

Airbus Arrival Briefing/Flows Guide								
<i>Updated 03-16-17</i>								
W	Weather – Obtain ATIS							
A	Automation Flows							
	MCDU Reverse "Z"							
	F-PLN	<ul style="list-style-type: none"> Re-do if Return or Divert (2L lateral revision) Select ARRIVAL page and enter RWY, APPR, STAR, TRANS, and APPR VIA (Access by lateral revision at destination) Clean up flight plan with FAF as "TO" Waypoint 						
	RAD NAV	<ul style="list-style-type: none"> VOR: Check for proper NAVAID tuning, either auto or manual. 						
	1. MCDU	<ul style="list-style-type: none"> Insert runway under 4R for situational awareness If RNAV approach (NOT VOR): <ul style="list-style-type: none"> RNP 0.3 NM must be displayed on PROG page GPS PRIMARY or NAV ACCURACY HIGH must be present on both PROG pages (may be confirmed on ND) 						
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;"></td> <td style="width: 33%; text-align: center;">PROG</td> <td style="width: 33%; text-align: center;">PERF</td> </tr> <tr> <td style="text-align: center;">F-PLN</td> <td style="text-align: center;">RAD NAV</td> <td style="text-align: center;"></td> </tr> </table>		PROG	PERF	F-PLN	RAD NAV		<ul style="list-style-type: none"> Activate / Confirm Approach (when in SELECTED SPEED Mode, ask other pilot) Enter Landing Data <ul style="list-style-type: none"> QNH, Temp, MAG WIND V_{APP} (if required) DH/MDA (DH/DA - CAT II/III, DA/DDA - CAT I, RNAV, VOR) LDG CONF (GPWS LDG FLAP 3 pb OFF if required)
		PROG	PERF					
	F-PLN	RAD NAV						
	PERF APPR	<ul style="list-style-type: none"> Leave default values unchanged 						
	PERF GO-AROUND	<ul style="list-style-type: none"> Leave default values unchanged 						
2. ILS pb (if ILS/LOC Approach) / PM VOR sel switch to VOR (if VOR Approach)								
3. Seat Belt Sign - ON								
4. Set AUTO BRK (if desired)								
5. Check ECAM memos, status, and cabin rate of descent								
6. Check GW < MLW								
Report – Arrival Briefing								
R	1. STAR / Approach Chart	<p>Use FMS and electronic displays when applicable and ensure arrival verification accomplished.</p> <ul style="list-style-type: none"> FMS: Arrival, arrival transition, approach (ensure NO VIA unless required) Top of descent point 						
	2. PFD	<ul style="list-style-type: none"> Primary navaid Frequency * Final approach course * DA (DH), AH, or DDA/MAP * 						
	3. F-PLN page	<ul style="list-style-type: none"> Final approach verification altitude * Missed approach * 						
	4. All Approaches	<ul style="list-style-type: none"> MEL items Planned runway turnoff and taxi route/hot spots/runway crossings Landing performance Autobrakes setting Landing flaps setting A/C type max pitch on landing (A319/320 - 10°, A321 - 7.5°) Any applicable special considerations such as: <ul style="list-style-type: none"> Unique Airport Ops Advisory page approach information Unique noise abatement procedures Unique engine failure during missed approach procedures Significant terrain or obstacles in terminal area relative to approach routing Significant weather conditions (windshear, icing, runway conditions) LAHSO ECAM status that may affect approach & landing capabilities Any other known risks and intentions 						
	<p>* If in night conditions or weather less than 2000/3 Note: Blue colored text required for ALL briefings.</p> <p>If in day conditions with weather 2000/3 or greater:</p> <ul style="list-style-type: none"> Electronic / visual means to identify the runway. 							
D	Descent - Approach Checklist							

A319/320/321 Callouts

Takeoff to Flap Retraction		
Trigger	PF	PM
Commencing takeoff roll	<ul style="list-style-type: none"> Advance thrust levers to approximately 50% N1 (CFM or 1.05 EPR (IAE)) Advance thrust levers to FLX or TOGA Check MAN FLX or MAN TOGA on FMA 	<ul style="list-style-type: none"> Verify takeoff thrust on E/WD
	<ul style="list-style-type: none"> Captain assumes/maintains control of thrust levers 	<ul style="list-style-type: none"> Verify takeoff thrust on E/WD
80 kts	"CHECKED"	"80" <ul style="list-style-type: none"> Check STBY airspeed
V₁		"V1"
	<ul style="list-style-type: none"> Captain removes hand from thrust levers 	
V_R	<ul style="list-style-type: none"> Rotate at 3° / sec to 15° 	"ROTATE"
After liftoff	<ul style="list-style-type: none"> Verify positive rate of climb 	<ul style="list-style-type: none"> Verify positive rate of climb on VSI
	<ul style="list-style-type: none"> Maintain F/D commanded attitude Establish initial climb speed of not less than V₂ + 10 knots 	<ul style="list-style-type: none"> Position gear lever UP Monitor speed and altitude
Above 100' AFL	"AUTOPILOT 1" or "AUTOPILOT 2" , as appropriate	<ul style="list-style-type: none"> Select autopilot ON, if requested
At or above 400' AFL	<ul style="list-style-type: none"> Select/Request "HEADING _____" if appropriate 	<ul style="list-style-type: none"> Select HDG, if requested
At the THR RED ALT LVR CLB flashing	<ul style="list-style-type: none"> Move thrust levers to the CL detent 	
	<ul style="list-style-type: none"> Verify THR CLB annunciations on FMA 	"CLIMB SET"
At ACCEL ALT (SRS changes to CLB or OP CLB)	<ul style="list-style-type: none"> Follow F/D commands to reduce pitch and accelerate 	
F speed (only displayed when FLAPS 2 or 3 were used for takeoff)	<ul style="list-style-type: none"> Check airspeed 	<ul style="list-style-type: none"> Check airspeed
	"FLAPS 1" , if appropriate	<ul style="list-style-type: none"> "FLAPS 1", if requested Select FLAPS 1, if requested
S speed	<ul style="list-style-type: none"> Check airspeed 	<ul style="list-style-type: none"> Check airspeed
	<ul style="list-style-type: none"> Monitor acceleration to 250 knots 	<ul style="list-style-type: none"> Select FLAPS 0 Disarm spoilers Accomplish After Takeoff Flow and Checklist

