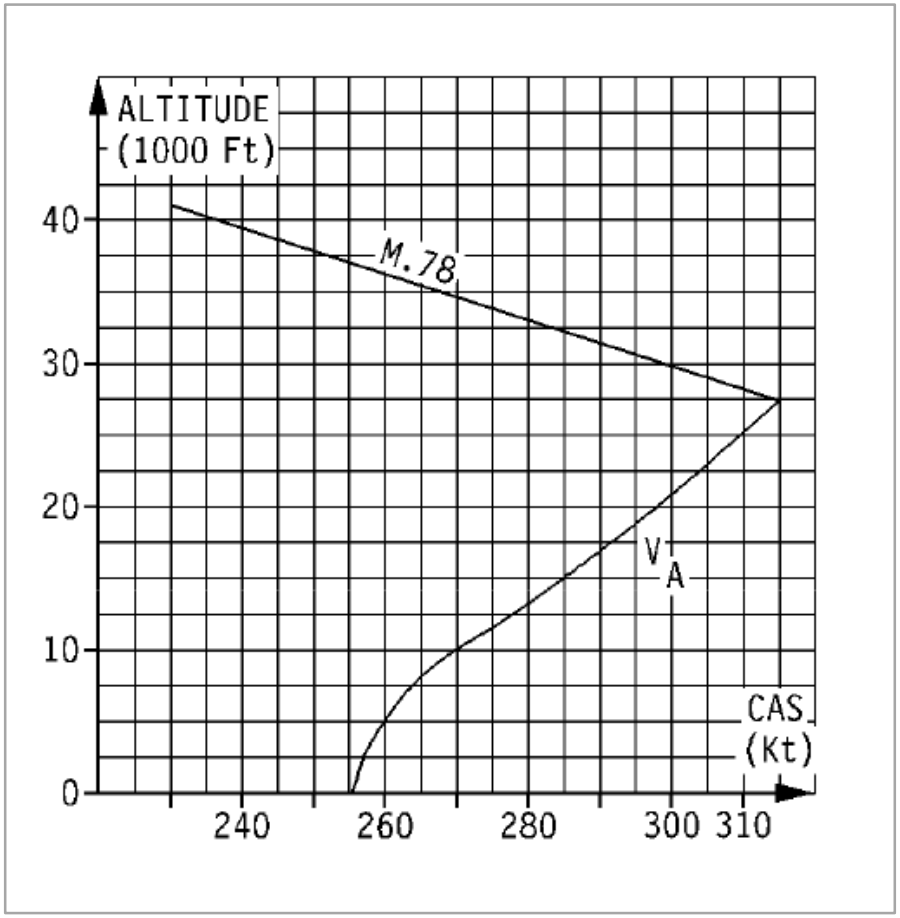
CAUTION	**Rapid and large reversal control inputs**, with large changes in pitch, roll or yaw, may result in **loads higher than the limit** and **structural failures** at any speed, **even below VA.** In the event of such rudder inputs, the rudder travel limiter **does not prevent** structural damage or failure.

A300-600 - VA



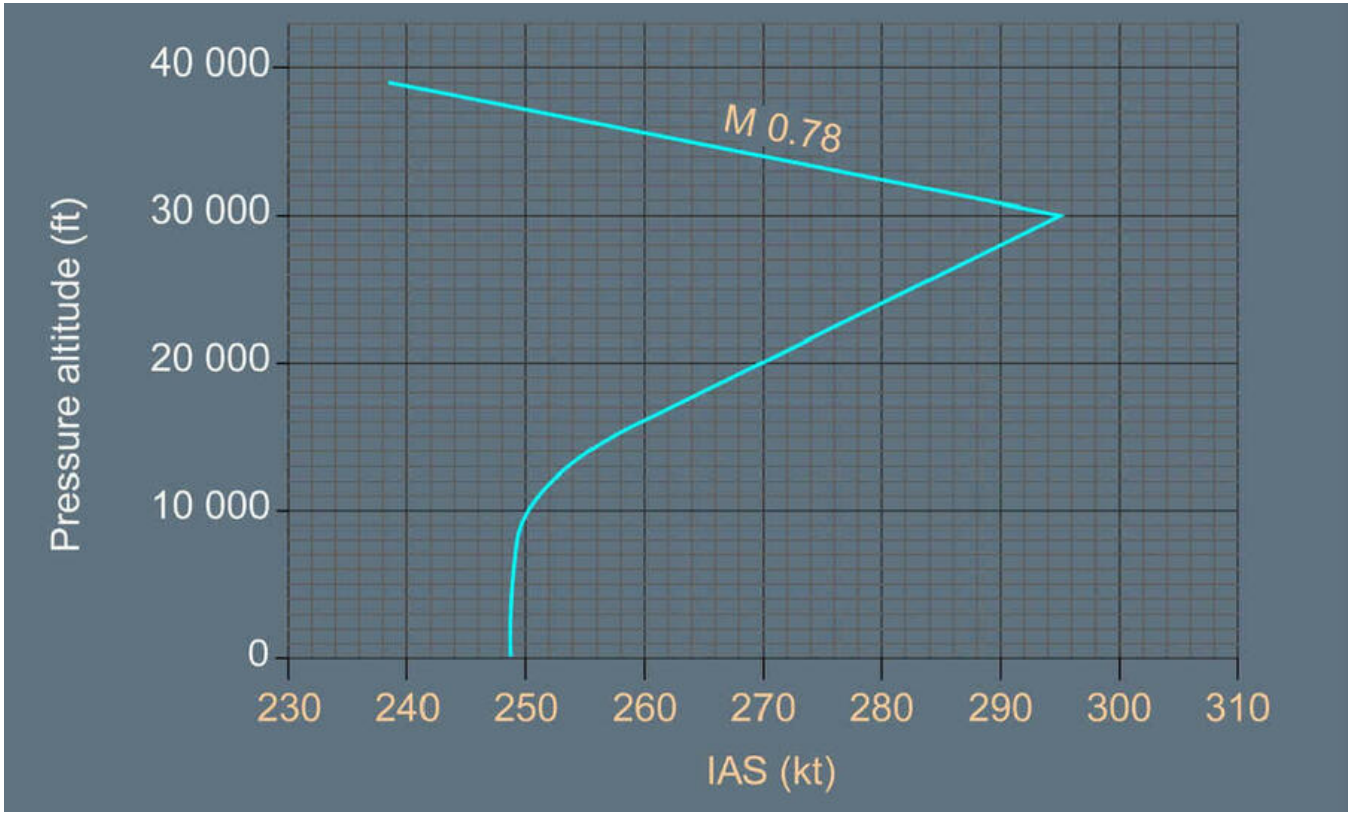
AIRBUS

A310 - VA

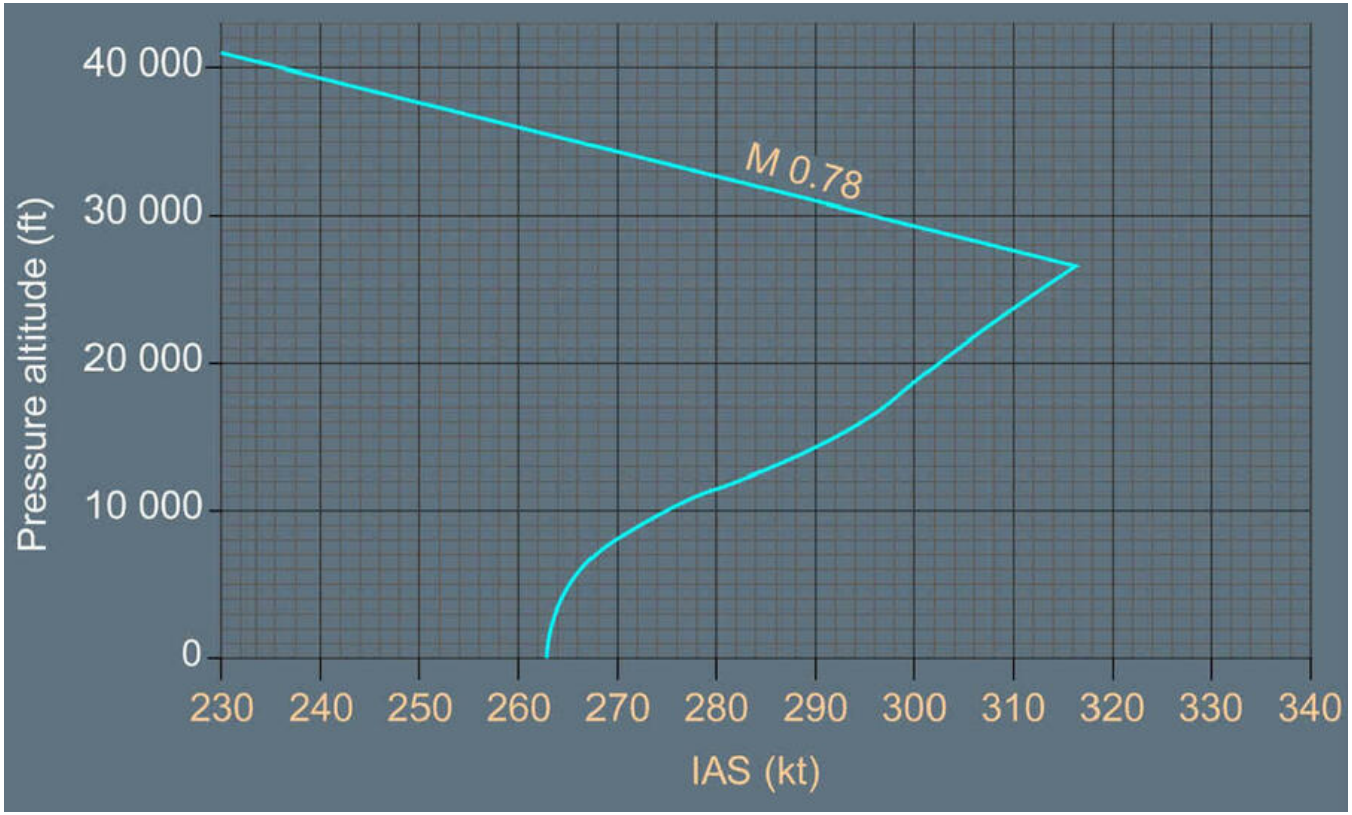


AIRBUS

A320 - VA



A330 - VA



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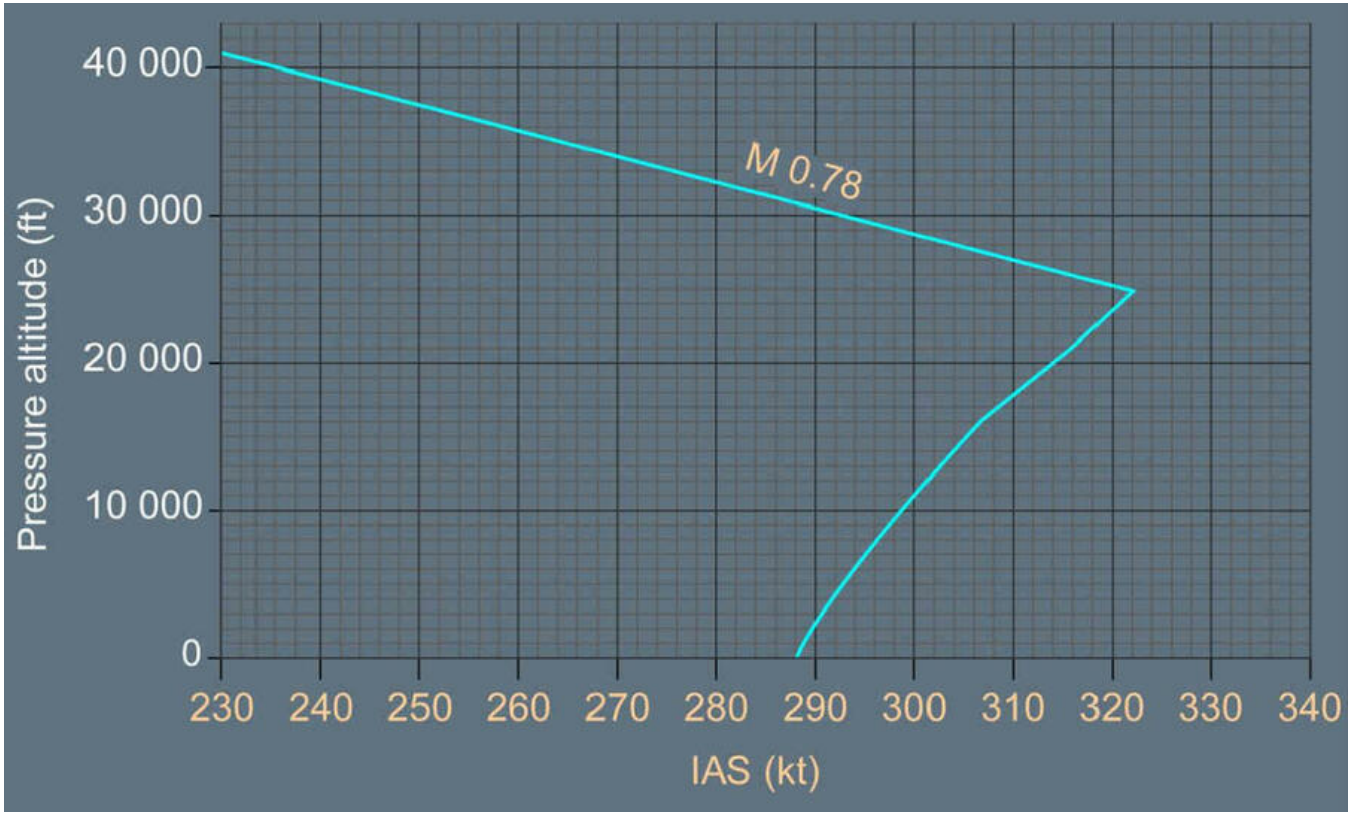

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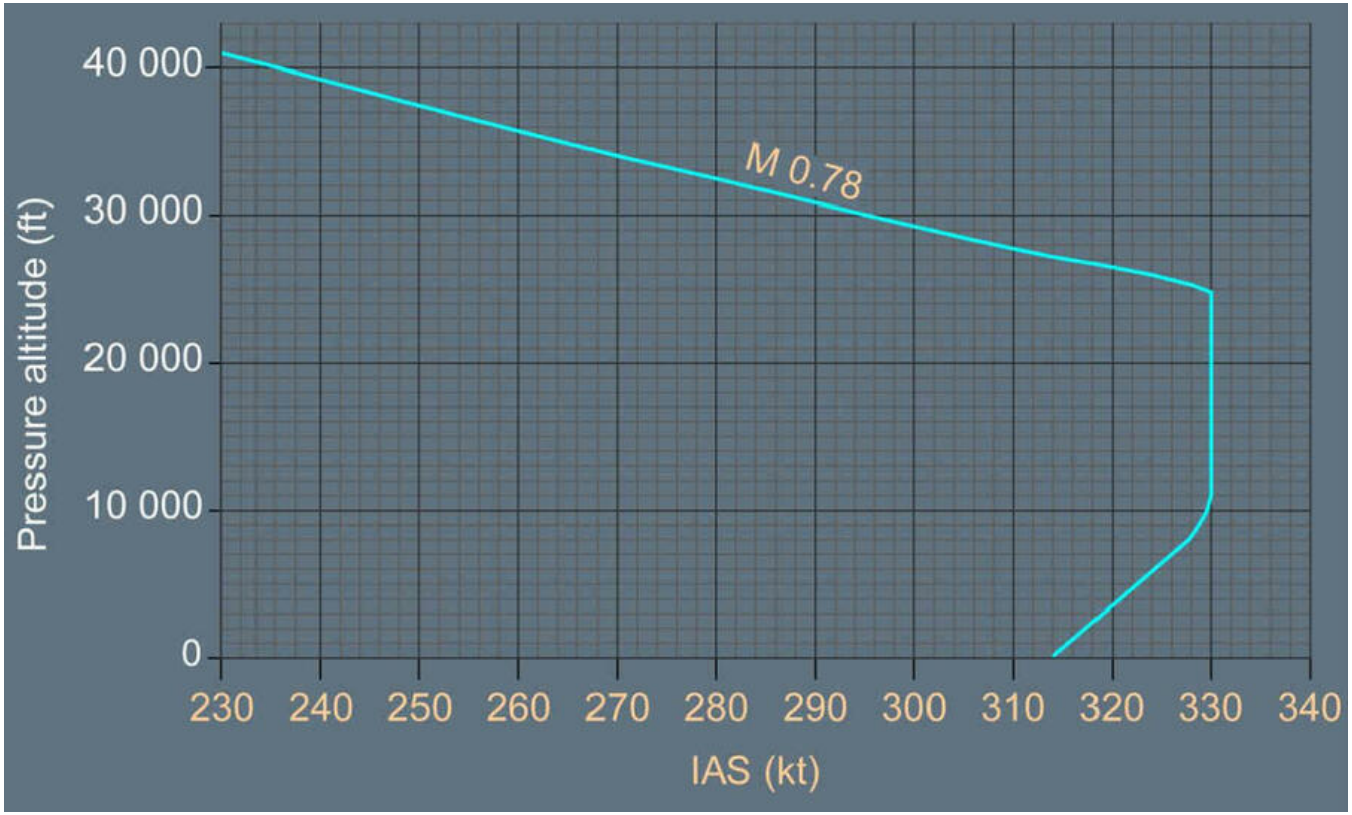

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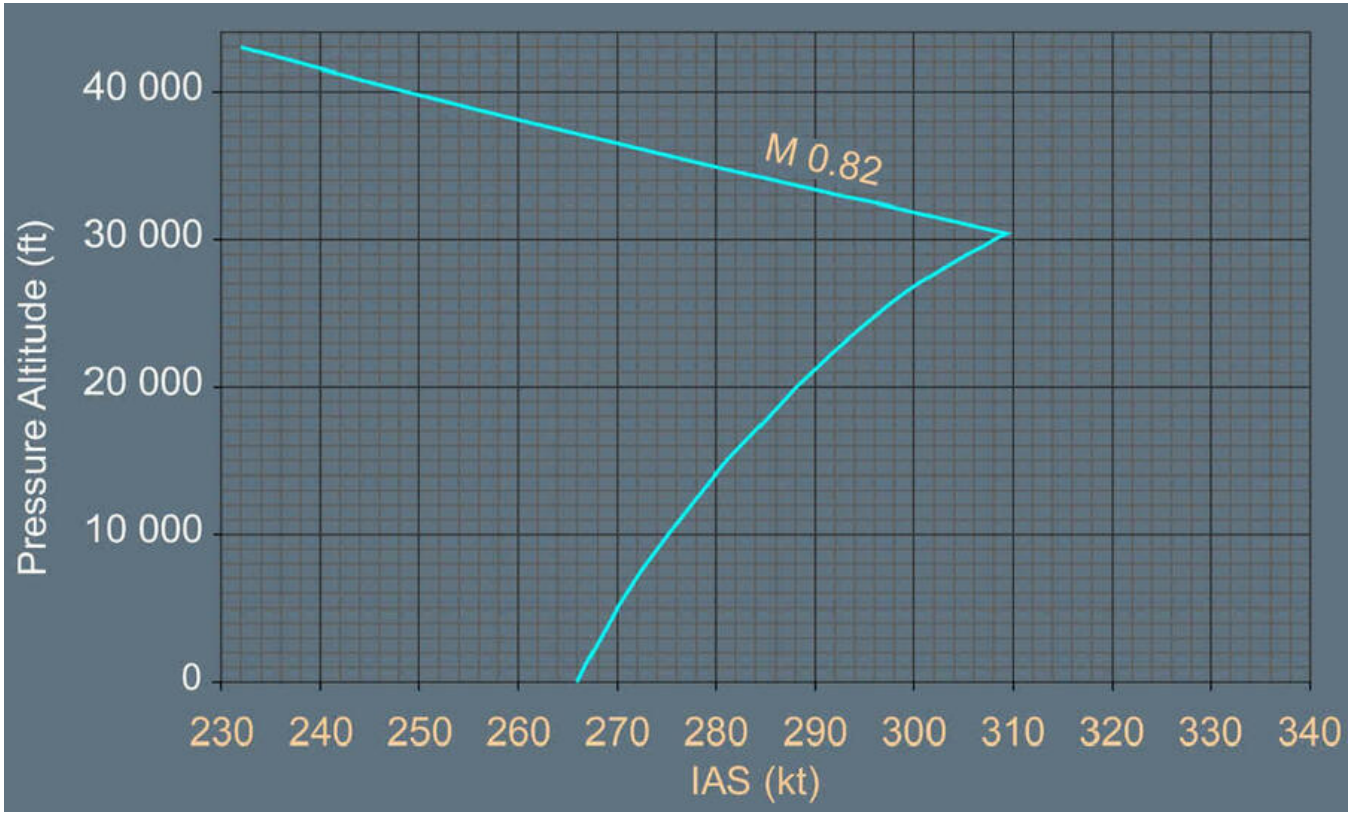
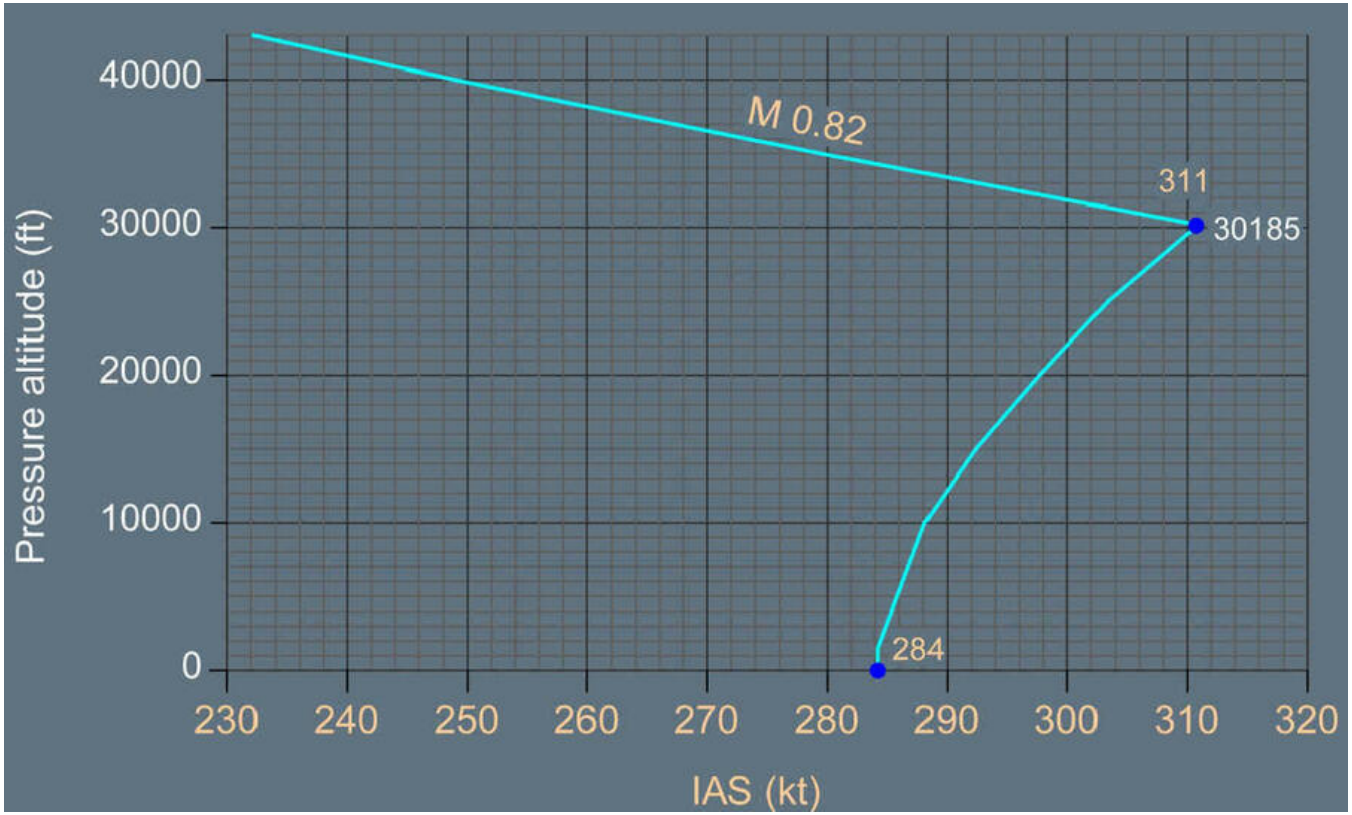


A380 - VA



PREV

AIRBUS

Airplane Upset Prevention and Recovery Training

Airplane Upset Recovery Techniques

START

AIRBUS

OCT 2022

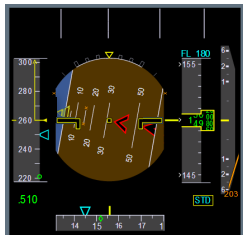
Upset Recovery Techniques – Reminder

- An airplane upset is an **undesired airplane state** characterized by unintentional divergences from parameters normally experienced during operations. An upset condition exists any **time an airplane is diverging from what the pilots are intending it to do.**

- The first upset recovery actions must be **effective and timely**. Only engaged - and therefore **situationally aware** – pilots can effectively and timely recover from an upset.

- Actions to recover from an upset encompass the following basic activities:
  1. **Become situationally aware and analyze the situation** (Recognition)
  2. **Arrest the flight path divergence and recover to a stabilized flight path** (Recovery)**.**

These activities must be part of every upset recovery.



PREV NEXT

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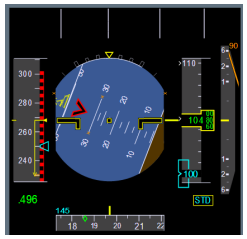
Upset Recovery Techniques – Reminder

- All upset recovery techniques assume **the airplane is NOT STALLED.** When needed, **RECOVER FROM STALL FIRST**.
- The techniques represent a logical progression for recovering the airplane. They are not necessarily procedural. The sequence of actions is for guidance only and represents a series of options for the pilot to consider and to use depending on the situation. **Not all actions may, or should, be necessary once recovery is underway**.
- The Primary Flight Display (PFD) is the **primary reference for recovery.**
- Exaggerated control inputs through **reflex responses must be avoided**. Control inputs to counter a developing upset must be **smooth, positive, and proportional** to the amount and rate of pitch, roll, or yaw experienced**.**
- For more information, refer to the FCTM (Procedures / Abnormal and Emergency Procedures / Miscellaneous / Upset Prevention and Recovery)



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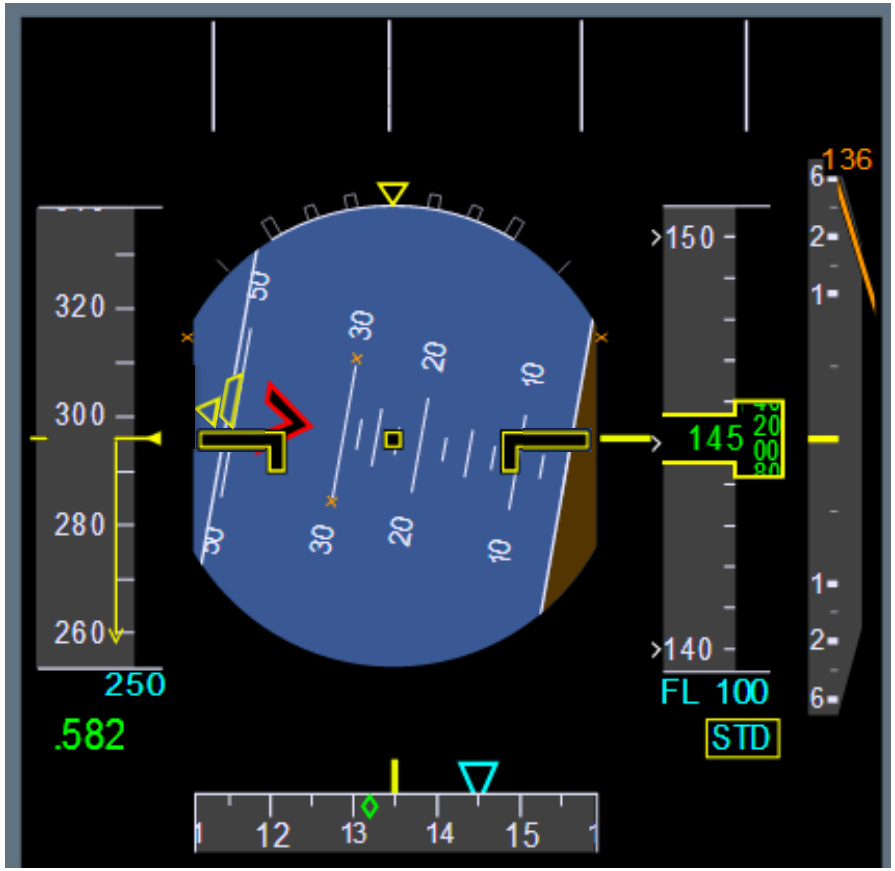
Upset Recovery Techniques – Nose High



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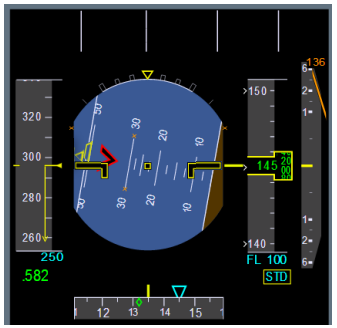
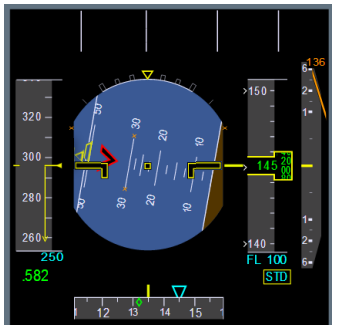
Upset Recovery Techniques – Nose High



Nose High Actions

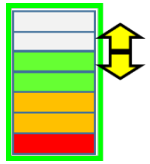
- **Recognize and confirm the situation**

Upset Recovery Techniques – Nose High

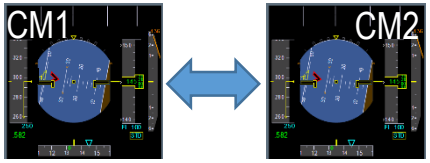


Troubleshooting the cause of the upset is secondary to initiating the recovery. However, the pilot still must **recognize and confirm the situation** before a recovery can be initiated. This means:

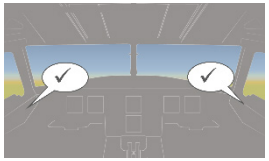
- Assess the energy: Energy state and energy rate of change



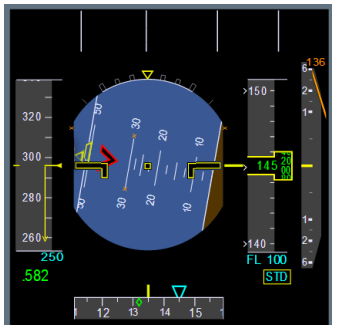
- Confirm the airplane attitude: Pitch and bank angles



- Announce: “NOSE HIGH”



Upset Recovery Techniques – Nose High



Nose High Actions

- Recognize and confirm the situation
- **Takeover and disconnect AP and A/THR (if required)**

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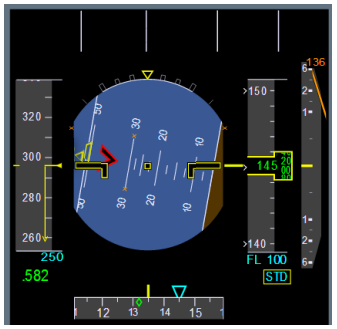
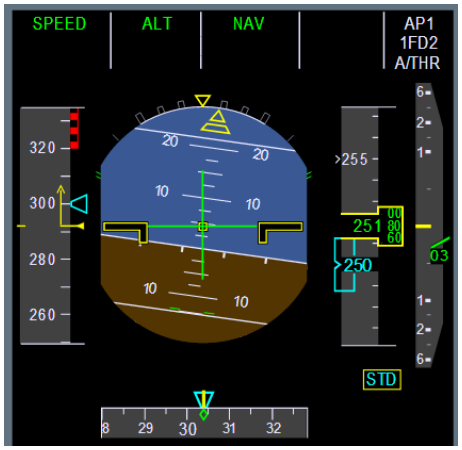
Upset Recovery Techniques – Nose High



If the AP and A/THR responses enable to stop the flight path divergence, the flight crew may keep the AP and A/THR engaged.



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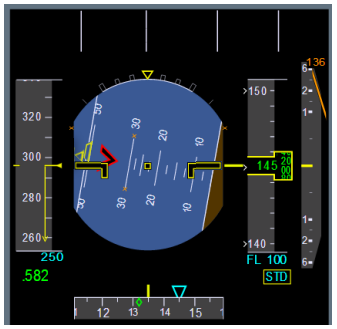
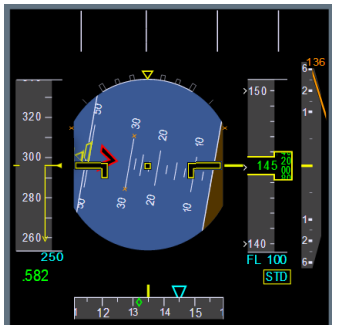
Upset Recovery Techniques – Nose High



Nose High Actions

- Recognize and confirm the situation
- Takeover and disconnect AP and A/THR (if required)
- **Apply nose down pitch order**

Upset Recovery Techniques – Nose High



The flight crew must apply as much nose down pitch order as required to obtain a nose down pitch rate.

In the case of lack of pitch down authority, the flight crew may use incremental inputs on the trim (nose down) to improve the effectiveness of the elevator control.

<u>Note:</u> Excessive use of pitch trim may make the upset situation worse or may result in high structural loads.

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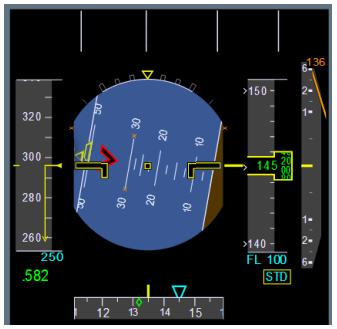
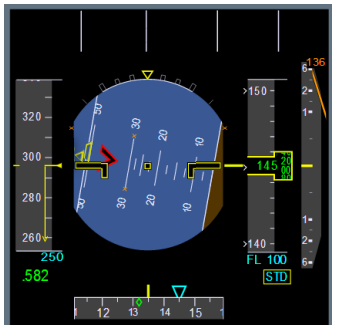
Upset Recovery Techniques – Nose High



Nose High Actions

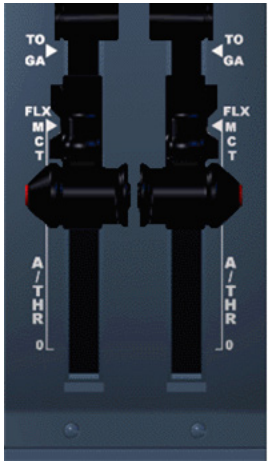
- Recognize and confirm the situation
- Takeover and disconnect AP and A/THR (if required)
- Apply nose down pitch order
- **Adjust the thrust**

Upset Recovery Techniques – Nose High



Select up to maximum thrust available while ensuring adequate pitch control.

Increasing thrust may reduce the effectiveness of nose-down pitch control. It may be necessary to limit or reduce thrust to the point where control of the pitch is achieved.