Loss of Thrust At or Above V₁		
Trigger	PF	PM
Loss of thrust	<ul style="list-style-type: none"> Pilot first recognizing engine failure "ENGINE FAILURE" 	
	<ul style="list-style-type: none"> "TOGA", if desired Advance thrust levers to TOGA, if desired 	<ul style="list-style-type: none"> Ensure thrust levers at TOGA, if requested "TOGA SET", if requested
V_R	<ul style="list-style-type: none"> Rotate at 3° / sec to 12.5° 	"ROTATE"
After liftoff	<ul style="list-style-type: none"> Verify positive rate of climb "GEAR UP" Maintain F/D commanded attitude Trim rudder to maintain a centered β target 	<ul style="list-style-type: none"> Verify positive rate of climb on VSI "POSITIVE RATE" "GEAR UP" Position gear lever UP Monitor speed and altitude
Above 100' AFL	<ul style="list-style-type: none"> "AUTOPILOT 1" or "AUTOPILOT 2", as appropriate 	<ul style="list-style-type: none"> Select autopilot ON, as requested
At or above 400' AFL (or altitude as specified on applicable route manual "Engine Failure – Takeoff" procedure)	<ul style="list-style-type: none"> Comply with runway specific "Engine Failure - Takeoff" procedure (if published), otherwise, fly runway heading 	
	<ul style="list-style-type: none"> Select/request "HEADING _____" or "NAV" for EOSID, as appropriate 	<ul style="list-style-type: none"> Select runway heading, engine failure heading, or NAV, if requested Advise ATC, when able
Climbing through Engine Out Acceleration Altitude	<ul style="list-style-type: none"> Push V/S knob or request "VERTICAL SPEED ZERO" 	<ul style="list-style-type: none"> Push V/S knob, if vertical speed zero requested Verify V/S 0
E speed (only displayed when FLAPS 2 or 3 were used for takeoff)	<ul style="list-style-type: none"> Check airspeed "FLAPS 1", if appropriate 	<ul style="list-style-type: none"> Check airspeed "FLAPS 1", if requested Select FLAPS 1, if requested
S speed	<ul style="list-style-type: none"> Check airspeed "FLAPS UP" Monitor acceleration to green dot speed 	<ul style="list-style-type: none"> Check airspeed "FLAPS UP" Select FLAPS 0 Disarm spoilers
Green dot speed (V_{FTO})	<ul style="list-style-type: none"> Select/request "OPEN CLIMB", if desired Select/request "SPEED _____", Maintain green dot speed Select MCT "MCT" 	<ul style="list-style-type: none"> Select Open Climb, if requested Select green dot speed, if requested Verify thrust levers at MCT "MCT SET"
	<ul style="list-style-type: none"> Accomplish ECAM and/or QRH procedure(s) as appropriate 	

Rejected Takeoff	
Capt	FO
<p>"REJECT, MY AIRCRAFT"</p> <ul style="list-style-type: none"> Retard thrust levers to IDLE Use Autobrakes MAX or maximum manual braking Select and maintain maximum reverse thrust until it can be assured the aircraft can stop on the runway¹ Maintain slight forward pressure on sidestick <p><i>As soon as aircraft is stopped</i></p> <ul style="list-style-type: none"> After immediately evaluating situation" <ul style="list-style-type: none"> Make a PA announcement" <ul style="list-style-type: none"> "THIS IS THE CAPTAIN. REMAIN SEATED, REMAIN SEATED, REMAIN SEATED" Advise cabin of intentions when able 	<p>"YOUR AIRCRAFT"</p> <ul style="list-style-type: none"> Monitor autobrakes "NO AUTOBRAKES", if applicable Monitor deceleration throughout reject Notify tower, when able "80"
<p><i>Or</i></p> <ul style="list-style-type: none"> Call for and accomplish QRH Evacuation checklist 	<ul style="list-style-type: none"> Accomplish QRH Evacuation checklist, if directed
<ul style="list-style-type: none"> Check brake temperature indication 	
<p>¹ In case of complete loss of braking, accomplish "Loss of Braking" procedure in PHB Chapter 2i</p>	

Loss of Braking Procedure
<p>IF AUTOBRAKE IS SELECTED:</p> <ol style="list-style-type: none"> BRAKE PEDALS ... PRESS <p>IF NO BRAKNG AVAILABLE:</p> <ol style="list-style-type: none"> REV ... MAX BRAKE PEDALS ... RELEASE <ul style="list-style-type: none"> <i>Brake pedals should be released when the A/SKID & N/W STRG selector is switched OFF, since pedal force produces more braking action in alternate mode than in normal mode.</i> A/SKID & N/W STRG ... OFF BRAKE PEDALS ... PRESS <ul style="list-style-type: none"> <i>Apply brakes with care since initial pedal force or displacement produces more braking action in alternate mode than in normal mode.</i> MAX BRK PR ... 1000 PSI <ul style="list-style-type: none"> <i>Monitor brake pressure on BRAKES PRESS indicator. Limit brake pressure to approximately 1000 psi and at low ground speed adjust brake pressure as required.</i> <p>IF STILL NO BRAKING:</p> <ol style="list-style-type: none"> PARKING BRAKE ... SHORT AND SUCCESSIVE APPLICATION <ul style="list-style-type: none"> <i>Use short and successive brake applications to stop the aircraft. Brake onset asymmetry may be felt at each parking brake application. If possible delay use of parking brake until low speed to reduce the risk of tire burst and lateral control difficulties.</i>
<p>CAUTION: Autobrakes will not activate below 72 knots.</p>

ILS CAT I			
Trigger	PF	PM	
Prior to starting the approach	<ul style="list-style-type: none"> Ensure waypoints are sequenced properly Confirm the approach phase has been activated 		
Initial approach	<ul style="list-style-type: none"> Check airspeed "FLAPS 1" Verify S speed 	<ul style="list-style-type: none"> Check airspeed "FLAPS 1" Select FLAPS 1 	
	<ul style="list-style-type: none"> Check airspeed "FLAPS 2" Verify F speed 	<ul style="list-style-type: none"> Check airspeed "FLAPS 2" Select FLAPS 2 	
Cleared for the approach	<ul style="list-style-type: none"> Check correct LOC identifier displayed on PFD Select APPR on FCU 		
	<ul style="list-style-type: none"> Verify both AP1 and AP2 engaged, if an autopilot approach Verify GS and LOC annunciate blue on FMA 		
LOC alive	<ul style="list-style-type: none"> Verify LOC deviation display 	"COURSE ALIVE"	
	<ul style="list-style-type: none"> Verify LOC* annunciates green on FMA 		
G/S alive	<ul style="list-style-type: none"> Verify G/S Deviation Display 	"GLIDESLOPE ALIVE"	
1 ½ dots or 3 nm from FAVA	<ul style="list-style-type: none"> Check airspeed "GEAR DOWN" 	<ul style="list-style-type: none"> Check airspeed "GEAR DOWN" Position gear lever DOWN Check Triple Indicator 	
½ dot or 2 nm from FAVA	<ul style="list-style-type: none"> Check airspeed "FLAPS 3, LANDING CHECKLIST" Spoilers Arm 	<ul style="list-style-type: none"> Check airspeed "FLAPS 3" Select FLAPS 3 Accomplish Landing Flow and Checklist 	
On GS or 1 nm from FAVA	2 E N G	<ul style="list-style-type: none"> Check airspeed "FLAPS FULL", if needed 	<ul style="list-style-type: none"> Check airspeed "FLAPS FULL" Select FLAPS FULL, if requested Complete Landing Checklist Monitor speed
		<ul style="list-style-type: none"> Verify GS annunciates green on FMA 	
	1 E N G	"SET MISSED APPROACH ALTITUDE"	<ul style="list-style-type: none"> Set missed approach altitude on FCU
		<ul style="list-style-type: none"> Verify GS annunciates green on FMA 	
Final Approach Verification Altitude Fix	<ul style="list-style-type: none"> Verify Final Approach Verification Altitude 		
1,000' AFL	<ul style="list-style-type: none"> Verify altitude "STABLE" 	"1000" (auto callout)	
	<ul style="list-style-type: none"> Verify autothrust in SPEED mode 		
500' AFL	<ul style="list-style-type: none"> Verify altitude, speed, and sink rate 	"500" (auto callout) "STABLE, TARGET, SINK _____" or "STABLE, ± _____, SINK _____"	