Pitch up moment of underwing mounted engines

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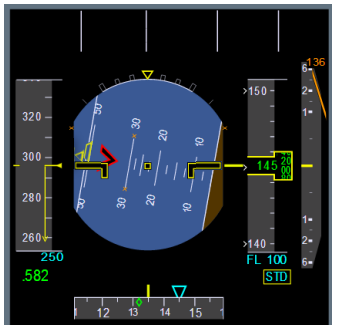
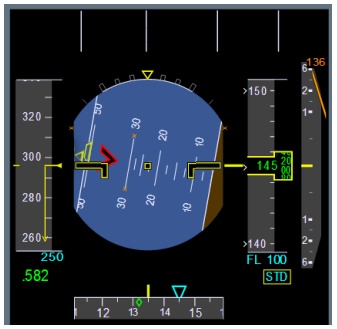
Upset Recovery Techniques – Nose High



Nose High Actions

- Recognize and confirm the situation
- Takeover and disconnect AP and A/THR (if required)
- Apply nose down pitch order
- Adjust the thrust
- **Adjust the roll not to exceed 60 degrees**

Upset Recovery Techniques – Nose High

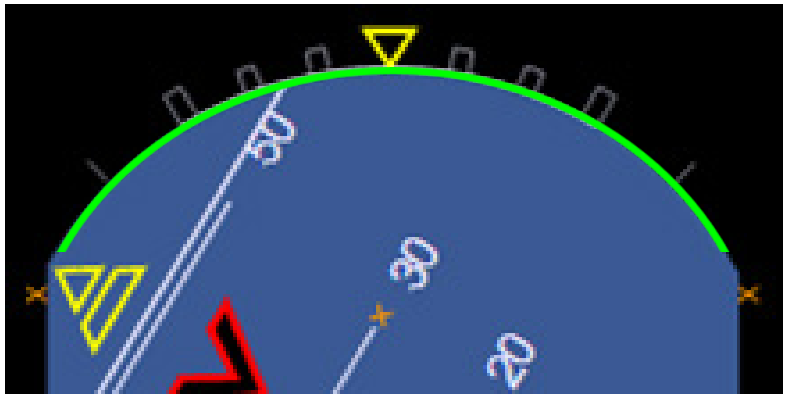


The bank angle must not exceed 60 degrees.

If all normal pitch control techniques are unsuccessful, the flight crew can keep the current bank or bank the aircraft to enable the nose to drop toward the horizon.

The bank angle should be the least possible to start the nose down and never exceed approximately 60 degrees. If the bank angle is already greater than 60 degrees, the flight crew should reduce it to an amount less than 60 degrees.

60 degrees maximum



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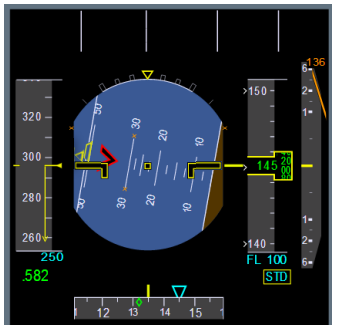
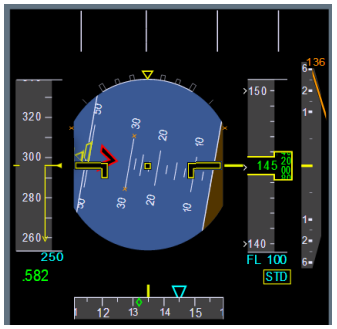
Upset Recovery Techniques – Nose High



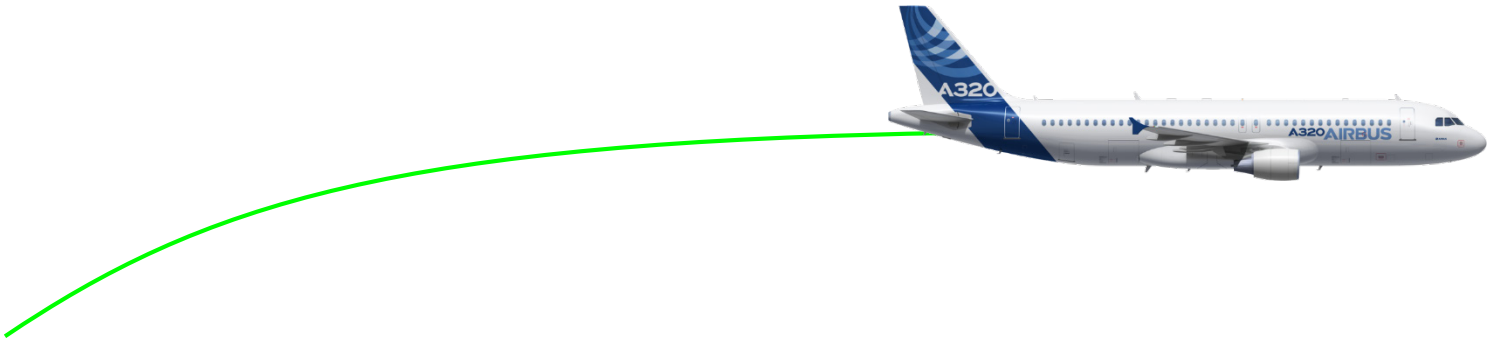
Nose High Actions

- Recognize and confirm the situation
- Takeover and disconnect AP and A/THR (if required)
- Apply nose down pitch order
- Adjust the thrust
- Adjust the roll not to exceed 60 degrees
- **Recover the level flight**

Upset Recovery Techniques – Nose High



Recover to level flight at a sufficient airspeed while avoiding a stall due to premature recovery at low speed, or excessive g-loading at high speed.



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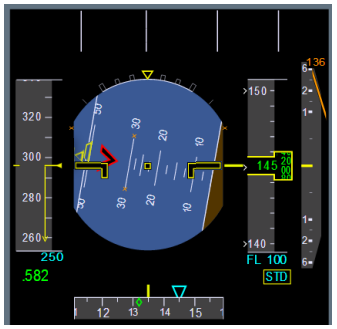
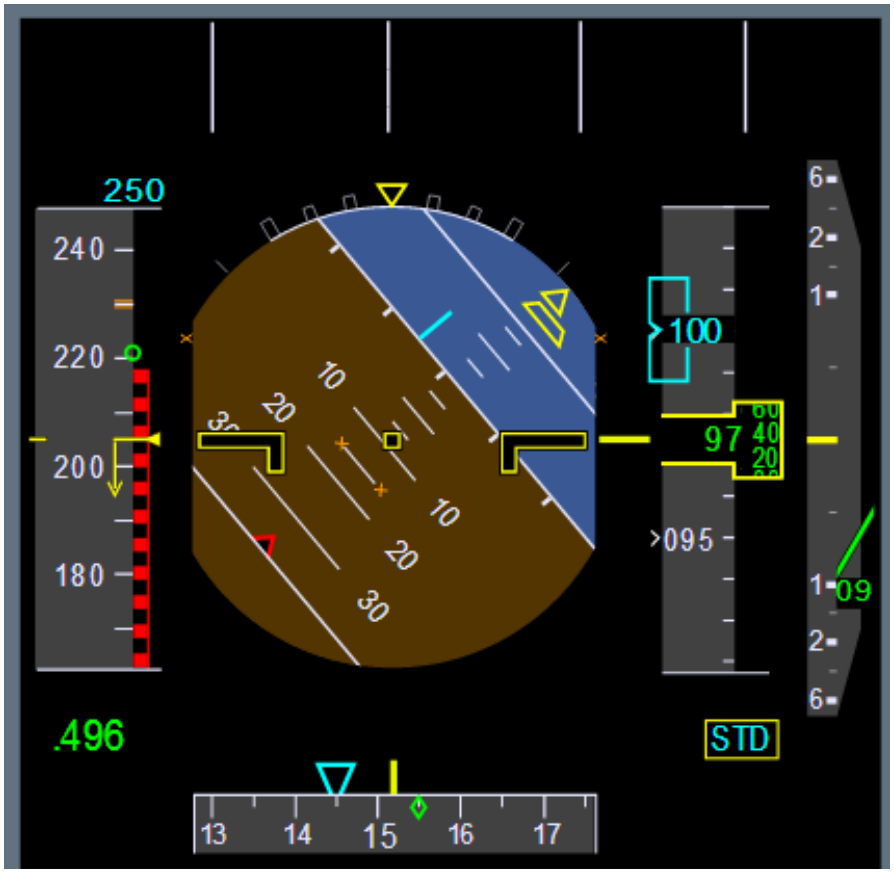
Upset Recovery Techniques – Nose High



Nose High Actions

- Recognize and confirm the situation
- Takeover and disconnect AP and A/THR (if required)
- Apply nose down pitch order
- Adjust the thrust
- Adjust the roll not to exceed 60 degrees
- Recover the level flight

Upset Recovery Techniques – Nose Low



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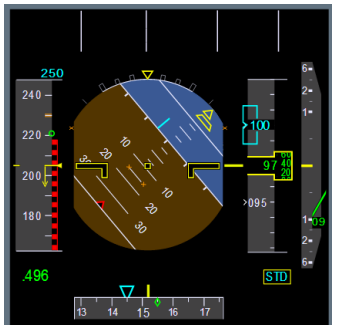
Upset Recovery Techniques – Nose Low



Nose Low Actions

- **Recognize and confirm the situation**

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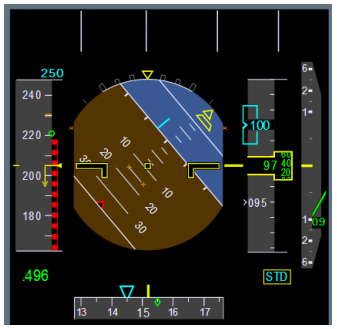
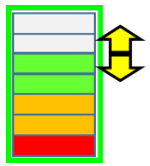
Upset Recovery Techniques – Nose Low

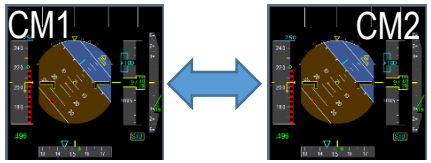


Troubleshooting the cause of the upset is secondary to initiating the recovery. However, the pilot still must **recognize and confirm the situation** before a recovery can be initiated. This means:

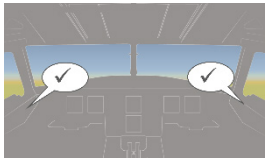
- Assess the energy: Energy state and energy rate of change



- Confirm the airplane attitude: Pitch and bank angles



- Announce: “NOSE LOW”



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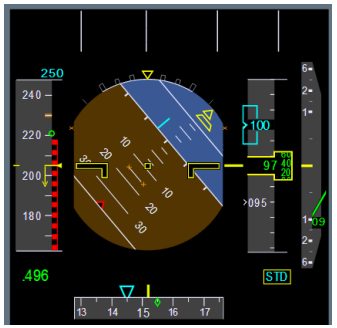
Upset Recovery Techniques – Nose Low



Nose Low Actions

- Recognize and confirm the situation
- **Takeover and disconnect AP and A/THR (if required)**

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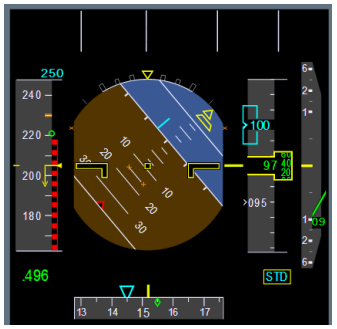
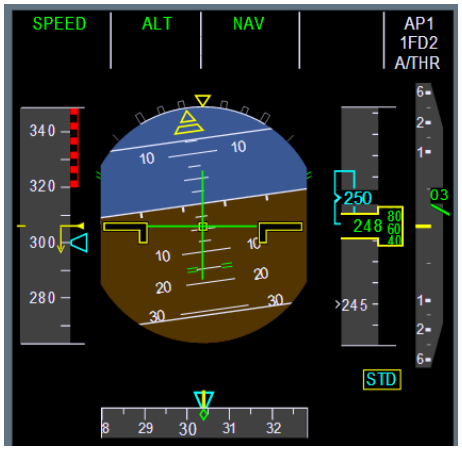
Upset Recovery Techniques – Nose Low



Same as Nose High

If the AP and A/THR responses enable to stop the flight path divergence, the flight crew may keep the AP and A/THR engaged.



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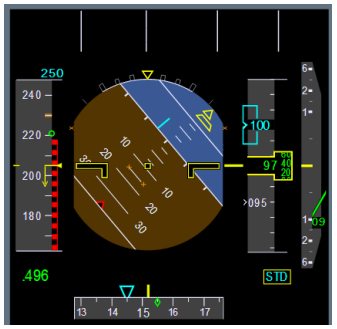
Upset Recovery Techniques – Nose Low



Nose Low Actions

- Recognize and confirm the situation
- Takeover and disconnect AP and A/THR (if required)
- **Recover from stall (if required)**

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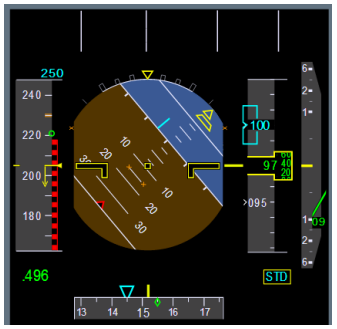
Upset Recovery Techniques – Nose Low



Even in a nose low situation, the aircraft may be stalled and it would be necessary to recover from a stall first.

This counter-intuitive action is just a reminder as you must always recover from stall first.

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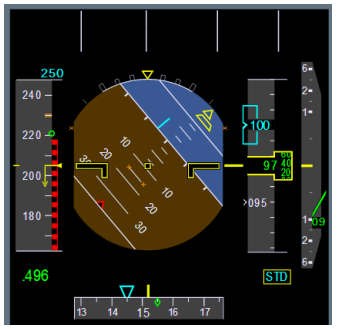
Upset Recovery Techniques – Nose Low



Nose Low Actions

- Recognize and confirm the situation
- Takeover and disconnect AP and A/THR (if required)
- Recover from stall (if required)
- **Adjust the roll in the shortest direction to wings level**

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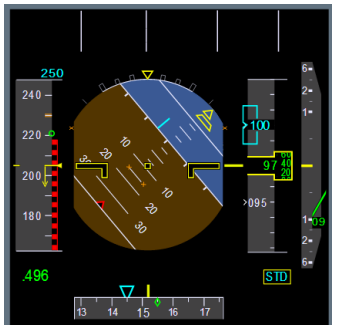
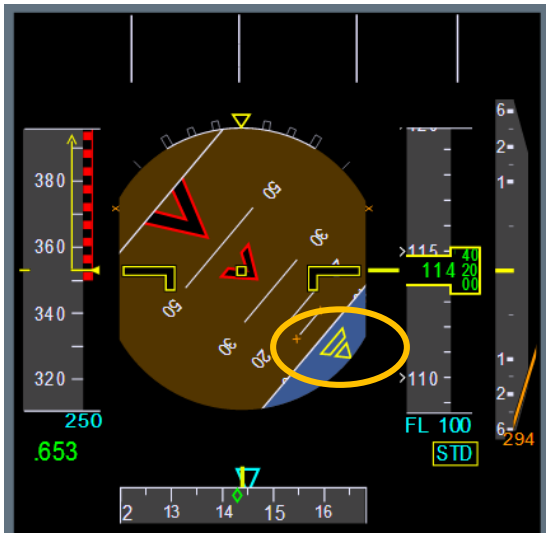
Upset Recovery Techniques – Nose Low



In general, a nose low, high-angle-of-bank requires prompt action, because the decreasing altitude is rapidly being exchanged for an increasing airspeed.

The bank angle indicator will show you the shortest direction to wings level.



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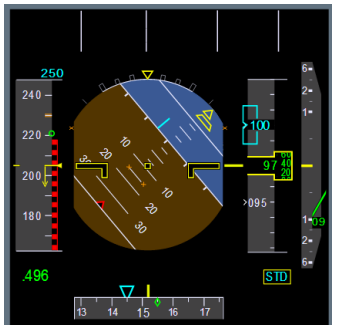
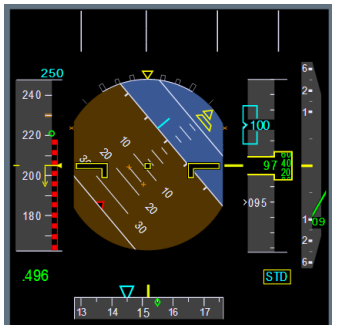
Upset Recovery Techniques – Nose Low



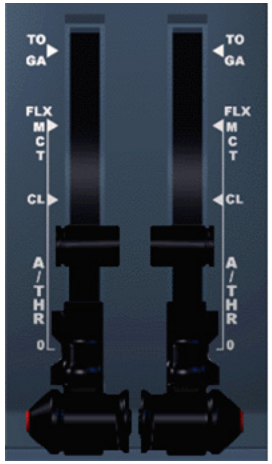
Nose Low Actions

- Recognize and confirm the situation
- Takeover and disconnect AP and A/THR (if required)
- Recover from stall (if required)
- Adjust the roll in the shortest direction to wings level
- **Adjust the thrust and the drag**

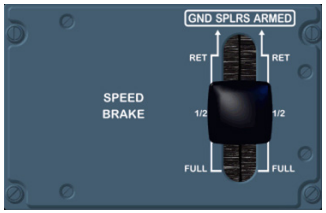
Upset Recovery Techniques – Nose Low



The flight crew should reduce the thrust and/or use the speedbrakes to control the speed.