ILS CAT I (Cont'd)		
100' above DA(H)	<ul style="list-style-type: none"> Verify altitude "CONTINUING" 	"100 ABOVE" ¹ (auto callout - if installed) <ul style="list-style-type: none"> Divide time between monitoring instruments and scanning outside for runway environment
DA(H) Runway NOT in sight	"GO AROUND, TOGA" <ul style="list-style-type: none"> Execute go around procedure 	"MINIMUMS" (auto callout - if installed) "NO CONTACT"
or		
DA(H) Runway in sight	"LANDING" <ul style="list-style-type: none"> Verify A/P disengaged prior to: <ul style="list-style-type: none"> 80 feet AGL if CAT 2, CAT 3 SINGLE, or CAT 3 DUAL annunciated on FMA 160 feet AGL if CAT I annunciated on FMA 	"MINIMUMS" , (auto callout - if installed) "<VISUAL CUES> IN SIGHT" ¹ ,
¹ Not required if "LANDING" callout has been made by PF.		

Visual Approach Callouts		
Trigger	PF	PM
1,000' AFL	<ul style="list-style-type: none"> Verify altitude "STABLE" 	"1000" (auto callout - if installed)
	<ul style="list-style-type: none"> Verify autothrust in SPEED mode 	
500' AFL	<ul style="list-style-type: none"> Verify altitude, speed, and sink rate 	"500" (auto callout - if installed) "STABLE, TARGET, SINK ____" or "STABLE, ± ____, SINK ____"

Communication During Manual Flight	
Autopilot	"AUTOPILOT OFF" or "AUTOPILOT 1(2)"
Flight Directors	"FLIGHT DIRECTORS OFF" ¹ or "FLIGHT DIRECTORS ON" Ensure both F/Ds are OFF or ON If one FD is off then the other FD <u>must</u> be selected off in order to ensure autothrust maintains target speed.
Speed	"SPEED ____" or "MANAGED SPEED"
Heading/Nav	"HEADING ____" or "NAV"
Managed/Open Climb (Descent)	"OPEN CLIMB (DESCENT)" or "MANAGED CLIMB (DESCENT)"
Vertical Speed	"VERTICAL SPEED PLUS (MINUS) ____" or "VERTICAL SPEED ZERO"
¹ If the Flight Directors are selected off, the use of the Flight Path Vector (FPV) is recommended.	

ILS CAT II/III			
Trigger	Captain (PF)	FO (PM)	
Prior to starting approach	<ul style="list-style-type: none"> Ensure waypoints are sequenced properly Confirm that the approach phase has been activated 		
Initial approach	<ul style="list-style-type: none"> Check airspeed "FLAPS 1" Verify S speed 	<ul style="list-style-type: none"> Check airspeed "FLAPS 1" Select FLAPS 1 	
	<ul style="list-style-type: none"> Check airspeed "FLAPS 2" Verify F speed 	<ul style="list-style-type: none"> Check airspeed "FLAPS 2" Select FLAPS 2 	
Cleared for the approach	<ul style="list-style-type: none"> Check correct LOC identifier displayed on the PFD 		
	<ul style="list-style-type: none"> Select APPR on FCU Select second autopilot ON "CAT 3 DUAL" or "CAT 3 SINGLE" or "CAT 2" 	<ul style="list-style-type: none"> Verify both AP1 and AP2 engaged Verify approach capability 	
LOC alive	<ul style="list-style-type: none"> Verify GS and LOC annunciate blue on FMA 		
	<ul style="list-style-type: none"> Verify LOC deviation display 	"COURSE ALIVE"	
G/S alive	<ul style="list-style-type: none"> Verify LOC* annunciates green on FMA 		
	<ul style="list-style-type: none"> Verify G/S Deviation Display 	"GLIDESLOPE ALIVE"	
1 ½ dots or 3 nm from FAVA	<ul style="list-style-type: none"> Check airspeed "GEAR DOWN" 	<ul style="list-style-type: none"> Check airspeed "GEAR DOWN" Position gear lever DOWN Check triple Indicator 	
	<ul style="list-style-type: none"> Check airspeed "FLAPS 3, LANDING CHECKLIST" Spoilers Arm 	<ul style="list-style-type: none"> Check airspeed "FLAPS 3" Select FLAPS 3 Accomplish Landing Flow and Checklist 	
On G/S or 1 nm from FAVA	2	<ul style="list-style-type: none"> Check airspeed "FLAPS FULL" 	<ul style="list-style-type: none"> Check airspeed "FLAPS FULL" Select FLAPS FULL, if requested Complete Landing Checklist Monitor speed
		<ul style="list-style-type: none"> Verify GS annunciates green on FMA 	
	1	<ul style="list-style-type: none"> "SET MISSED APPROACH ALTITUDE" 	<ul style="list-style-type: none"> Set missed approach altitude on FCU
		<ul style="list-style-type: none"> Verify GS annunciates green on FMA 	
(A320 Autoland requires Flaps Full)		<ul style="list-style-type: none"> Set missed approach altitude on FCU 	
Final Approach Verification Altitude Fix	<ul style="list-style-type: none"> Verify Final Approach Verification Altitude 		
1,000' AFL	<ul style="list-style-type: none"> Verify altitude "STABLE" 	"1000" (auto callout)	
	<ul style="list-style-type: none"> Verify autothrust in SPEED mode 		
500' AFL	<ul style="list-style-type: none"> Verify altitude, speed, and sink rate 		
	<ul style="list-style-type: none"> "500" (auto callout) "STABLE, TARGET, SINK _____" or "STABLE, ± _____, SINK _____" 		

ILS CAT II/III (Cont'd)		
Below 400' RA	<ul style="list-style-type: none"> Verify LAND annunciates green on FMA 	
	<ul style="list-style-type: none"> Monitor the approach 	"LAND GREEN" or "NO LAND GREEN" , "AUTOLAND WARNING" , "NO FLARE" (as appropriate)
100' above minimums	<ul style="list-style-type: none"> Verify altitude "CONTINUING" Divide time between monitoring auto flight system and scanning outside for runway environment 	"100 ABOVE" (auto callout) ¹ <ul style="list-style-type: none"> Verify altitude
DH Runway <u>not</u> in sight	"GO AROUND, TOGA" <ul style="list-style-type: none"> Execute go around procedure 	"MINIMUMS" (auto callout) <ul style="list-style-type: none"> Verify altitude
OR ...		
DH Runway in sight	"LANDING"	"MINIMUMS" (auto callout) ¹ <ul style="list-style-type: none"> Verify altitude
AH (Electronically verified aircraft will land in touchdown zone)	"LANDING"	"MINIMUMS" (auto callout) ¹ <ul style="list-style-type: none"> Verify altitude
If Autoland RETARD (auto callout): 10 feet RA or If Manual landing: 20-30 feet RA	<ul style="list-style-type: none"> Verify thrust levers at idle 	<ul style="list-style-type: none"> Monitor attitude on PFD "PITCH", if pitch attitude reaches 10 degrees A319/320 or 7.5 degrees A321 "BANK", if bank reaches 7 degrees
Touchdown	<ul style="list-style-type: none"> Select Idle Reverse Select Max Reverse, as required 	<ul style="list-style-type: none"> Verify spoiler extension and REV green on ECAM "SPOILERS" or "NO SPOILERS", if applicable "ONE REVERSE" or "NO REVERSE", if applicable "NO ROLLOUT", if applicable
Nosewheel touchdown	<ul style="list-style-type: none"> Apply brakes, as required 	<ul style="list-style-type: none"> Monitor autobrakes, if selected "NO AUTOBRAKES", if applicable Monitor deceleration
80 kts	<ul style="list-style-type: none"> Begin to modulate toward Idle Reverse 	"80"
60 kts	<ul style="list-style-type: none"> Ensure Idle Reverse thrust or less Disconnect autopilot 	