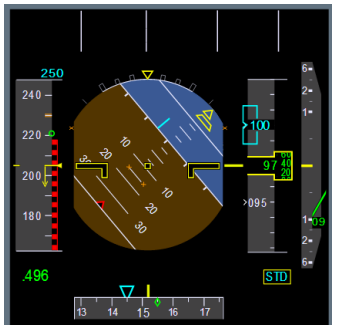


and/or



AIRBUS

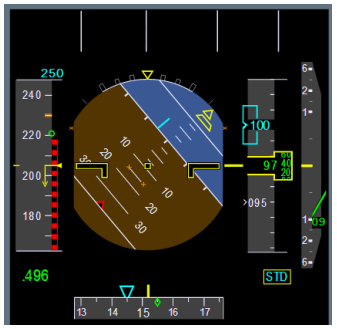
Upset Recovery Techniques – Nose Low



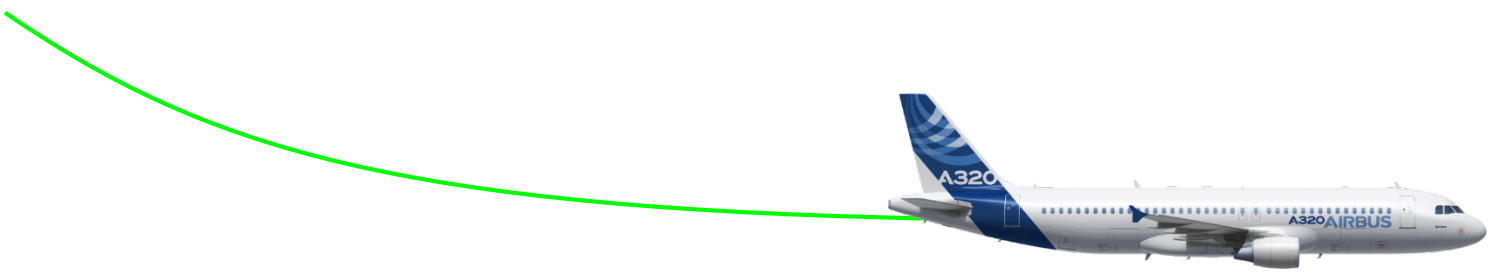
Nose Low Actions

- Recognize and confirm the situation
- Takeover and disconnect AP and A/THR (if required)
- Recover from stall (if required)
- Adjust the roll in the shortest direction to wings level
- Adjust the thrust and the drag
- **Recover the level flight**

Upset Recovery Techniques – Nose Low

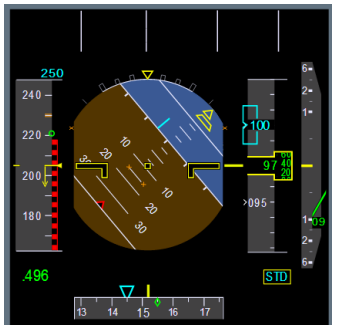


Recover to level flight at a sufficient airspeed while avoiding a stall due to premature recovery at low speed, or excessive g-loading at high speed.



AIRBUS

Upset Recovery Techniques – Nose Low



Nose Low Actions

- Recognize and confirm the situation
- Takeover and disconnect AP and A/THR (if required)
- Recover from stall (if required)
- Adjust the roll in the shortest direction to wings level
- Adjust the thrust and the drag
- Recover the level flight

Airplane Upset Prevention and Recovery Training

Extreme Attitude Training

START

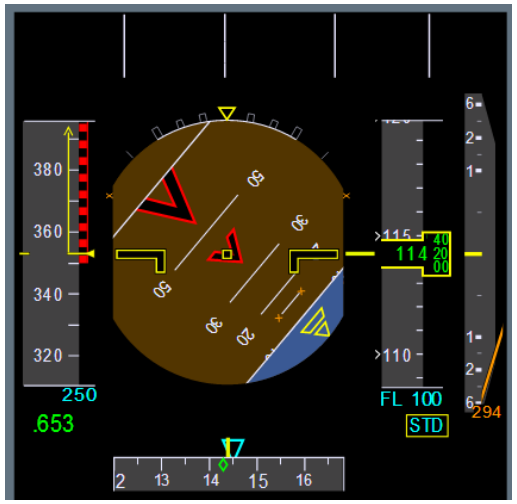
AIRBUS

OCT 2022

Extreme Attitude Training

- Aim:
  - To reinforce 3D mental picture in order to recognize and confirm developed upset situations.

Extreme Attitude Training



- Objectives:
  - To rapidly observe PFDs in upset situations
  - To recognize stall conditions, if any
  - To assess the airplane energy state and energy rate of change
  - To confirm the airplane attitude: Pitch and bank angles
  - To verbalize the situation (NOSE HIGH or NOSE LOW)
  - To determine actions to be performed for an effective recovery.

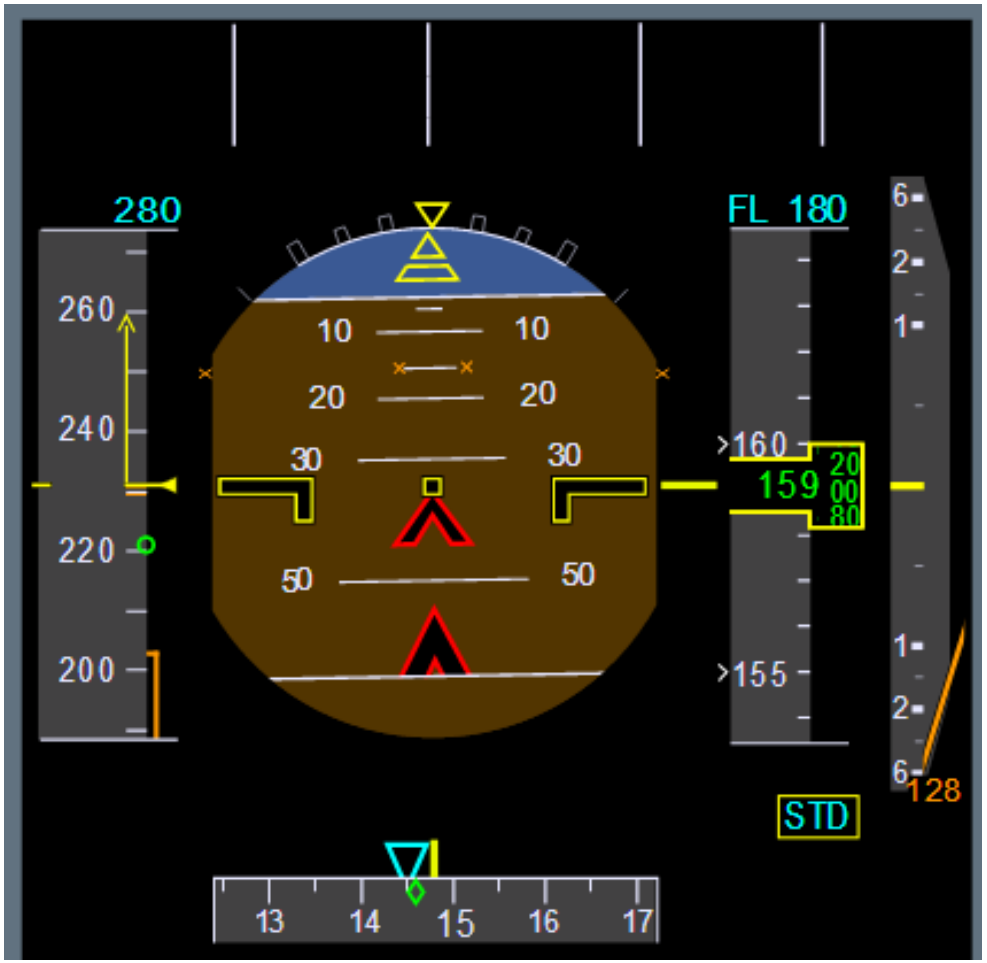
Extreme Attitude Training

Display the next slide for 2 seconds only

PREV NEXT

AIRBUS

Extreme Attitude Training



PREV NEXT

AIRBUS

Extreme Attitude Training

Any stall?

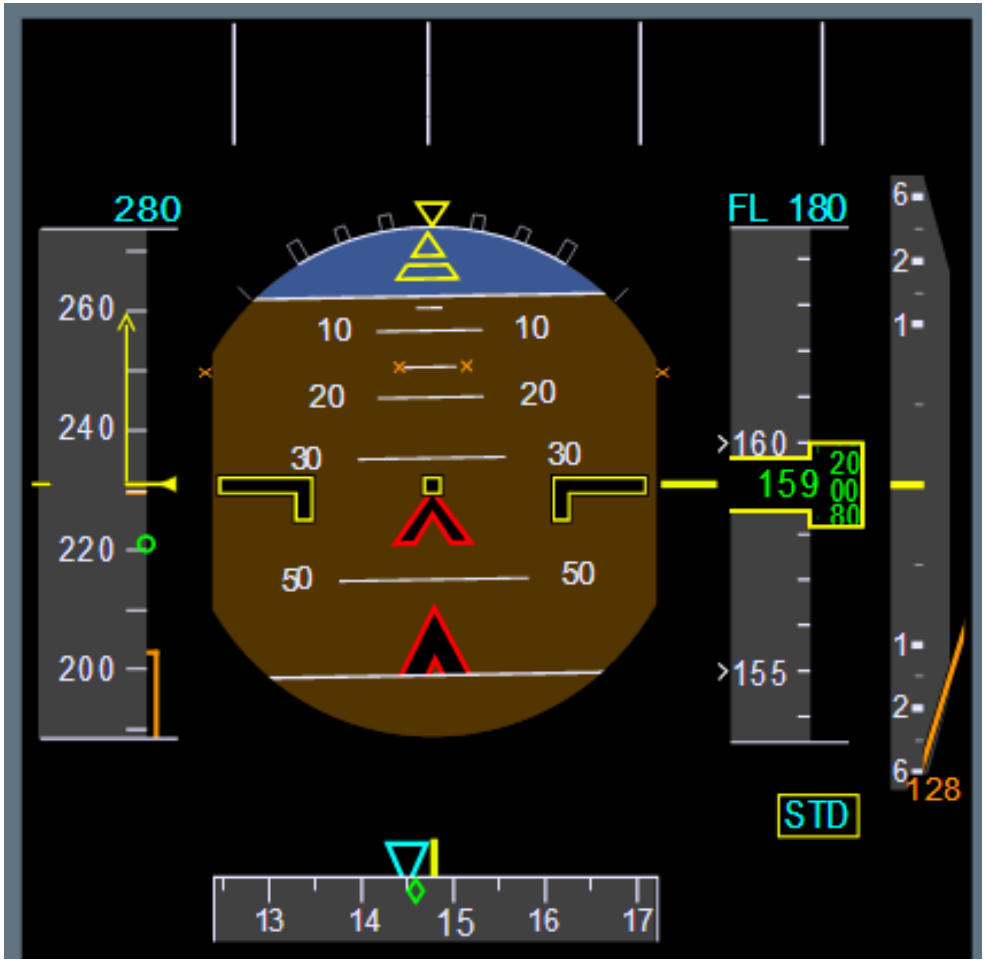
Energy state and rate of change?

Airplane attitude: pitch and bank?

Which actions for Nose High or Nose Low?

Find out the answers on the next slide…

Extreme Attitude Training



Nose Low Actions

- Adjust the thrust and the drag, if necessary
- Recover the level flight

PREV NEXT

AIRBUS

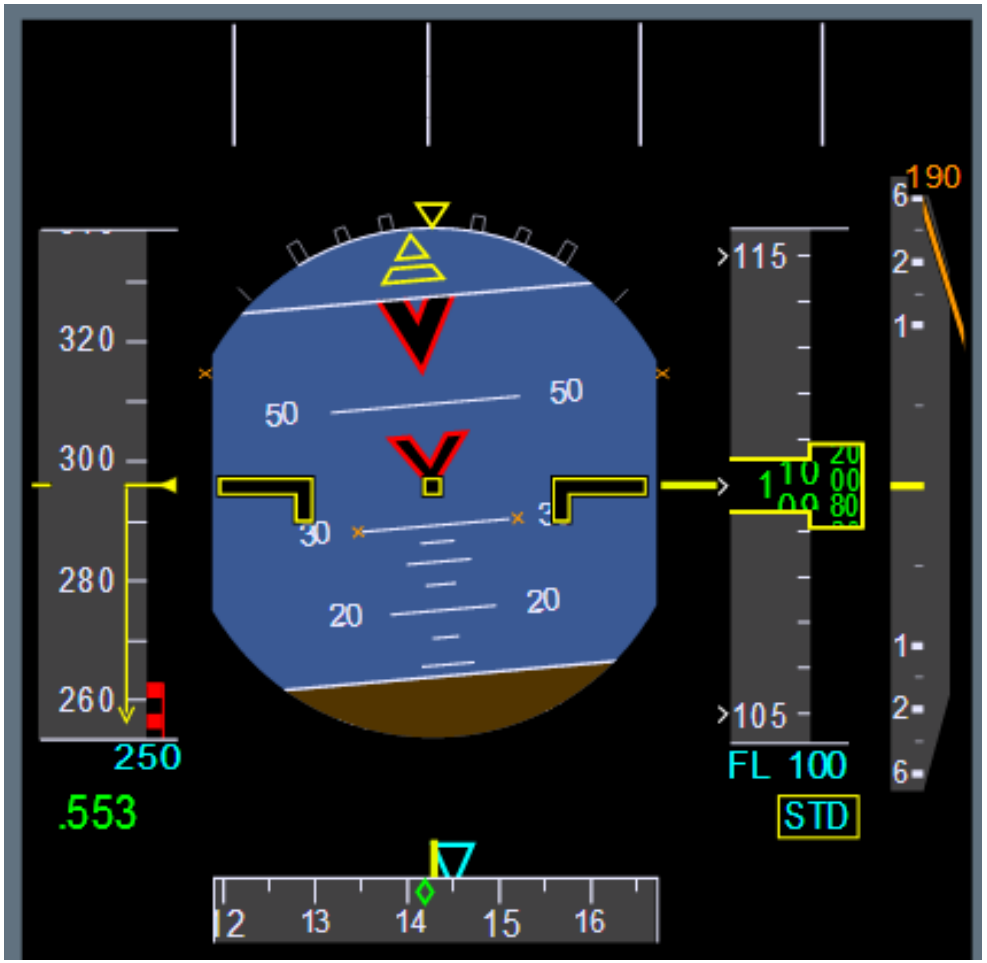
Extreme Attitude Training

Display the next slide for 2 seconds only

PREV NEXT

AIRBUS

Extreme Attitude Training



PREV NEXT

AIRBUS

Extreme Attitude Training

Any stall?

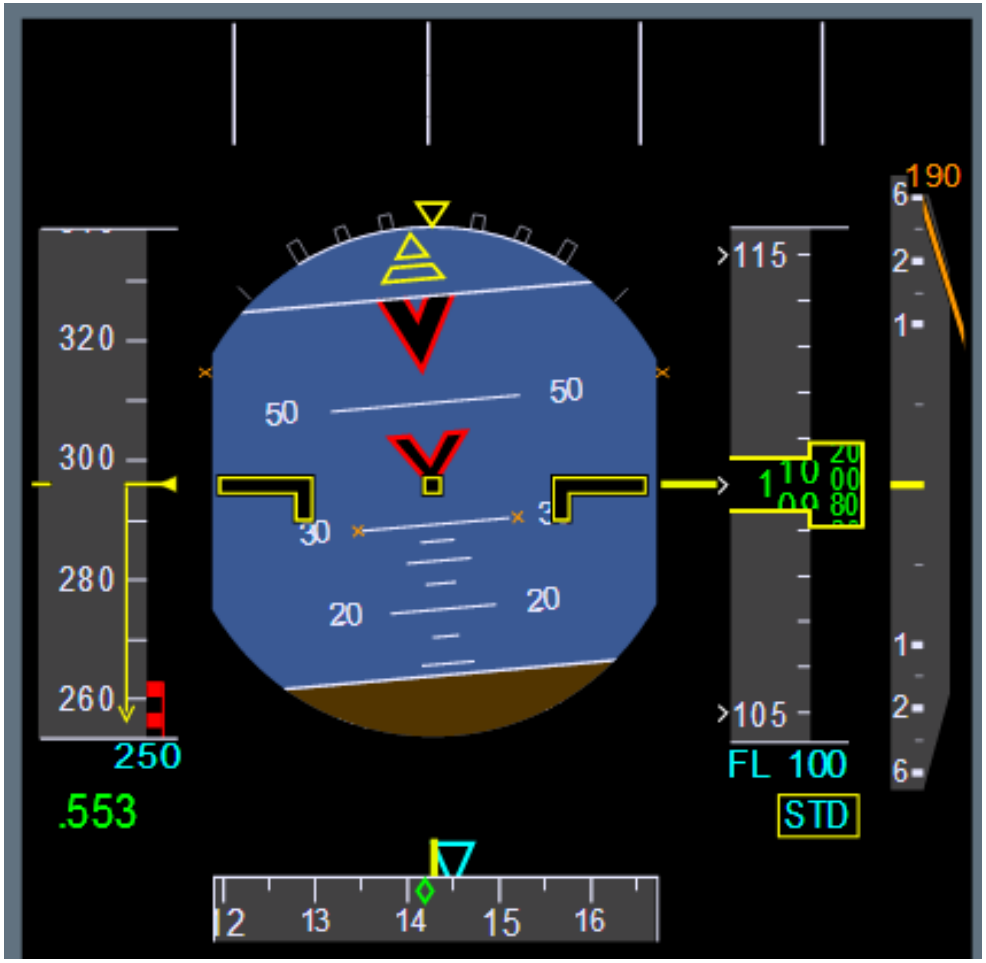
Energy state and rate of change?

Airplane attitude: pitch and bank?

Which actions for Nose High or Nose Low?