Managed Non-ILS Approach			
Trigger	PF	PM	
Prior to starting approach	<ul style="list-style-type: none"> Ensure waypoints are sequenced properly Confirm that the approach phase has been activated 		
Initial approach	<ul style="list-style-type: none"> Check airspeed "FLAPS 1" Verify S speed 	<ul style="list-style-type: none"> Check airspeed "FLAPS 1" Select FLAPS 1 	
	<ul style="list-style-type: none"> Check airspeed "FLAPS 2" Verify F speed 	<ul style="list-style-type: none"> Check airspeed "FLAPS 2" Select FLAPS 2 	
Cleared for the approach	<ul style="list-style-type: none"> Select APPR on FCU 		
	<ul style="list-style-type: none"> Verify FINAL and APP NAV annunciate blue on FMA 		
Final approach course intercept	<ul style="list-style-type: none"> Verify APP NAV annunciates green on FMA 		
Approx 3 miles prior to FAF/GP Intcpt	<ul style="list-style-type: none"> Check airspeed "GEAR DOWN," 	<ul style="list-style-type: none"> Check airspeed "GEAR DOWN" Position gear lever DOWN Check Triple Indicator 	
Approx 2 miles prior to FAF	<ul style="list-style-type: none"> Check airspeed "FLAPS 3, LANDING CHECKLIST" 	<ul style="list-style-type: none"> Check airspeed "FLAPS 3" Select FLAPS 3 Accomplish Landing Flow and Checklist 	
Approx 1 mile prior to FAF	2 E N G	<ul style="list-style-type: none"> Check airspeed "FLAPS FULL", if needed 	<ul style="list-style-type: none"> Check airspeed "FLAPS FULL" Select FLAPS FULL, if requested Complete Landing Checklist Monitor speed
		1 E N G	
Glidepath intercept/capture (FINAL APP)	<ul style="list-style-type: none"> Verify FINAL APP annunciates green on FMA 		
	"SET MISSED APPROACH ALTITUDE"	<ul style="list-style-type: none"> Set missed approach altitude on FCU 	
1,000' AFL	<ul style="list-style-type: none"> Verify altitude "STABLE" 	"1000" (auto callout)	
500' AFL	<ul style="list-style-type: none"> Verify altitude, speed, and sink rate 	"500" ¹ (auto callout) "STABLE, TARGET, SINK _____" Or "STABLE, ± _____, SINK _____"	
100' above DA or DDA	<ul style="list-style-type: none"> Verify altitude "CONTINUING"² 	"100 ABOVE" ^{2,3} <ul style="list-style-type: none"> Divide time between monitoring instruments and scanning outside for runway environment 	
DA or DDA (Runway environment <u>not</u> in sight)	"GO AROUND, TOGA" <ul style="list-style-type: none"> Execute go around procedure 	"MINIMUMS, NO CONTACT" ³	
DA or DDA (Runway environment <u>is</u> in sight)	"LANDING"	"MINIMUMS, <VISUAL CUES> IN SIGHT" ²	
<ul style="list-style-type: none"> Verify A/P disengaged no later than DA/DDA 			

¹Callout not required when it occurs near the same time as the "Hundred Above" or "Minimums" callouts.

²Not required if "LANDING" callout has been made by PF.

³Some aircraft will also make an auto callout.

RNAV (RNP) AR/SAAAR Approach Notes

RNAV (RNP) AR/SAAAR approach plate identifiers include:

- (RNP) in the title
- SPECIAL AIRCRAFT & AIRCREW AUTHORIZATION REQUIRED in notes section
- Another possible feature is the curved segment, called an RF (radius to fix) leg.

The MCDU FLT PLAN page will have "___ ARC" displayed between the defining waypoints of an RF leg, where the number is the radius of the arc.

Airbus aircraft have uncompensated BARO-VNAV systems. Temperature limits must be respected.

To determine approach category use VAPP on MCDU PERF page. Use approach category to determine maximum speed when on an RF leg segment (consult QRH table).

Do not accept any clearance direct to a fix unless it is outside the FAF/GP intercept and does not immediately precede an RF leg.

Do not modify waypoints. Modifying waypoints may remove an RF leg, compromising obstacle clearance.

Once inside the FAF/GP Intercept, the PM must callout deviations that equal or exceeds 1/2 dot on the V/DEV scale. If V/DEV increases to $\geq 3/4$ dot deviation, execute a missed approach.

MISSED APPROACH

ESTIMATED is the measure of position accuracy. If ESTIMATED value exceeds the REQUIRED value, NAV ACCUR DOWNGRAD is displayed. FM position is reliable but not sufficient to continue. Continue use of NAV but execute a missed approach.

GPS PRIMARY and HIGH accuracy must be present on both MCDU PROG pages. If GPS PRIMARY is lost, ESTIMATED position will increase with time. FM position is reliable but not sufficient to continue. Continue use of NAV but execute Missed Approach. Monitor FMA to ensure NAV is engaged.

If a missed approach is executed above 1000 ft AGL with NAV available, either

- Stop the descent and monitor FMA to ensure NAV is engaged, or
- Accomplish the go-around maneuver and monitor the FMA to ensure NAV is engaged.

If a missed approach is executed below 1000 ft AGL, utilize the go-around procedure. Monitor FMA to ensure NAV is engaged.

Always monitor FMA to ensure NAV is engaged. GA TRK may cause the aircraft to rapidly depart a curved RF course.

Missed Approach is required for:	Missed Approach Execution:
<ul style="list-style-type: none"> • GPS PRIMARY LOST or NAV ACCUR DOWNGRADE is displayed on the ND and/or MCDU • FM/GPS POS DISAGREE ECAM, FMS1/FMS2 POS DIFF, or MAP NOT AVAILABLE is triggered • Vertical deviation $\geq 3/4$ dot after FAF/GP Intercept • Any failure or degradation of FMS, GPS, Autopilot, or Flight Director • At MAP and visual landing cues not in sight 	<ul style="list-style-type: none"> • Stop descent (below 1000' RA use Go-Around procedure), maintain or climb to (whichever is higher): <ul style="list-style-type: none"> ○ Approach segment altitude, or ○ Missed approach altitude • Remain in NAV: <ul style="list-style-type: none"> ○ Reengage, if required ○ Follow the lateral approach path or missed approach path

Stabilized Approach Callouts		
If ...	and...	then ...
At 1,000 ft AFL	Stabilized	The PF calls "STABLE"
	Unstabilized in IMC	The PF calls "UNSTABLE" and performs a go-around. ¹
	Unstabilized in VMC	Compliance with the flight parameters shown above (not rate of descent) may be delayed until 500 ft AFL as long as "UNSTABLE" is called out along with the deviation (e.g., "slightly high – correcting", etc.), otherwise the PF calls out "UNSTABLE" and performs a go-around ¹ .
At 500 ft AFL	Stabilized ²	The PM calls "STABLE, ± _____ (from Target Speed), SINK _____"
	Unstabilized	The PM calls "UNSTABLE" and the PF performs a go-around. ¹

¹If non-normal conditions require deviation and are briefed the approach can be continued.
²Callout not required during non-ILS approach when it occurs near the same time as the "Hundred Above" or "Minimums" callout.