Find out the answers on the next slide…

Extreme Attitude Training



Nose High Actions

- Apply nose down pitch order
- Adjust the thrust
- If all normal pitch control techniques are unsuccessful, adjust the roll not to exceed 60º
- Recover the level flight

PREV NEXT

AIRBUS

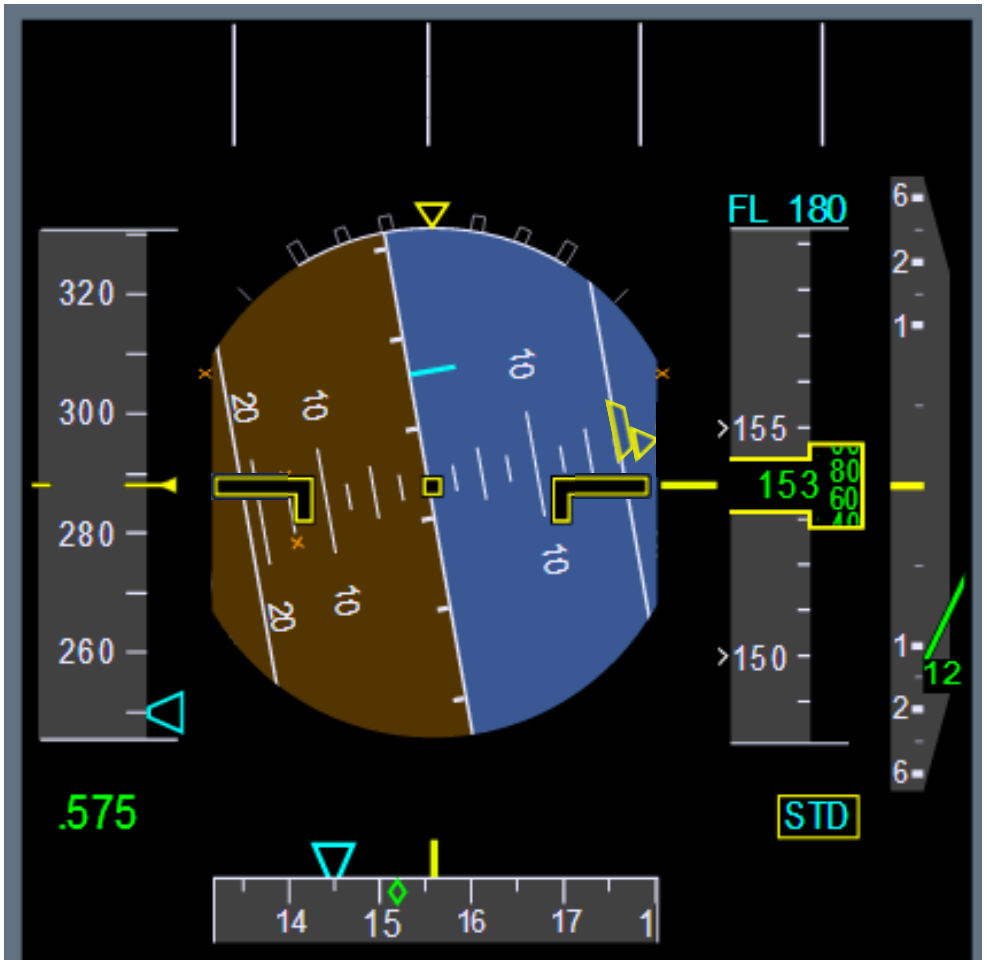
Extreme Attitude Training

Display the next slide for 2 seconds only

PREV NEXT

AIRBUS

Extreme Attitude Training



PREV NEXT

AIRBUS

Extreme Attitude Training

Any stall?

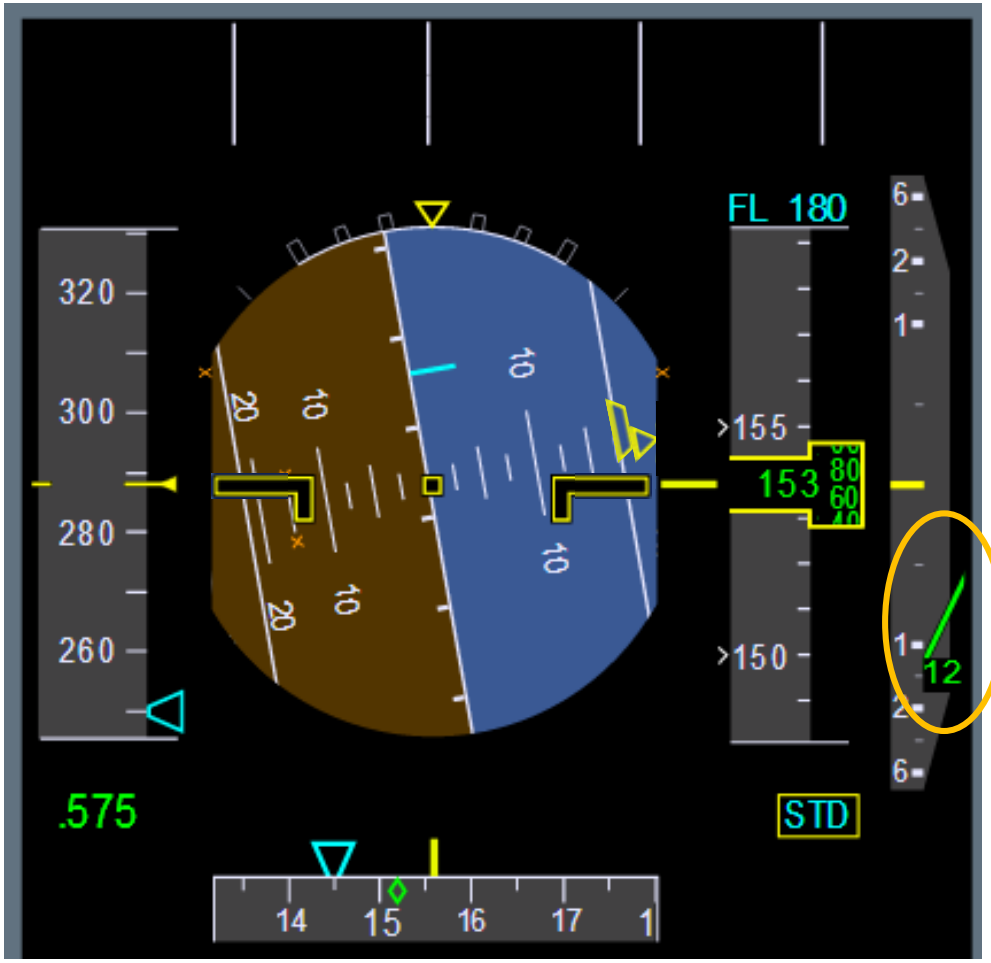
Energy state and rate of change?

Airplane attitude: pitch and bank?

Which actions for Nose High or Nose Low?

Find out the answers on the next slide…

Extreme Attitude Training



Nose Low Actions (V/S is negative)

- Adjust the roll to the right to wings level
- Adjust the thrust, if necessary
- Recover the level flight

PREV NEXT

AIRBUS

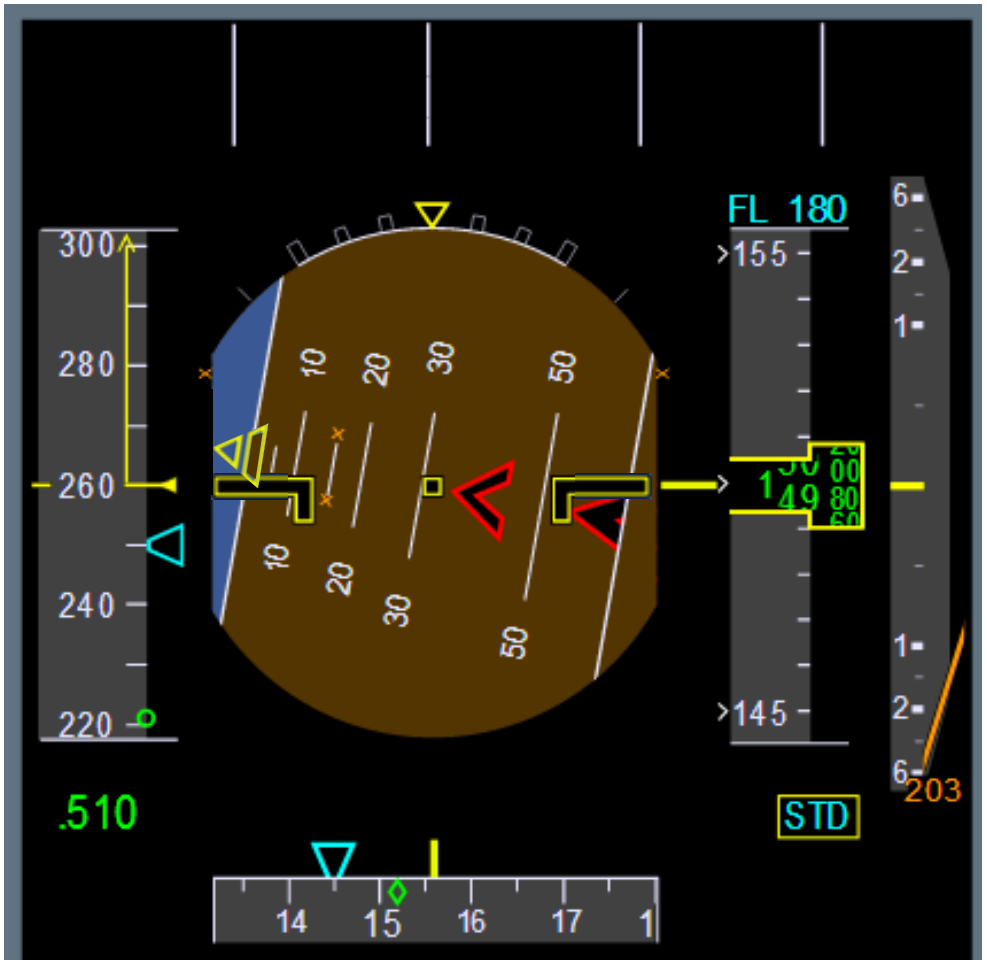
Extreme Attitude Training

Display the next slide for 2 seconds only

PREV NEXT

AIRBUS

Extreme Attitude Training



PREV NEXT

AIRBUS

Extreme Attitude Training

Any stall?

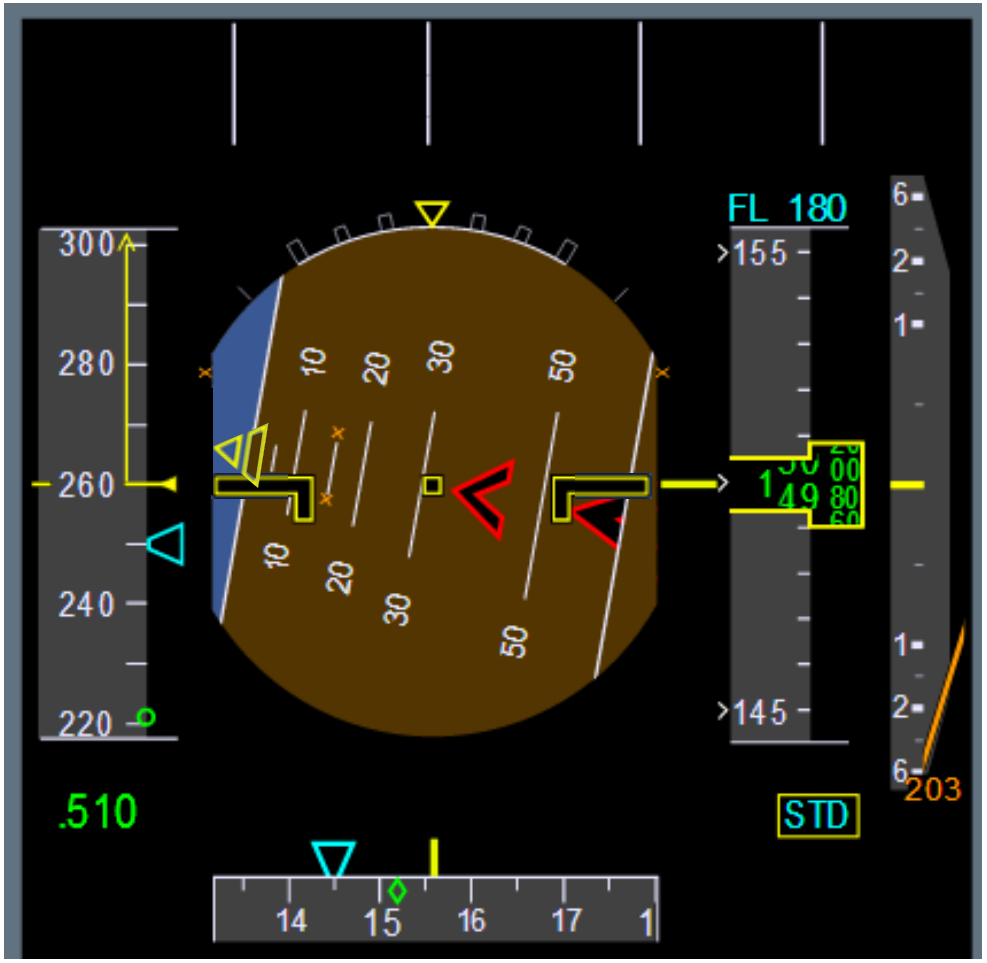
Energy state and rate of change?

Airplane attitude: pitch and bank?

Which actions for Nose High or Nose Low?

Find out the answers on the next slide…

Extreme Attitude Training



Nose Low Actions

- Roll to the left to wings level
- Adjust the thrust and/or the drag, if necessary
- Recover the level flight avoiding excessive g-loading

AIRBUS

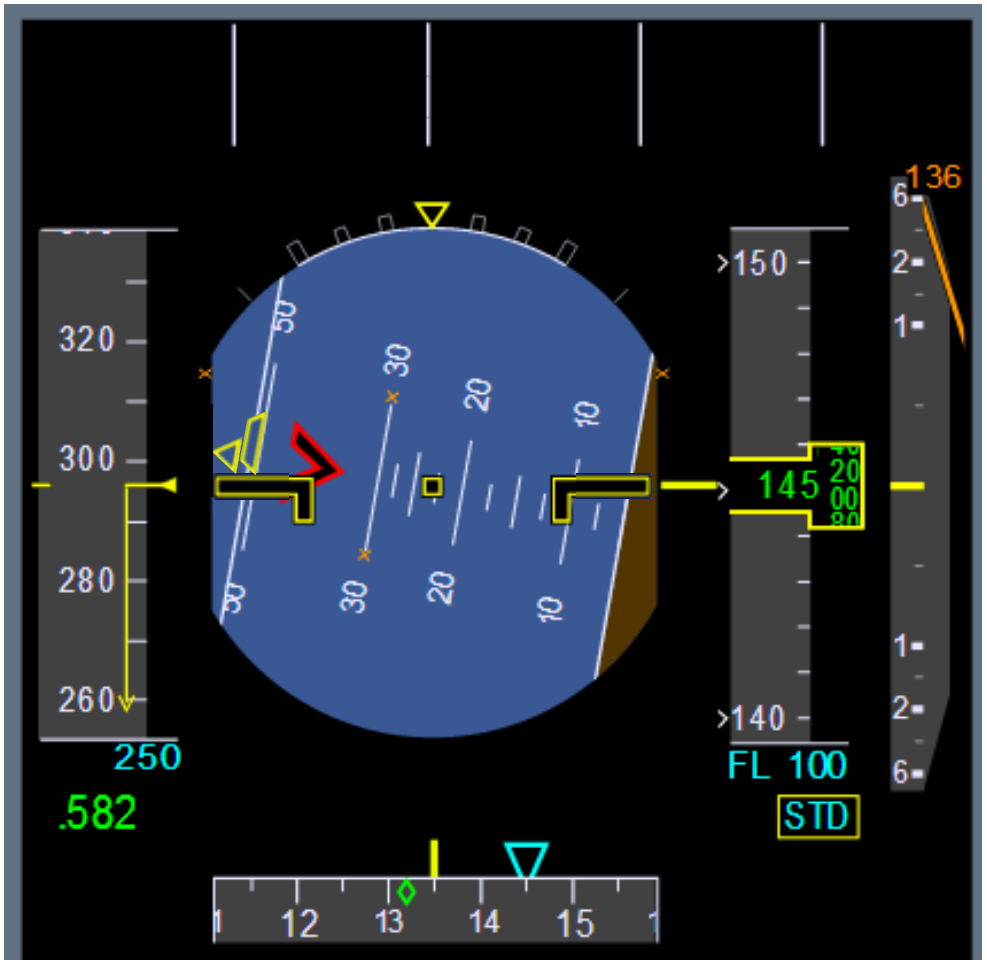
Extreme Attitude Training

Display the next slide for 2 seconds only

PREV NEXT

AIRBUS

Extreme Attitude Training



PREV NEXT

AIRBUS

Extreme Attitude Training

Any stall?

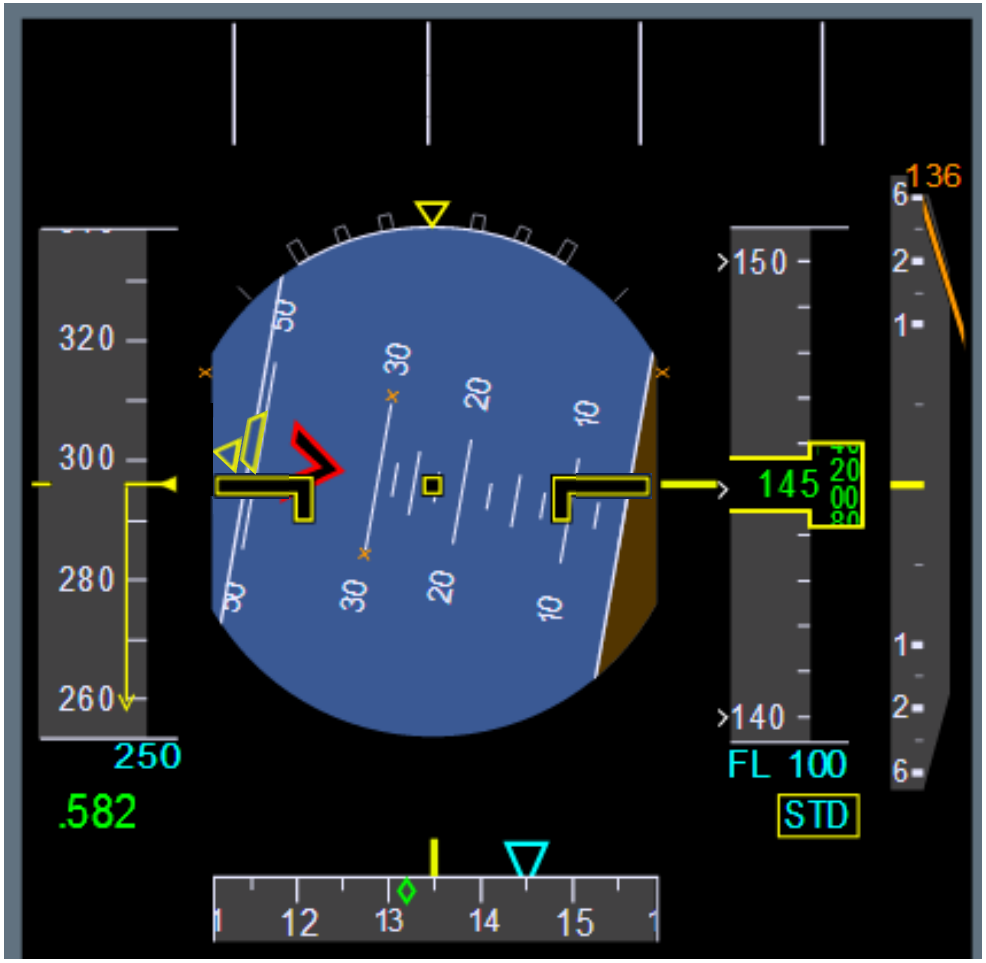
Energy state and rate of change?