Deviation Callouts	
Airspeed	"AIRSPEED" – With landing flaps, anytime IAS is: <ul style="list-style-type: none"> • Less than Target -5 knots • More than Target +10 knots
Rate of Descent	"SINK RATE" when: <ul style="list-style-type: none"> • Below 2000' AFL and descent rate exceeds 2000 fpm • Below 1000' AFL and descent rate exceeds 1000 fpm • Inside FAF and descent rate exceeds 1000 fpm
LOC or G/S Indication	"LOCALIZER" / "GLIDESLOPE" when: <ul style="list-style-type: none"> • On final, LOC deviation greater than ½ dot on PFD LOC • After GS interception, ½ dot on PFD GS
Non-ILS Approaches	Vertical deviation – "PATH" Cross-track error exceedance – "TRACK" Bearing deviation – "VOR" or "NDB"

Landing		
Trigger	PF	PM
If Autoland: (RETARD auto callout) 10' RA or If Manual landing: 20-30 feet RA	<ul style="list-style-type: none"> • Verify thrust levers at idle 	<ul style="list-style-type: none"> • Monitor attitude on PFD • "PITCH", if pitch attitude reaches 10° (A319/320) or 7.5° (A321) • "BANK", if bank reaches 7°
Touchdown	<ul style="list-style-type: none"> • Select Max Reverse, as required 	<ul style="list-style-type: none"> • Verify spoiler extension and green on ECAM REV "SPOILERS" or "NO SPOILERS" if applicable "ONE REVERSE" or "NO REVERSE" if applicable "NO ROLLOUT" If applicable
Nose wheel touchdown	<ul style="list-style-type: none"> • Apply brakes, as required 	<ul style="list-style-type: none"> • Monitor autobrakes if selected • "NO AUTOBRAKES", if applicable • Monitor deceleration
80 kts	<ul style="list-style-type: none"> • Begin to modulate toward idle reverse 	"80"
60 kts	<ul style="list-style-type: none"> • Ensure idle reverse thrust or less • If Autoland, disconnect autopilot 	

Go-Around		
Trigger	PF	PM
Go-around	<p>"GO-AROUND, TOGA"</p> <ul style="list-style-type: none"> Advance thrust levers to TOGA Simultaneously rotate to F/D commanded attitude Engage/Ensure NAV¹ <p>"GO-AROUND FLAPS"</p>	<ul style="list-style-type: none"> Verify TOGA Thrust on E/WD "TOGA SET" Engage/Ensure NAV¹ <p>"FLAPS ____"</p> <ul style="list-style-type: none"> Retract Flaps to the go-around setting (e.g. Flaps 3)
	<ul style="list-style-type: none"> Verify MAN TOGA SRS annunciated on FMA 	
Positive rate of climb	<ul style="list-style-type: none"> Verify positive rate of climb "GEAR UP" Execute published missed approach or proceed as instructed by ATC 	<ul style="list-style-type: none"> Verify positive rate of climb on VSI "POSITIVE RATE" <p>"GEAR UP"</p> <ul style="list-style-type: none"> Position gear lever UP Advise ATC
Above 100' AFL	<p>"AUTOPILOT 1", or "AUTOPILOT 2", as appropriate</p>	<ul style="list-style-type: none"> Select autopilot on, if requested
At or above 400' AFL	<ul style="list-style-type: none"> Select/request "HEADING ____" if appropriate 	<ul style="list-style-type: none"> Select/adjust HDG, if requested
At the THR RED ALT LVR CLB flashing	<ul style="list-style-type: none"> Move thrust levers to the CL detent "CLIMB" 	
	<ul style="list-style-type: none"> Verify CLB annunciations on FMA 	
	<ul style="list-style-type: none"> Follow F/D commands to reduce pitch and accelerate Check airspeed 	"CLIMB SET"
F speed	<p>"FLAPS 1"</p>	<ul style="list-style-type: none"> Check airspeed "FLAPS 1" Select FLAPS 1
S speed	<ul style="list-style-type: none"> Check airspeed "FLAPS UP, AFTER TAKEOFF CHECKLIST" Monitor acceleration to green dot speed 	<ul style="list-style-type: none"> Check airspeed "FLAPS UP" Select FLAPS 0 Disarm Spoilers Accomplish After Takeoff Flow and Checklist

¹NAV should be promptly engaged unless the desired missed approach path cannot be flown in NAV (e.g. visual approach, dual FMGC failure, etc) or ATC assigns a heading. If HDG is used, maintain the current heading until reaching 400' AFE.

Engine-out Go-Around		
Trigger	PF	PM
Go-around	<p>"GO-AROUND, TOGA"</p> <ul style="list-style-type: none"> Advance thrust lever to TOGA Simultaneously rotate to F/D commanded attitude Engage/Ensure NAV or HDG¹ as required <p>"GO-AROUND FLAPS"</p>	<ul style="list-style-type: none"> Verify TOGA Thrust on E/WD "TOGA SET" Engage/Ensure NAV or HDG¹ as required "NAV or "HDG" as required "FLAPS ____" Retract Flaps to the go-around setting (e.g. Flaps 2)
	<ul style="list-style-type: none"> Verify MAN TOGA SRS annunciated on FMA 	
Positive rate of climb	<ul style="list-style-type: none"> Verify positive rate of climb "GEAR UP" Maintain F/D commanded attitude 	<ul style="list-style-type: none"> Verify positive rate of climb on VSI "POSITIVE RATE" "GEAR UP" Position gear lever UP Advise ATC Monitor speed and altitude
Above 100' AFL	<p>"AUTOPILOT 1", or "AUTOPILOT 2", if appropriate</p>	<ul style="list-style-type: none"> Select autopilot on, if requested
At or above 400' AFL	<ul style="list-style-type: none"> Comply with runway specific "Engine Failure – Missed Approach procedure (if published); otherwise, fly runway heading Select/request "HEADING ____", if appropriate 	<ul style="list-style-type: none"> Select runway heading, engine failure heading, if requested Monitor missed approach procedure
At or above 1000' AFL (or altitude as specified on published "Engine Failure – Missed Approach")	<ul style="list-style-type: none"> Push V/S knob or request "VERTICAL SPEED ZERO" 	<ul style="list-style-type: none"> Push V/S knob, if vertical speed zero requested Verify V/S 0
F speed	<ul style="list-style-type: none"> Check airspeed "FLAPS 1" 	<ul style="list-style-type: none"> Check airspeed "FLAPS 1" Select FLAPS 1
S speed	<ul style="list-style-type: none"> Check airspeed "FLAPS UP, AFTER TAKEOFF CHECKLIST" Monitor acceleration to green dot speed 	<ul style="list-style-type: none"> Check airspeed "FLAPS UP" Select FLAPS 0 Disarm Spoilers Accomplish After Takeoff Flow and Checklist
Green dot speed	<ul style="list-style-type: none"> Select/request Open Climb, if desired Select/request Speed ____ Maintain green dot speed Select MCT "MCT" 	<ul style="list-style-type: none"> Select Open Climb, if requested Select green dot speed, if requested Verify thrust levers at MCT "MCT SET"
	<ul style="list-style-type: none"> If necessary, accomplish ECAM and/or QRH procedure(s) as appropriate 	

¹NAV should be promptly engaged unless the desired MAP path cannot be flown in NAV (e.g. visual approach, dual FMGC failure, etc) or ATC assigns a heading. If HDG is used, maintain the current heading until reaching 400' AFE.

Windshear Escape Maneuver	
PF	PM
When encountering a windshear	
Call "ESCAPE, TOGA"	
Simultaneously: <ul style="list-style-type: none"> Advance thrust levers to TOGA Roll wings level and rotate at normal takeoff rotation rate (2-3°/second) to follow SRS commanded pitch. Note: If SRS is <u>not</u> available, use 17.5° with full back sidestick, if required Utilize autopilot if engaged Note: Automatic disengagement may occur if alpha > alpha prot 	<ul style="list-style-type: none"> Ensure all required actions are completed Call out: <ul style="list-style-type: none"> Any omissions Altitude and trend information based on radio altimeter (e.g., "300 FEET DESCENDING, 400 FEET CLIMBING")
Do not: <ul style="list-style-type: none"> Change gear/flap configuration Attempt to regain lost airspeed <i>Until windshear is no longer a factor</i>	
After escape is successful	
<ul style="list-style-type: none"> Resume normal flight Retract gear/flaps as required 	<ul style="list-style-type: none"> Issue PIREP to ATC

Windshear Alerts: Takeoff		
Alert	Prior to V ₁	At or Above V ₁
Advisory ¹ Windshear icon on ND only	<ul style="list-style-type: none"> TOGA Continue the takeoff² 	<ul style="list-style-type: none"> TOGA Maneuver as required to avoid the windshear
Caution ¹ "Monitor radar display"	<ul style="list-style-type: none"> Delay/reject the takeoff 	
Warning "Windshear ahead, Windshear ahead" ¹ or "Windshear. Windshear. Windshear" ³	<ul style="list-style-type: none"> Delay/reject the takeoff 	<ul style="list-style-type: none"> Perform the Windshear Escape Maneuver
Unacceptable Airspeed Deviations	<ul style="list-style-type: none"> Reject the takeoff 	<ul style="list-style-type: none"> Perform the Windshear Escape Maneuver At V_R, rotate normally to 15° no later than 2000 feet runway remaining

¹ Inhibited from 100 knots to 50 feet RA.
² Prior to the start of the takeoff roll, delay the takeoff and refer to Severe Weather/Windshear decision tree in the QRH OD pages.
³ Inhibited on the ground until 3 seconds after liftoff.

Windshear Alerts: During Approach	
Alert/Aural	During Approach
Advisory ¹ Windshear icon on ND only	<ul style="list-style-type: none"> Continue the approach if able to avoid windshear Otherwise, execute a normal go-around and maneuver as required to avoid the windshear
Caution ¹ "Monitor radar display"	
Warning ² "Go around. Windshear ahead"	<ul style="list-style-type: none"> Perform either: <ul style="list-style-type: none"> a normal go-around, or the windshear escape maneuver
Warning ³ "Windshear. Windshear. Windshear"	<ul style="list-style-type: none"> Perform the windshear escape maneuver
Unacceptable Flight Deviations	

¹ Inhibited above 1500 feet and below 50 feet RA
² Inhibited above 1200 feet and below 50 feet RA
³ Inhibited above 1300 feet and below 50 feet RA

ILS/LDA PRM Climbing Breakout		
Trigger	Capt (PF)	FO (PM)
Alert	Simultaneously: "BREAKOUT, TOGA" <ul style="list-style-type: none"> • Disconnect Autopilot • Advance thrust levers to TOGA • Turn to heading • Establish climb (follow RA, if received) • Select thrust levers to CL when able "CLIMB"	<ul style="list-style-type: none"> • If RA procedure, turn both FDs OFF "TOGA SET" • Set and select heading on FCU • Set (do <u>not</u> select) altitude on FCU • Verify CL limit on E/WD "CLIMB SET" • Monitor flight path and speed; call out deviations
Established on heading	<ul style="list-style-type: none"> • Reestablish automation • Reconfigure aircraft, as desired 	<ul style="list-style-type: none"> • Reconfigure aircraft, as desired
ILS/LDA PRM Descending Breakout		
Trigger	Capt (PF)	FO (PM)
Alert	Simultaneously: "BREAKOUT" <ul style="list-style-type: none"> • Verify thrust levers remain in CL detent • Disconnect autopilot • Turn to heading • Establish descent (follow RA, if received), not exceed 1,000 FPM (unless directed by RA) 	<ul style="list-style-type: none"> • If RA procedure, turn both FDs OFF • Set and select heading on FCU • Set (do <u>not</u> SELECT) altitude on FCU • Monitor flight path and speed; call out deviations
Leveled off and established on heading	<ul style="list-style-type: none"> • Reestablish automation • Reconfigure aircraft, as desired¹ 	<ul style="list-style-type: none"> • Reconfigure aircraft, as desired
¹ After a descending breakout, the GA phase will not have been automatically sequenced. Unless TOGA is subsequently selected, it will be necessary to re-insert the anticipated approach into the flight plan.		

EGPWS Warning Escape Maneuver		
Step	PF	PM
1 Accomplished Simultaneously	THRUST "TOGA" <ul style="list-style-type: none"> • Set TOGA thrust 	<ul style="list-style-type: none"> • Verify all actions have been completed and call out any omissions • Monitor <i>radio altimeter</i> and call out information on flight path¹ (e.g., "300 FEET DESCENDING, 400 FEET CLIMBING") • Monitor attitude, airspeed, and altitude • Call out the safe altitude (e.g., "MSA IS 3,400 FEET") • Advise ATC
	PITCH <ul style="list-style-type: none"> • Autopilot – disconnect • Roll wings level • Rotate to full back sidestick 	
2	CONFIGURATION <ul style="list-style-type: none"> • Speedbrakes - retract • Do <u>not</u> alter gear/flap configuration until terrain clearance is assured 	
3	<ul style="list-style-type: none"> • Climb to safe altitude 	
4	AFTER RECOVERY <ul style="list-style-type: none"> • Resume normal flight • Retract gear/flaps as required 	
¹ Radio altimeter is primary flight path indicator. In some cases barometric instruments (altimeter/VSI) can indicate a climb even though terrain elevation may be increasing faster than the climb rate of the airplane. In these cases it is critical to call out the trend "Descending" as determined from the radio altimeter.		