Airplane attitude: pitch and bank?

Which actions for Nose High or Nose Low?

Find out the answers on the next slide…

Extreme Attitude Training



Nose High Actions

- Apply nose down pitch order
- Adjust the thrust
- Reduce the roll not to exceed 60°
- Recover the level flight

PREV NEXT

AIRBUS

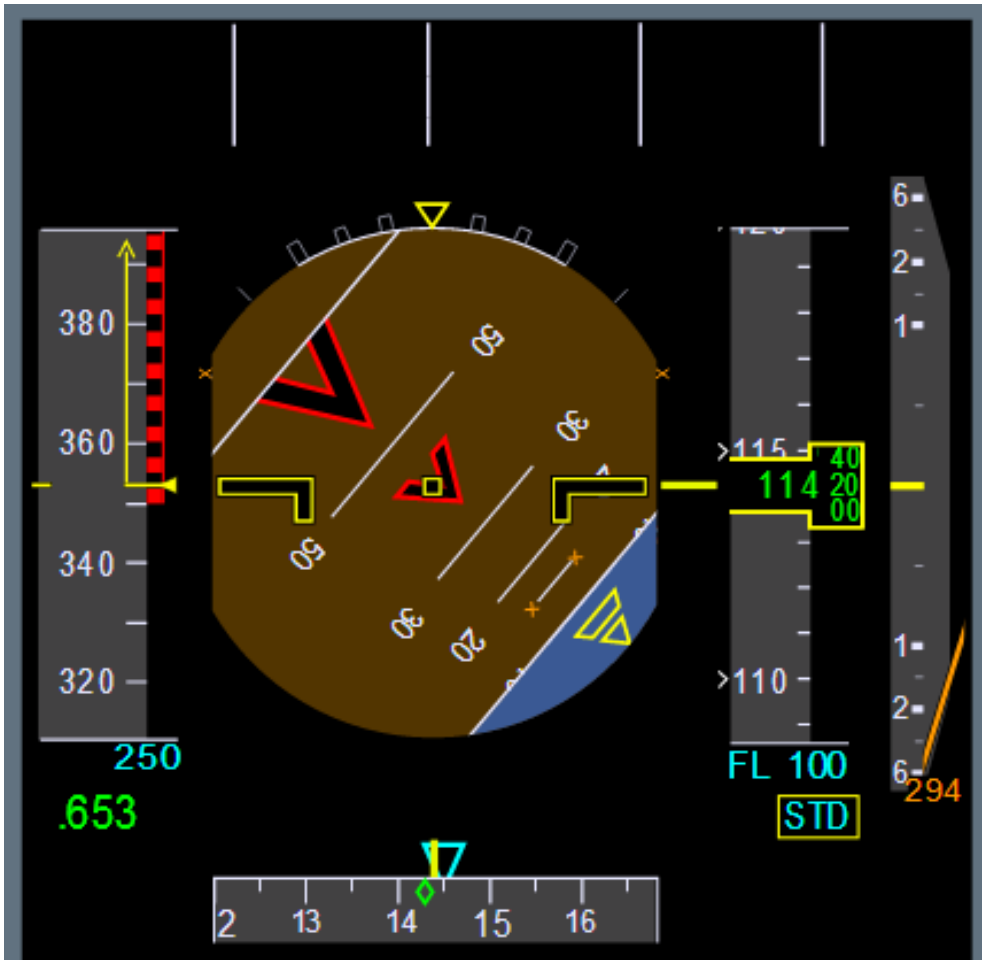
Extreme Attitude Training

Display the next slide for 2 seconds only

PREV NEXT

AIRBUS

Extreme Attitude Training



PREV NEXT

AIRBUS

Extreme Attitude Training

Any stall?

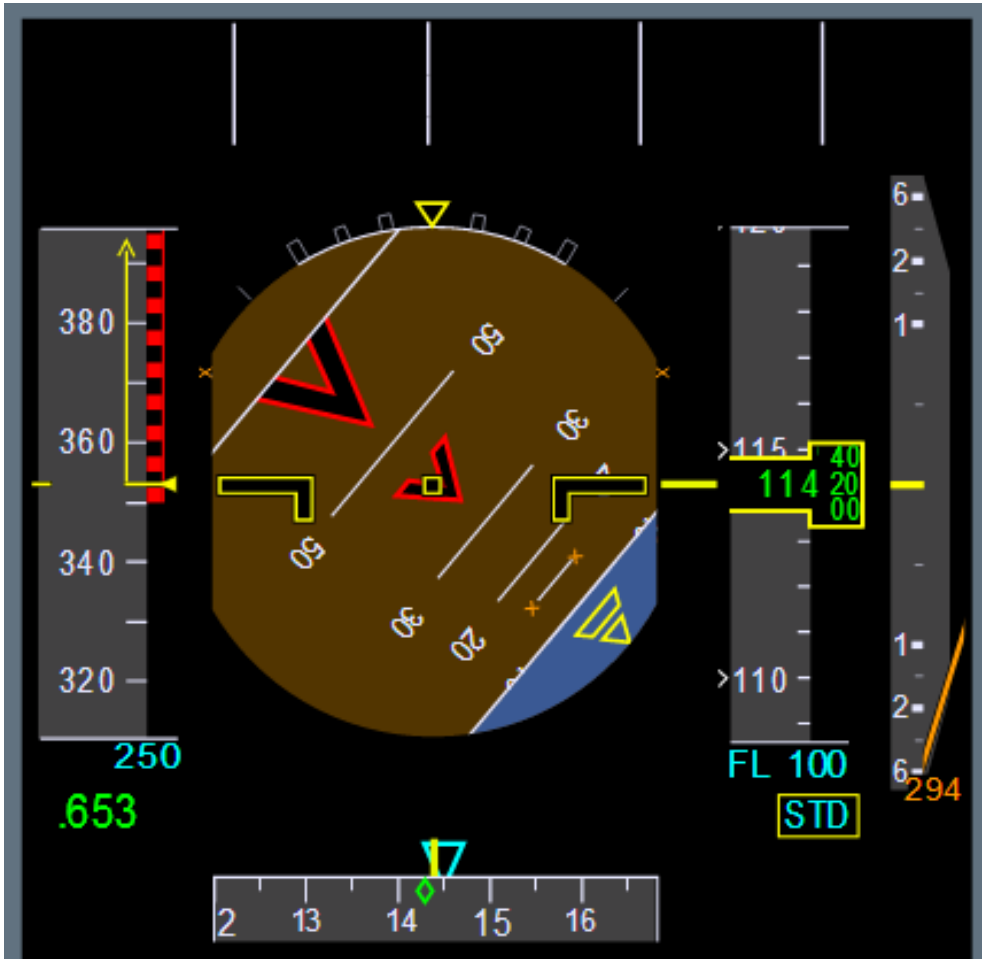
Energy state and rate of change?

Airplane attitude: pitch and bank?

Which actions for Nose High or Nose Low?

Find out the answers on the next slide…

Extreme Attitude Training



Nose Low Actions

- Roll to the right to wings level
- Adjust the thrust and the drag
- Recover the level flight avoiding excessive g-loading

PREV NEXT

AIRBUS

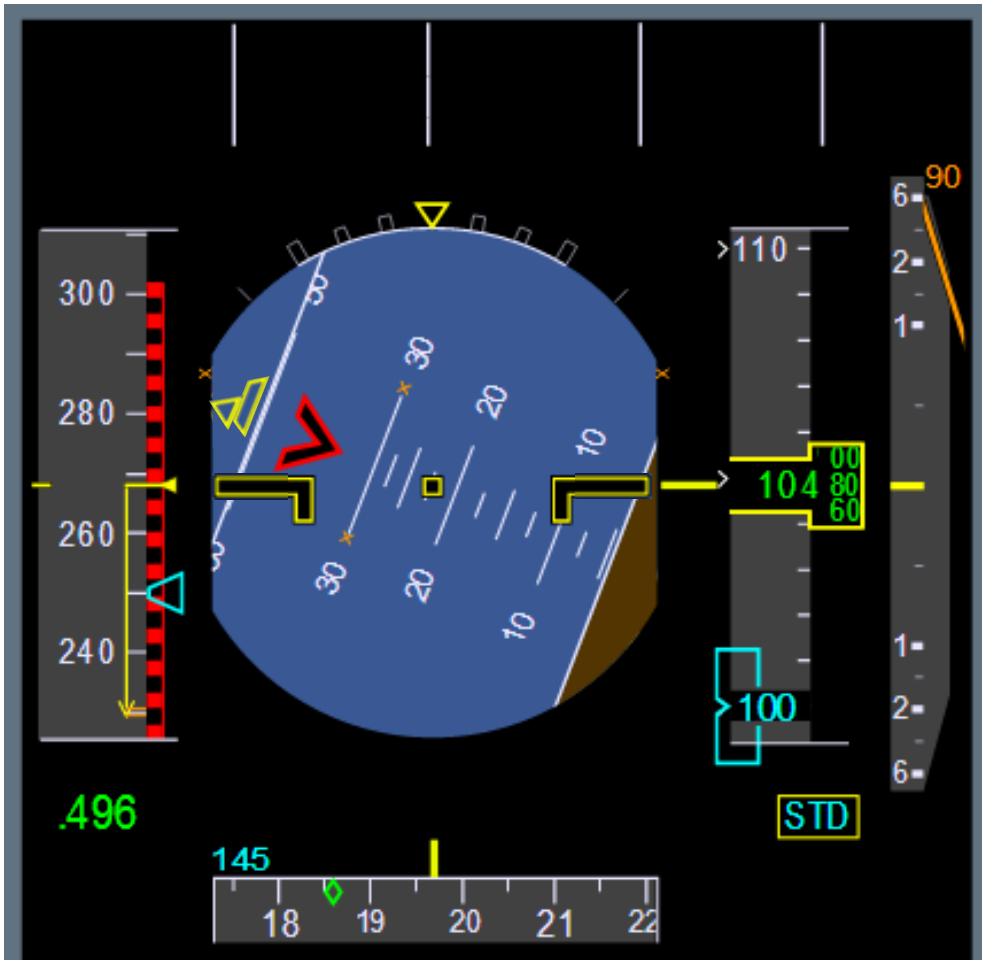
Extreme Attitude Training

Display the next slide for 2 seconds only

PREV NEXT

AIRBUS

Extreme Attitude Training



PREV NEXT

AIRBUS

Extreme Attitude Training

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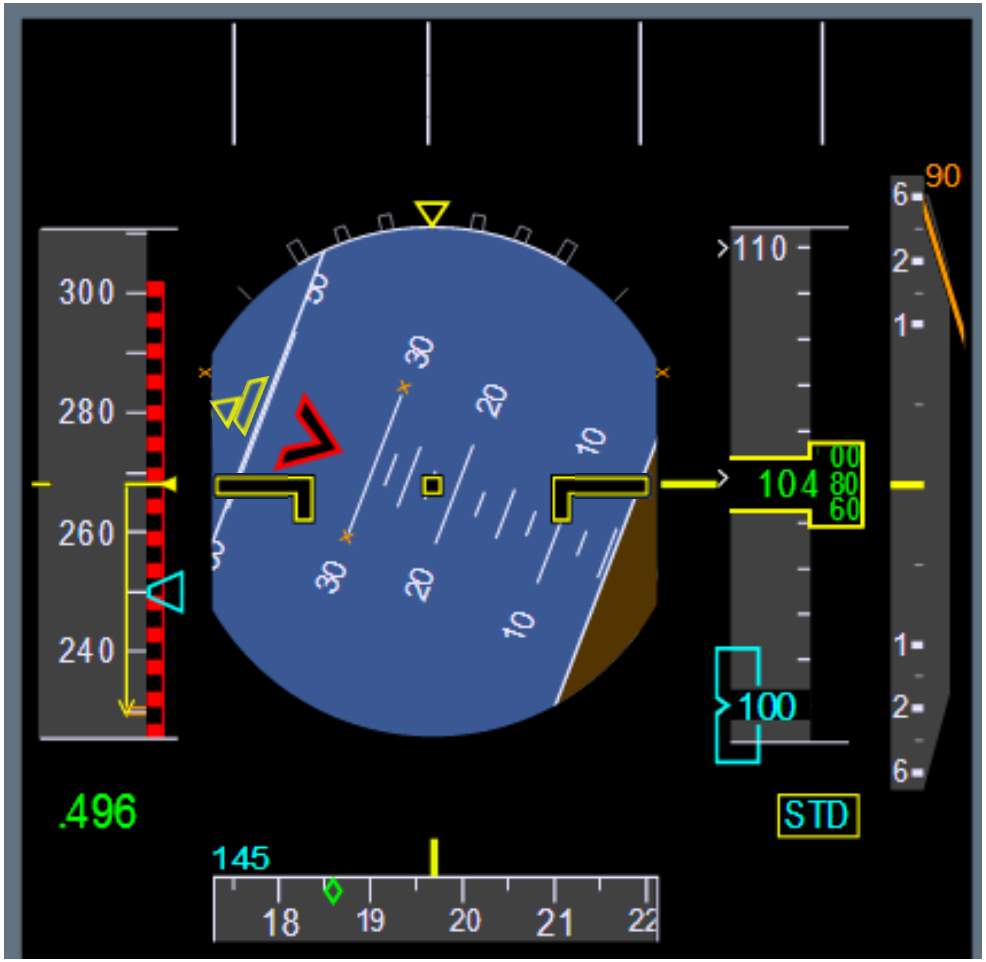
Airplane attitude: pitch and bank?

Which actions for Nose High or Nose Low?

Find out the answers on the next slide…

Extreme Attitude Training



Stall recovery

- Apply nose down pitch order (reduce the AOA and unload)

In the case of lack of pitch down authority, reducing thrust may be necessary

- Simultaneously, bank to left to wings level

When out of stall:

Apply the appropriate upset recovery technique

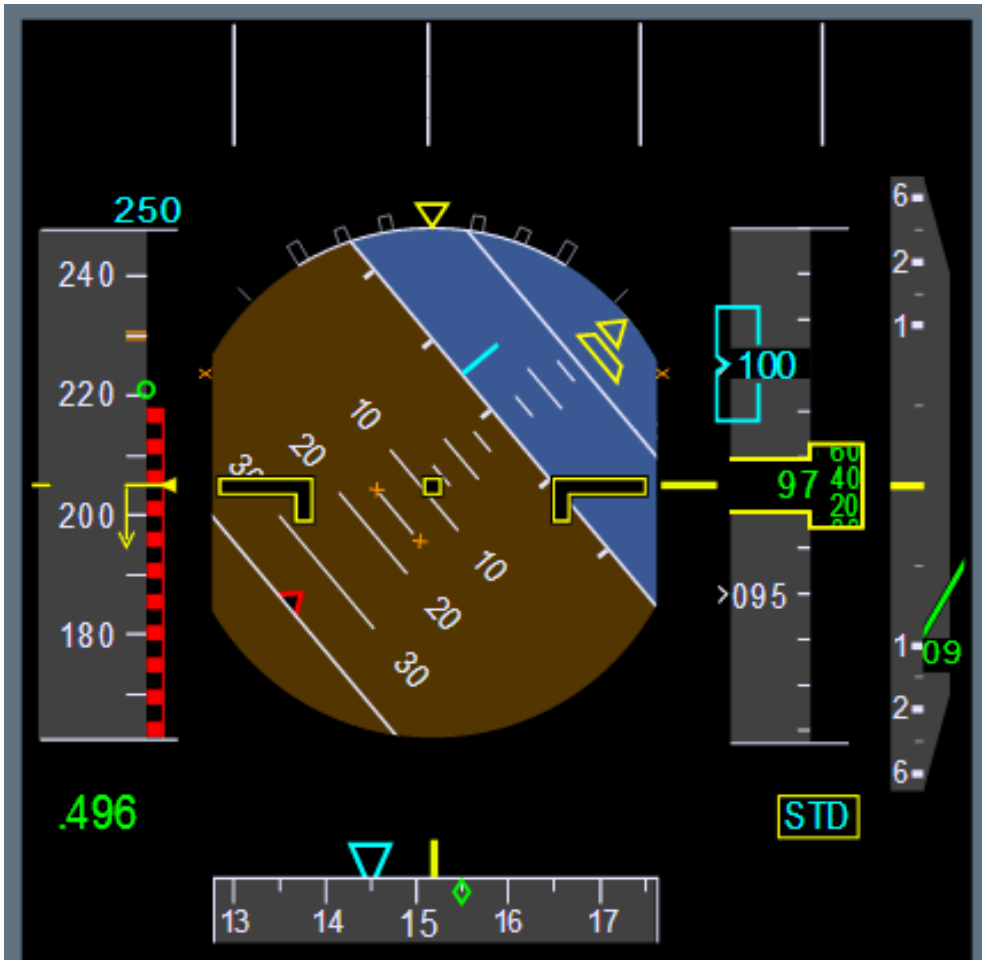
Extreme Attitude Training

Display the next slide for 2 seconds only

PREV NEXT

AIRBUS

Extreme Attitude Training



PREV NEXT

AIRBUS

Extreme Attitude Training

Any stall?