Nose Low Recovery Actions and Callouts		
Nose Low Recognition: A nose-low pitch attitude is recognized by low pitch attitude, high rate of descent, increasing airspeed, and possibly excessive bank angle.		
Step	PF	PM
1	Recognize and confirm the situation	
2	Autopilot - Disconnect	<ul style="list-style-type: none"> • Verify all actions have been completed and call out any omissions • Monitor attitude, airspeed and altitude • Monitor radio altimeter, and call out information on flight path (e.g., "300 Feet Descending; 400 Feet Climbing", etc.)
	Pitch	
	<ul style="list-style-type: none"> • Apply nose down elevator if necessary to recover from stall and to aid in rolling wings level. 	
	Roll	
	<ul style="list-style-type: none"> • Roll in the shortest direction toward wings-level attitude¹ 	
	Thrust	
	<ul style="list-style-type: none"> • Reduce thrust and extend SPEED BRAKE as needed 	
3	<ul style="list-style-type: none"> • Apply nose up elevator when bank has been reduced to wings-level and raise nose to horizon² • Check airspeed and adjust thrust 	<ul style="list-style-type: none"> • Advise ATC if required
¹ During recovery from nose-low, high bank angle attitudes, focus on the sky pointer (bank pointer) of the attitude indicator. Roll the aircraft in the direction of the bank indicator. This is the shortest direction toward an upright wings-level attitude.		
² The primary concern is to decrease bank angle (if present) to prevent overloading the aircraft when the pitch is raised to the horizon.		

Nose High Recovery Actions and Callouts		
Nose High Recognition: A nose high pitch attitude is recognized by a pitch attitude unintentionally greater than 25°, airspeed decreasing rapidly, and possibly excessive bank.		
Step	PF	PM
1	Recognize and confirm the situation	
2	Autopilot - Disconnect	<ul style="list-style-type: none"> • Verify all actions have been completed and call out any omissions • Monitor attitude, airspeed and altitude • Monitor radio altimeter, and call out information on flight path (e.g., "300 Feet Descending; 400 Feet Climbing", etc.)
	Pitch	
	<ul style="list-style-type: none"> • Apply as much as full nose down elevator to reduce pitch 	
	Roll	
	<ul style="list-style-type: none"> • Roll to obtain a nose down pitch¹ 	
	Thrust	
	<ul style="list-style-type: none"> • Apply thrust proportional to airspeed degradation² 	
3	<ul style="list-style-type: none"> • SPEED BRAKE - retract 	<ul style="list-style-type: none"> • Advise ATC if required
4	<ul style="list-style-type: none"> • Roll to wings-level when approaching the horizon • Check airspeed and adjust thrust • Establish pitch attitude 	
¹ Bank aids in lowering pitch while maintaining a positive load factor to avoid zero or negative G-forces. Depending upon the degree and rate of pitch change, bank angles from 35° to 60° (in the direction of any initial roll) may be required. For bank angles exceeding 90° focus on the sky pointer (bank pointer) of the attitude indicator. Roll the aircraft in the direction of the bank indicator. This is the shortest direction toward an upright wings-level attitude.		
² It may be necessary to reduce thrust to prevent the angle of attack from continuing to increase.		

Wake Turbulence Recovery Actions and Callouts		
Recognition: An encounter with wake vortices is associated with abrupt roll and aerodynamic loads similar to turbulence encounters. Prompt initiation of recovery procedures is necessary to preclude an unusual attitude.		
Step	PF	PM
1	Recognize and confirm the situation	
2	Autopilot - Disconnect	<ul style="list-style-type: none"> • Verify all actions have been completed and call out any omissions • Monitor attitude, airspeed and altitude • Monitor radio altimeter, and call out information on flight path (e.g., "300 Feet Descending; 400 Feet Climbing", etc.)
	Pitch	
	Roll	
	Thrust	
3	<ul style="list-style-type: none"> • Adjust pitch to horizon • Check airspeed and adjust thrust • Initiate go-around if on approach with probability of further encounter 	<ul style="list-style-type: none"> • Advise ATC if required
¹ During recovery, focus on the sky pointer (bank pointer) of the attitude indicator. Roll the aircraft in the direction of the bank indicator. This is the shortest direction toward an upright wings-level attitude.		

Stall Recovery		
Step	PF	PM
1	Recognize and confirm the situation	
2	Autopilot - Disconnect	<ul style="list-style-type: none"> • Verify all actions have been completed and call out any omissions • Monitor attitude, airspeed, and altitude • Monitor <i>radio altimeter</i> and call out information on flight path (e.g., "300 FEET DESCENDING, 400 FEET CLIMBING" etc.)
	Pitch	
	Roll	
	Thrust	
3	Configuration	<ul style="list-style-type: none"> • Select FLAPS 1 if requested
4	After Stall Recovery	
¹ If the sidestick does not provide the needed response, stabilizer trim may be necessary. Excessive use of pitch trim may aggravate the condition, or may result in loss of control or in high structural loads.		
² Excessive use of pitch trim or rudder may aggravate the condition, or may result in loss of control or in high structural loads.		

Emergency Descent	
<ul style="list-style-type: none"> This maneuver is designed to provide a smooth descent to a safe altitude, in minimum time, with the lowest possible passenger discomfort. The captain will assume PF duties for all emergency descents. If structural damage is suspected, limit airspeed as much as possible, and avoid high maneuvering loads. The autopilot and A/THR should remain engaged and used to accomplish the descent. If the autopilot is not available manually fly the maneuver. 	
Left Seat	Right Seat
<p>"Emergency Descent. My Aircraft"</p> <p>Altitude:</p> <ul style="list-style-type: none"> Descend to 10,000 ft or minimum safe altitude¹ (whichever is higher) Continue descent to 10,000 ft when able <p>Heading:</p> <ul style="list-style-type: none"> Select a turn or proceed straight ahead. <p>Airspeed:</p> <ul style="list-style-type: none"> SPD ... V_{mo}/M_{mo} (limit speed and avoid G load if damage suspected) <p><i>Wait minimum of 10 seconds then slowly:</i></p> <ul style="list-style-type: none"> Speedbrakes ... Extend (ensure V_{ls} does not exceed indicated airspeed) <hr/> <p><i>1000 feet prior to Level Off:</i></p> <ul style="list-style-type: none"> Speedbrakes ... Retract SPD ... LRC or as appropriate 	<p>"Your Aircraft"</p> <ul style="list-style-type: none"> PA – "Emergency descent, be seated" Notify ATC and obtain descent clearance Cabin Signs ... ON Engine Mode ... IGN Obtain altimeter setting Check safe altitude (MEA, MOCA, MORA, MSA) <p><i>If not in contact with ATC, also:</i></p> <ul style="list-style-type: none"> External Lights – All ON TCAS Selector – BELOW Transmit on 121.5 <ul style="list-style-type: none"> "PAN-PAN" or "MAYDAY" (3 times) present position intentions <hr/> <p>When cabin has descended below 14,000 feet:</p> <ul style="list-style-type: none"> Notify flight attendants
<p>¹Minimum Safe altitude is:</p> <ul style="list-style-type: none"> On airway: Minimum Enroute Altitude (MEA), or Minimum Obstacle Clearance Altitude (MOCA), whichever is higher, or Off airway: Minimum Off-Route Altitude (MORA), or any other altitude based on terrain clearance, navigation aid reception, or Within terminal area: Highest Minimum Safe Altitude (MSA) 	
Expanded Discussion	
<p>Don oxygen masks and establish crew communications, if required. If CAB ALT > 14,000 ft, select PAX OXY MASKS to MAN ON.</p> <p>Select OP DES and VMO/MMO if appropriate. If A/THR is not available retard thrust levers to idle. Initiate a turn, if necessary. Smoothly extend the speedbrakes, and lower the nose to initial descent attitude (approximately 10° nose-down).</p> <p>Wait at least 10 seconds after the aircraft starts descent before fully extending the speedbrakes. Rapid deployment of the speedbrakes at high altitude/slow speed will cause VLS to be greater than the existing speed and may cause autopilot disconnection and speedbrakes auto retraction if angle of attack protection is activated.</p> <p>About 10 knots before reaching target speed (VMO/MMO) slowly reduce the pitch attitude to maintain target speed. If VMO/MMO is inadvertently exceeded, change pitch smoothly to decrease speed.</p> <p>Approaching level off altitude, smoothly adjust pitch attitude to reduce rate of descent. The speedbrake lever should be retracted approximately 1000 feet above the desired altitude. After reaching level flight, add thrust to maintain desired speed.</p> <p>When turbulent air is encountered or expected, reduce to turbulent air penetration speed. Rapid descent is normally made with the landing gear up and speedbrakes FULL.</p> <p>Level off at 10,000 feet or safe altitude, whichever is higher.</p> <p>Approximately 1000 feet above the desired altitude, smoothly return the speedbrake to CLOSE during the level off maneuver. When approaching the selected altitude, the altitude capture will engage automatically. Adjusting the command speed to approximately LRC or 300 knots prior to level off minimizes thrust lever activity at altitude capture. The pitch mode will then control altitude and the thrust levers will increase to hold speed.</p>	