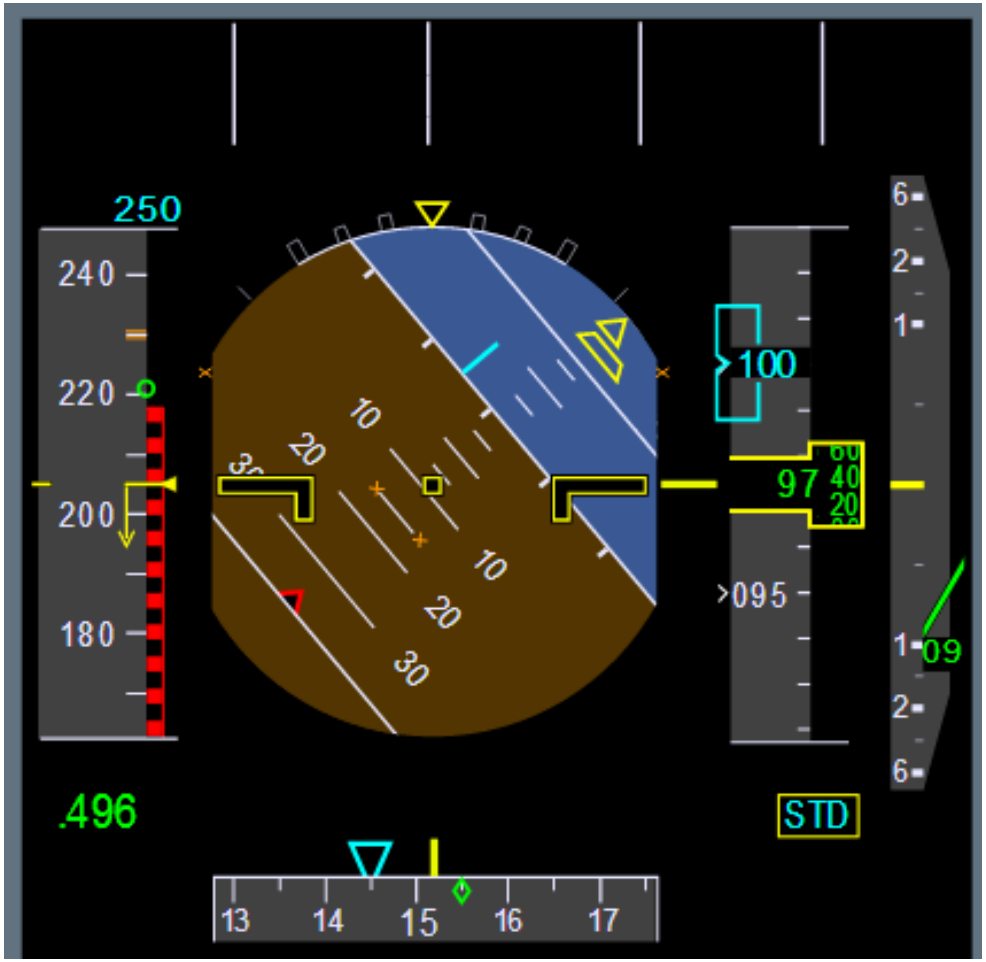
Energy state and rate of change?

Airplane attitude: pitch and bank?

Which actions for Nose High or Nose Low?

Find out the answers on the next slide…

Extreme Attitude Training



Stall recovery

- Apply nose down pitch order (reduce the AOA)
- Bank to the right to wings level

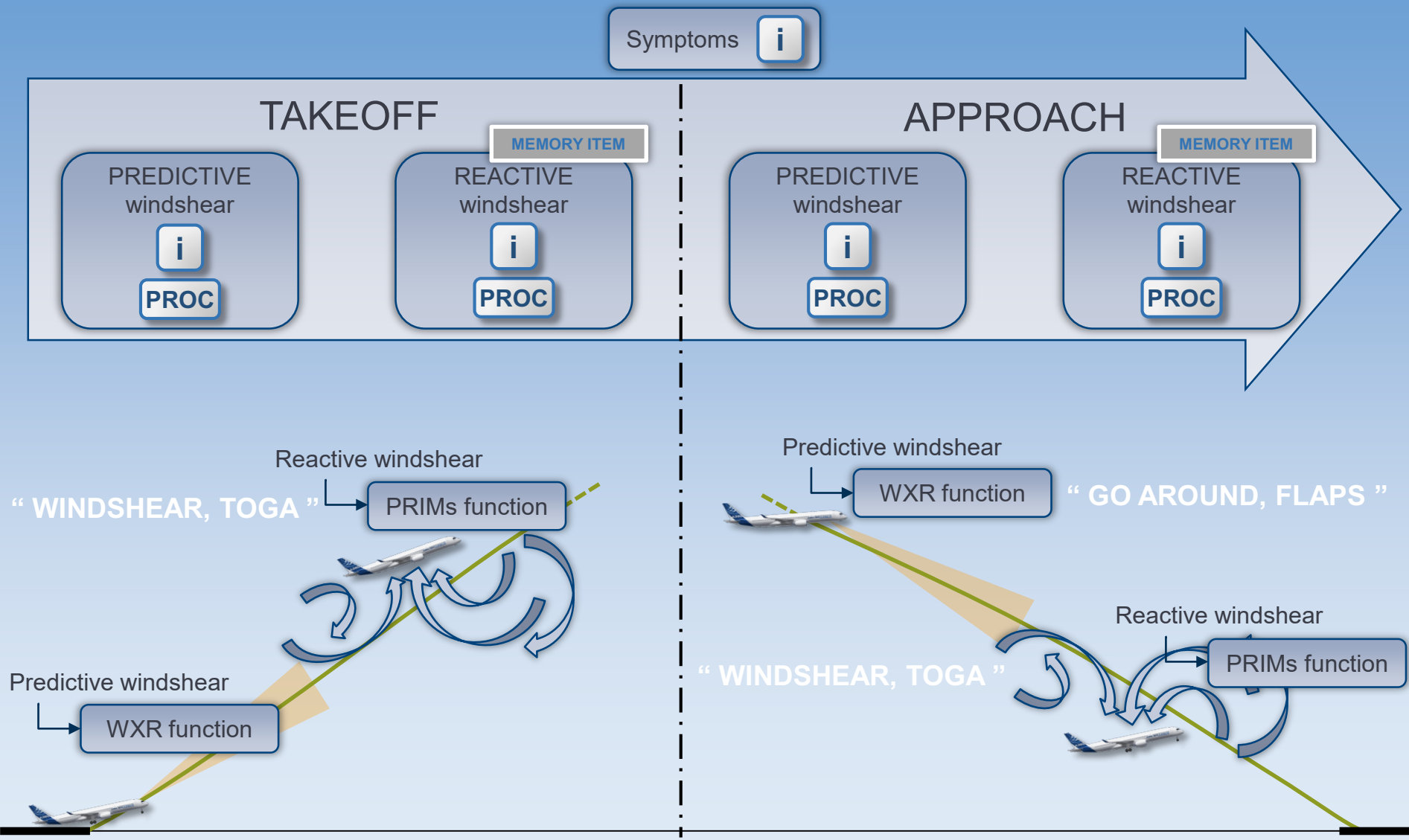
When out of stall:

- Increase the thrust smoothly as needed
- Check speed brakes retracted
- Recover smoothly the level flight avoiding a stall due to premature recovery at low speed
- Select FLAPS 1, if speed is still lower than VFE Next

PREV

AIRBUS

WINDSHEAR

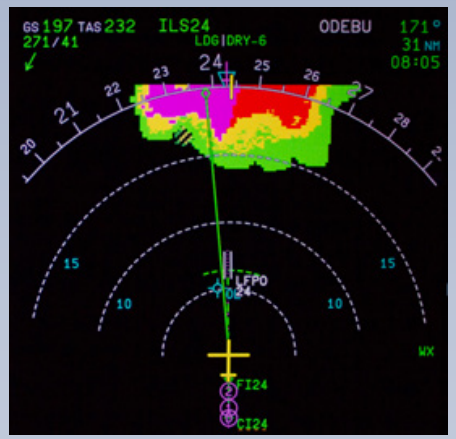


SYMPTOMS

BACK

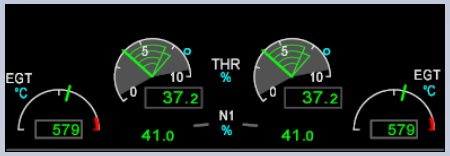
On PFD:

- Speed trend
- Speed margin
- Bird jerks (if displayed)
- Vertical Speed.



On ND:

- Ground speed
- Wind direction / Velocity
- Weather radar.



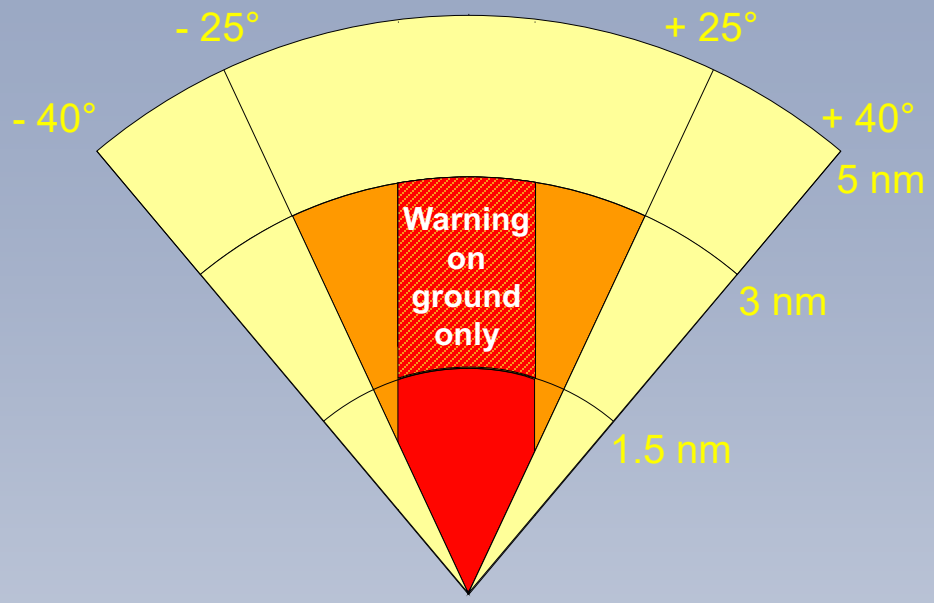
On ED:

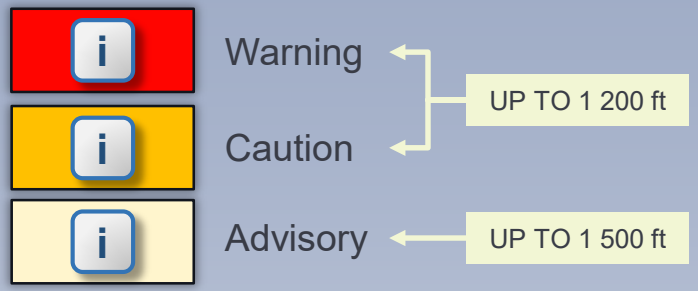
- Thrust variations.

WINDSHEAR

PREDICTIVE WINDSHEAR AT TAKEOFF

BACK





- Active only if the Weather Radar/Predictive Windshear is in automatic mode

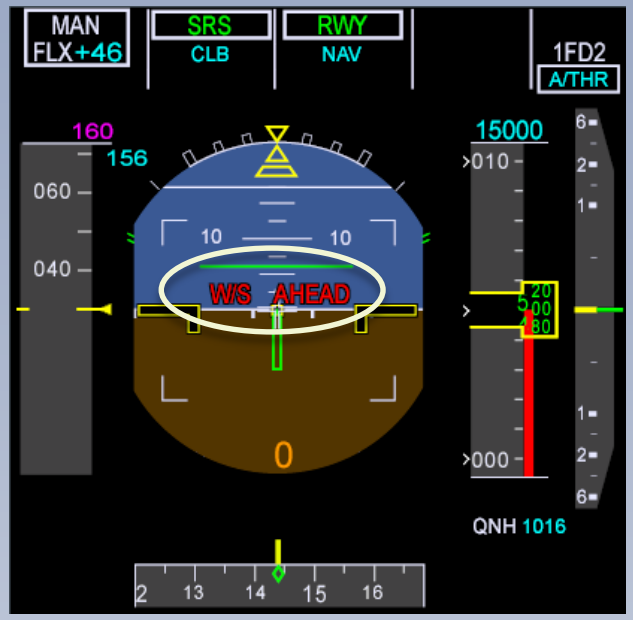
- Inhibited at takeoff between 100 kt and 50 ft.

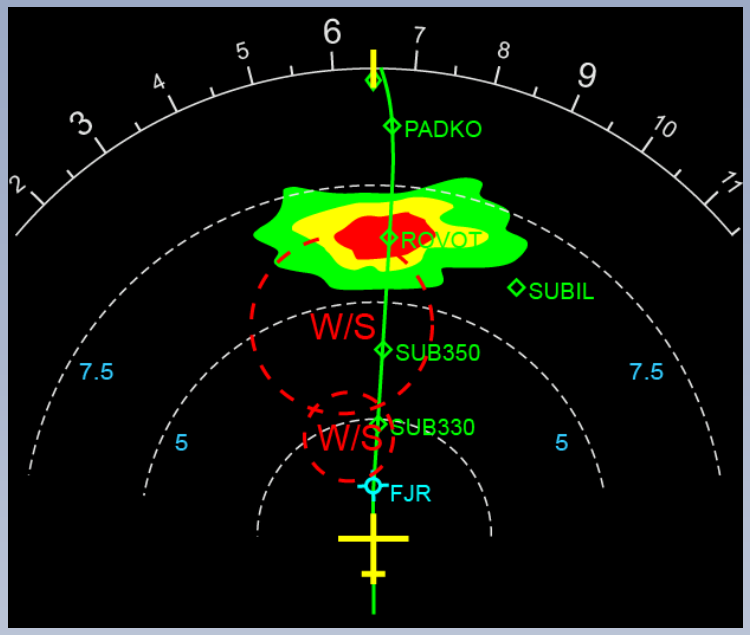
AIRBUS

WARNING

BACK

“ WINDSHEAR AHEAD, WINDSHEAR AHEAD ”





AUTOMATICALLY:

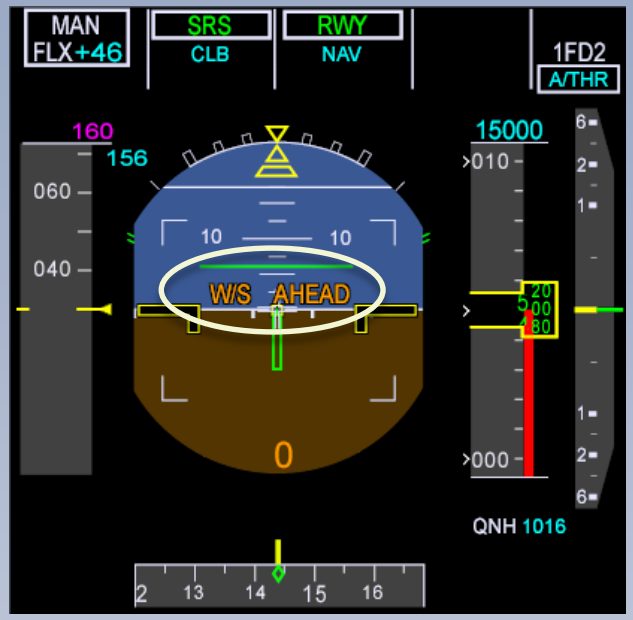
- WX DATA DISPLAYED ON ND
- ND SET TO ARC, RANGE 10 NM (AUTO RANGE / MODE)

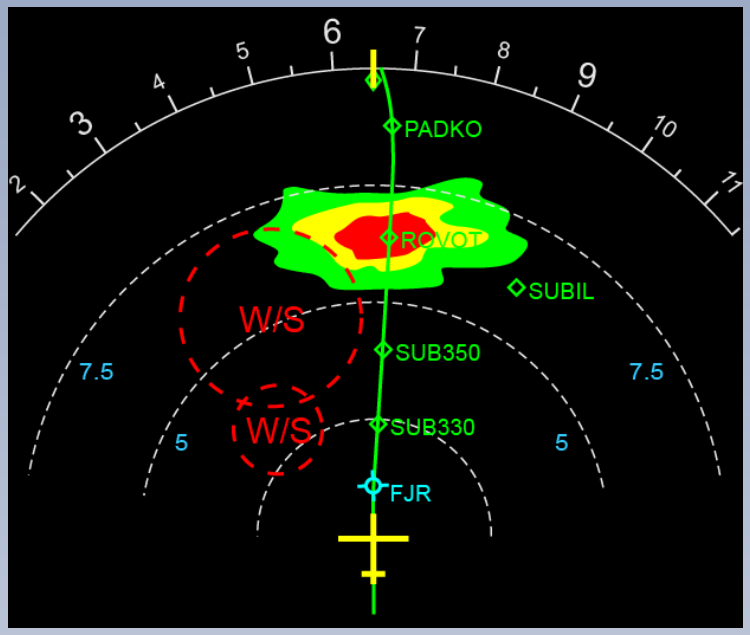
AIRBUS

CAUTION

BACK

“ MONITOR RADAR DISPLAY ”



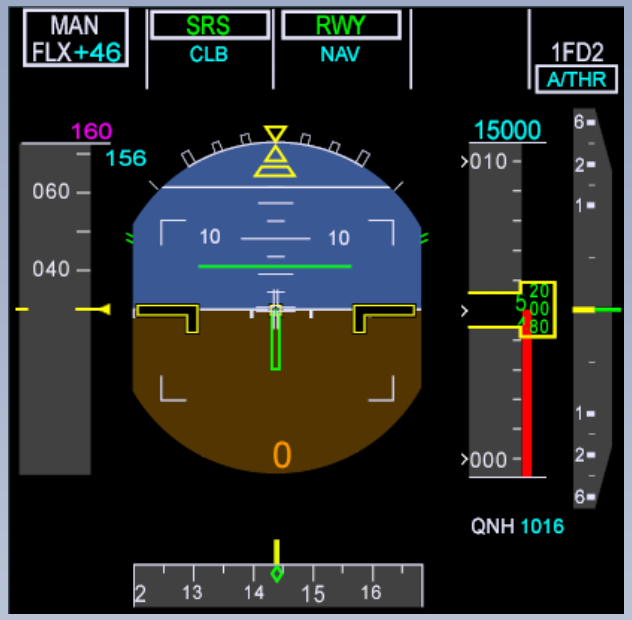


AUTOMATICALLY:

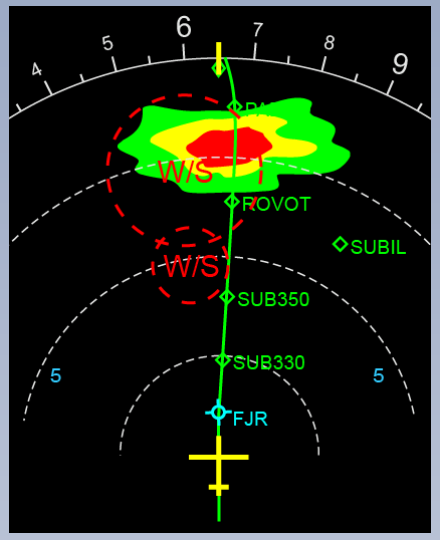
- WX DATA DISPLAYED ON ND
- ND SET TO ARC, RANGE 10 NM (AUTO RANGE / MODE)

ADVISORY

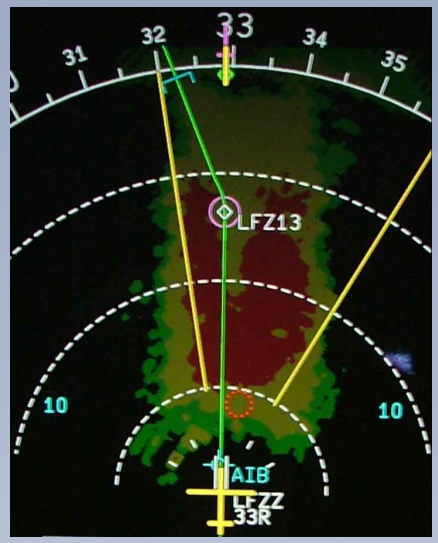
BACK



Range = 10 NM



Range > 10 NM



AUTOMATICALLY, WX DATA DISPLAYED ON ND

PREDICTIVE WINDSHEAR DURING TAKEOFF

BACK

PF **PM**

" WINDSHEAR AHEAD, WINDSHEAR AHEAD "

Or

" MONITOR RADAR DISPLAY "

Or

Windshear suspected by the flight crew

Before takeoff roll:

TAKEOFF.....DELAY

MOST SUITABLE RUNWAY.....REQUEST

TOGA THRUST.....SELECT

Do not use FLEX

Before V1:

TAKEOFF.....REJECT

After V1:

THRUST levers.....TOGA

When airborne:

AP (if engaged).....KEEP ON

FD orders.....FOLLOW

IF WINDSHEAR IS ENTERED DO NOT CHANGE CONFIGURATION

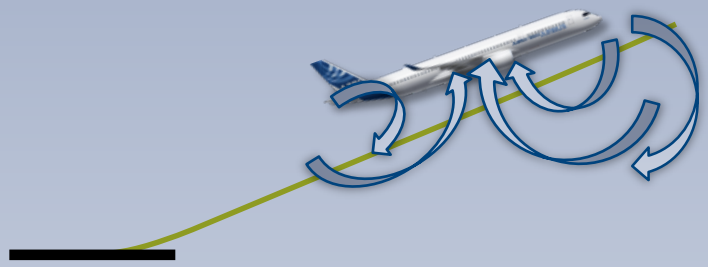
WINDSHEAR

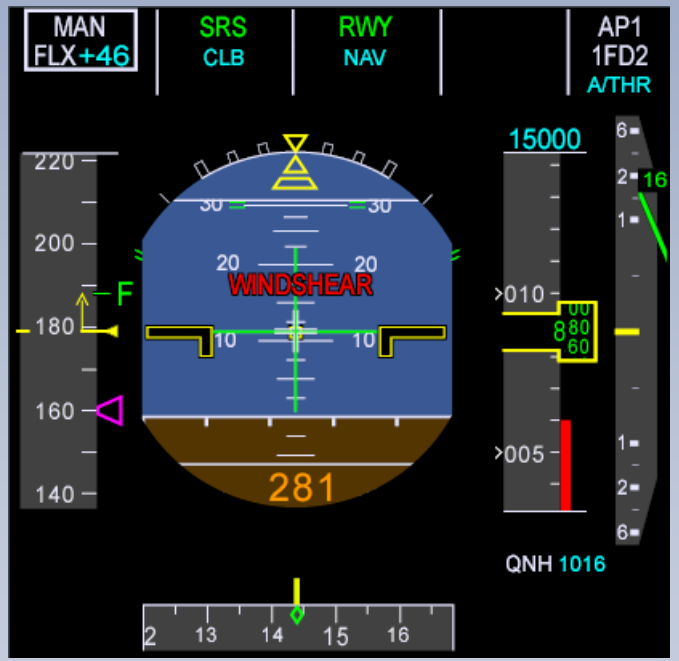
REACTIVE WINDSHEAR AT TAKEOFF

BACK

- Computed by the PRIMs
- Real-time function
- Active from 50 ft (or 3 sec after liftoff), up to 1 300 ft.

“ WINDSHEAR, WINDSHEAR, WINDSHEAR ”





REACTIVE WINDSHEAR DURING TAKEOFF

NEXT BACK

PF " WINDSHEAR, WINDSHEAR, WINDSHEAR " PM

On ground before V1

During takeoff roll WINDSHEAR alert is inhibited, Windshear recognition is based on the crew observation.
If significant airspeed and airspeed trend variations: Reject Takeoff.

On ground after V1

" WINDSHEAR, TOGA "

THRUST LEVEL……..TOGA
REACHING VR…..……ROTATE NORMALLY
SRS ORDERS……..……FOLLOW

Airborne

" WINDSHEAR, TOGA "

THRUST LEVERS AT TOGA…....SET or CONFIRM
AP (if engaged)…..…….……KEEP ENGAGED
SRS ORDERS……..……FOLLOW

Keep landing gear and slats/flaps position until out of windshear

REACTIVE WINDSHEAR DURING TAKEOFF

BACK

PF

PM

When out of windshear:

" POSITIVE CLIMB"

" GEAR UP"

LANDING GEAR.....UP

Above thrust reduction altitude:

THRUST levers.....CL

Above acceleration altitude:

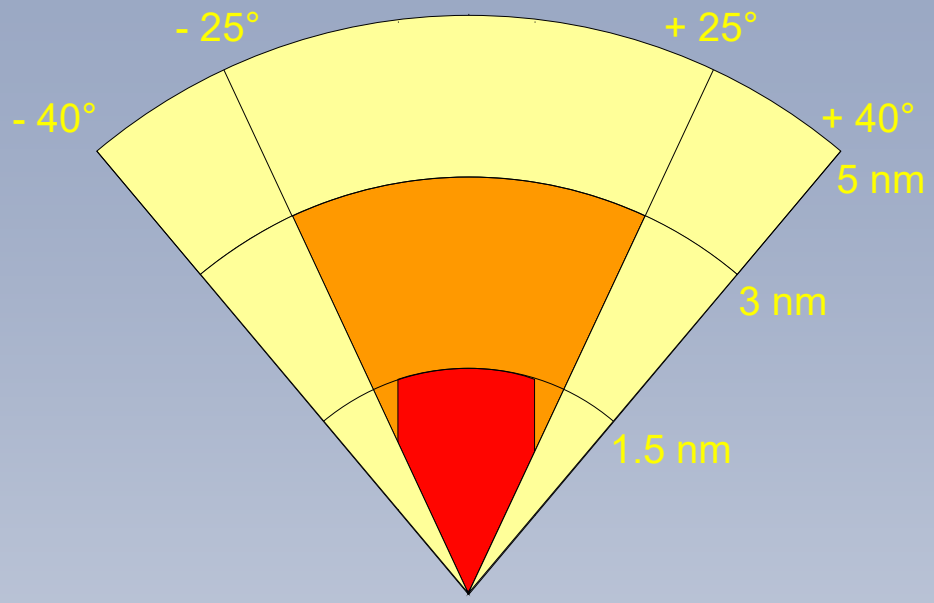
FLAPS.....RETRACT

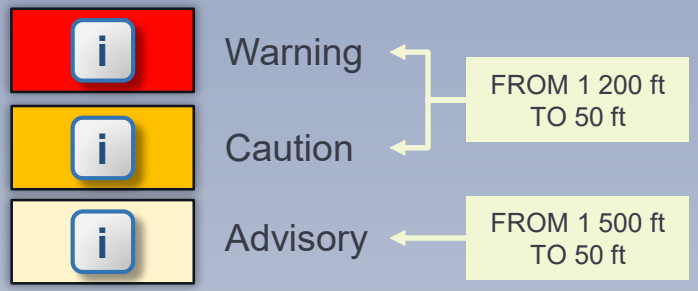
Never retract flaps in **SRS** mode

WINDSHEAR

PREDICTIVE WINDSHEAR DURING APPROACH

BACK





- Active only if the Weather Radar/Predictive Windshear is in automatic mode

WARNING

BACK

“ GO AROUND, WINDSHEAR AHEAD ”

AUTOMATICALLY:

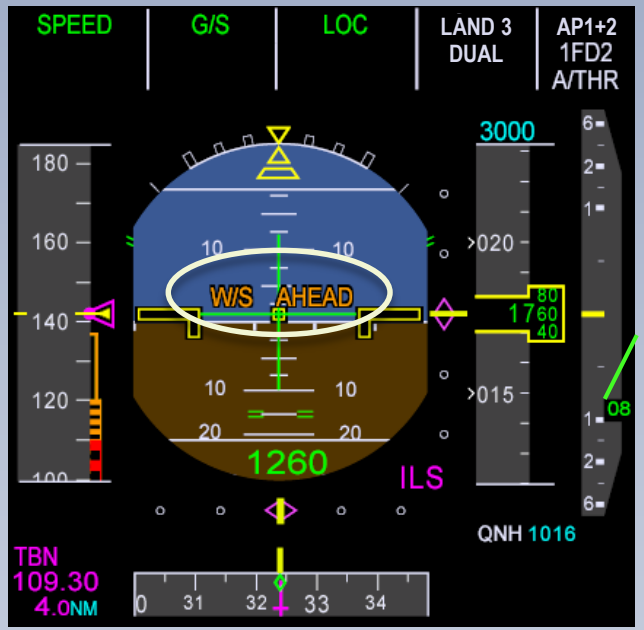
- WX DATA DISPLAYED ON ND
- ND SET TO ARC, RANGE 10 NM (AUTO RANGE / MODE)

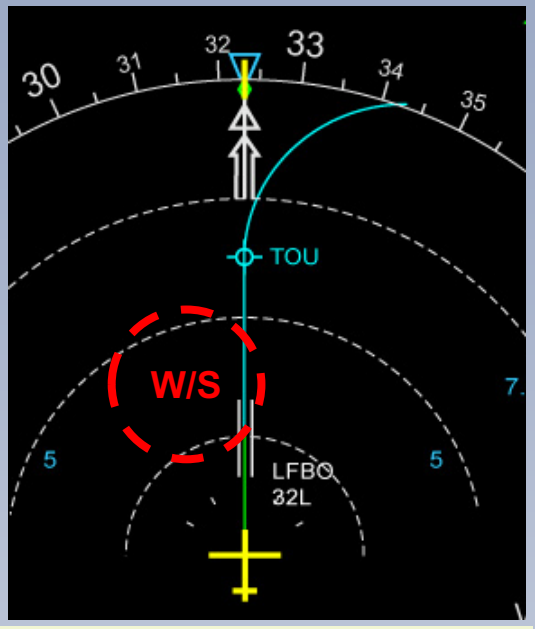
AIRBUS

CAUTION

BACK

“ MONITOR RADAR DISPLAY ”





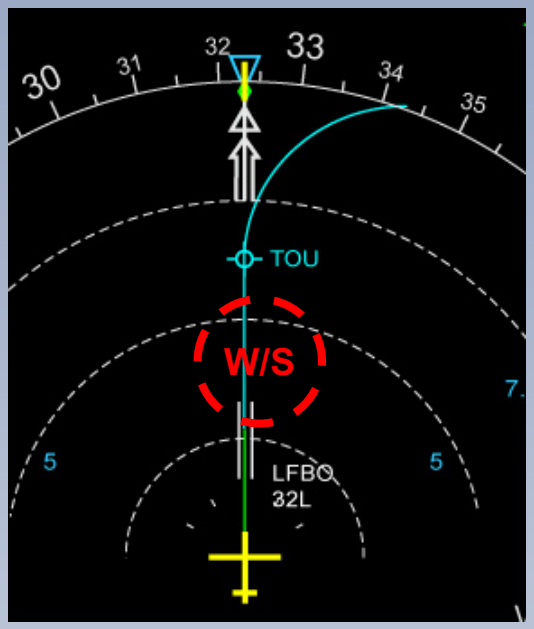
AUTOMATICALLY:

- WX DATA DISPLAYED ON ND
- ND SET TO ARC, RANGE 10 NM (AUTO RANGE / MODE)

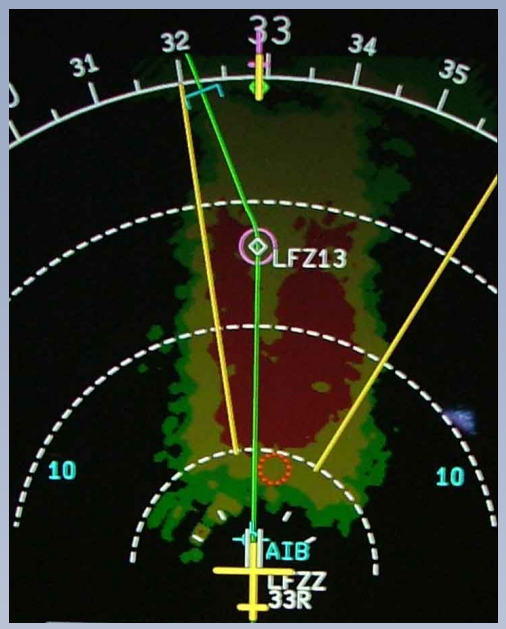
ADVISORY

BACK

Range = 10 NM



Range > 10 NM



AUTOMATICALLY, WX DATA DISPLAYED ON ND

PREDICTIVE WINSHEAR DURING APPROACH

BACK

PF

PM

“ MONITOR RADAR DISPLAY ”

Or windshear suspected by the flight crew

APPROACH……CONSIDER DELAYING

If downbursts are expected, select CONF 3 on the MFD and increase VAPP, up to VLS + 15 kt.

WEATHER RADAR……CHECK

MANAGED SPEED……USE

AP……USE

WEATHER RADAR……CHECK

FD……CHECK ON

“ GO AROUND, WINDSHEAR AHEAD ”

“ GO AROUND, FLAPS ”

GO AROUND……PERFORM

LANDING GEAR……UP

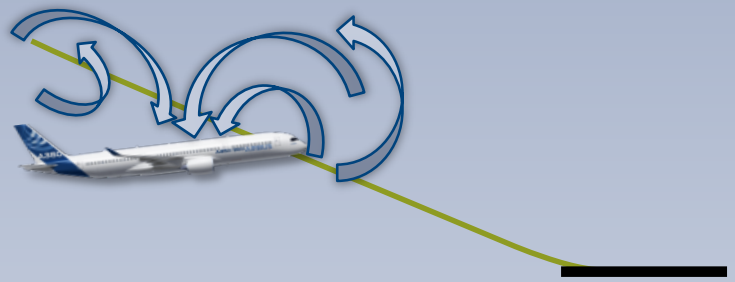
SRS orders……FOLLOW

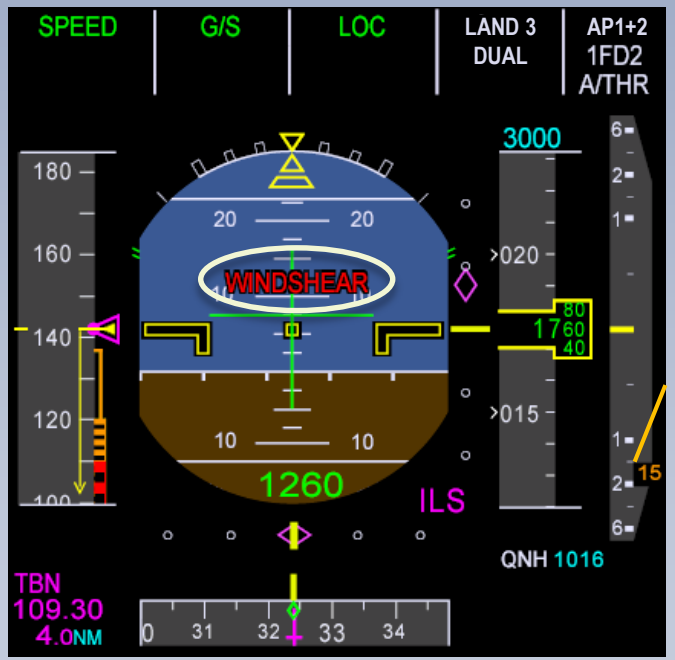
REACTIVE WINDSHEAR DURING APPROACH

BACK

- Computed by the PRIMs
- Real-time function
- Active from 1 300 ft.

“ WINDSHEAR, WINDSHEAR, WINDSHEAR ”





REACTIVE WINDSHEAR DURING APPROACH

BACK

PF

PM

" WINDSHEAR, WINDSHEAR, WINDSHEAR "

Or windshear detected by the flight crew

" WINDSHEAR, TOGA "

THRUST levers.....TOGA

SRS orders.....FOLLOW

AP (if engaged).....KEEP ENGAGED

Keep landing gear and slats/flaps position until out of windshear

When out of windshear, revert to go-around procedure

" GO AROUND, FLAPS "

Never retract flaps in **SRS** mode