TCAS Warnings		
Avoid excessive maneuvers while aiming to keep the vertical speed outside the red area of the VSI and within the green area (if applicable). If necessary, use the full speed range between Alpha max and Vmax. Resolution Advisories are inhibited below 900 ft.		
Trigger	PF	PM
Traffic Advisory - All		
"TRAFFIC, TRAFFIC" <i>Announcement</i>	<ul style="list-style-type: none"> Do <u>not</u> maneuver based on TA alone. 	<ul style="list-style-type: none"> Attempt to see the reported traffic¹
Preventative Resolution Advisory - All		
"MONITOR VERTICAL SPEED" <i>Announcement</i>	<ul style="list-style-type: none"> "AUTOPILOT - OFF" "FLIGHT DIRECTORS - OFF" Maintain or adjust the vertical speed as required to avoid the red area of the vertical speed scale 	<ul style="list-style-type: none"> Select both FDs OFF Verify all actions have been completed and coordinate with PF to accomplish omitted items.
Corrective Resolution Advisory - All		
RA <i>(See Announcement list below)</i>	<ul style="list-style-type: none"> Respond promptly and smoothly to an RA. "AUTOPILOT - OFF" "FLIGHT DIRECTORS - OFF" Adjust the vertical speed as required to remain within the green area of the vertical speed scale. Respect the stall, GPWS, or Windshear warning. 	<ul style="list-style-type: none"> Select both FDs OFF Notify ATC Verify all actions have been completed and coordinate with PF to accomplish omitted items.
Corrective Resolution Advisory - Approach		
"CLIMB" or "INCREASE CLIMB" <i>Announcement</i>	<ul style="list-style-type: none"> Go Around - Execute 	<ul style="list-style-type: none"> Notify ATC
Clear of Conflict Advisory - All		
"CLEAR OF CONFLICT"	<ul style="list-style-type: none"> Expediently return to the previously assigned ATC clearance when the traffic conflict is resolved and resume normal navigation. AP and/or FD can be reengaged as desired. Attempt to see the reported traffic. 	
Note 1: The traffic acquired visually may not be the same traffic causing the RA. When an RA occurs, the PF should respond immediately to RA displays and maneuver as indicated, unless doing so would jeopardize the safe operation of the flight or the flight crew can assure separation with help of definitive visual acquisition of the aircraft causing the RA.		
Corrective Resolution Advisories Announcements (RAs)		
RA Category	TCAS II Version 7	
Climb	"CLIMB, CLIMB"	
Descend	"DESCEND, DESCEND"	
Altitude Crossing Climb	"CLIMB, CROSSING CLIMB" (twice)	
Altitude Crossing Descend	"DESCEND, CROSSING DESCEND" (twice)	
Reduce Climb	"ADJUST VERTICAL SPEED, ADJUST"	
Reduce Decent	"ADJUST VERTICAL SPEED, ADJUST"	
RA Reversal to a Climb RA	"CLIMB, CLIMB NOW" (twice)	
RA Reversal to a Descend RA	"DESCEND, DESCEND NOW" (twice)	
Increase Climb	"INCREASE CLIMB" (twice)	
Increase Descent	"INCREASE DESCENT" (twice)	
Maintain Rate	"MAINTAIN VERTICAL SPEED, MAINTAIN"	
Altitude Crossing, Maintain Rate (Climb and Descend)	"MAINTAIN VERTICAL SPEED, CROSSING MAINTAIN"	
Weakening of Initial RA	"ADJUST VERTICAL SPEED, ADJUST"	
Note: If an initial RA is changed to a less aggressive advisory, pilots should respond to the changed RA and adjust the airplane's vertical speed accordingly, while keeping the pitch guidance symbol in the green arc, and/or out of the red arc.		

Non-Normal Procedures

1. PF – Maintain Aircraft Control

The PF will devote total awareness to the control and navigation of the airplane and use automation as appropriate to help reduce workload.

2. Identify the Non-Normal

PM – Cancels the Warning or Caution, if applicable

The first crewmember recognizing the non-normal situation will clearly announce it (e.g., "Engine Fire"). In the case of an engine problem, do not identify which engine has malfunctioned at this time. The PM should review the overhead panel and/or associated system page (lower ECAM) to check that the system indications are not in conflict with the ECAM warning or caution, prior to taking any action. If not immediately obvious which procedure to use, additional analysis may be necessary. The captain will determine which procedure is appropriate.

3. PM - Determine if Immediate Action or ECAM Exception

Once:

- the airplane flight path and configuration are properly established, and
- the airplane is not in a critical phase of flight (e.g., takeoff, landing) ...

the PM determines and verbalizes whether the non-normal is an Immediate Action Item or an ECAM Exception. The Immediate Action Index and ECAM Exception Index are available on the back of the QRH.

4. PM - Accomplish Immediate Action Items, if applicable.

Accomplish any red items from memory, and then use the QRH to complete Immediate Action items without delay as follows:

PF	PM
Accomplish each non-normal checklist item using "Challenge-Response-Response Concept"	
Maintain aircraft control	Read aloud the appropriate QRH or electronic checklist items: <ul style="list-style-type: none"> • checklist title • challenge and response for all numbered items (left margin items on an electronic checklist) • indented items, if necessary, and • notes, cautions, and warnings
Perform/request all items directly related to flying the aircraft (e.g., flight path control, autopilot, thrust management, etc.)	Position controls <u>not</u> directly related to flying the aircraft and items requested by the PF

Note: Refined guidance has been created in an effort to putting the most standardized methodology into practice when handling non-normal procedures. In review, it is now preferred to consult the index on the back of the QRH to determine whether a non-normal situation is an Immediate Action or an ECAM Exception prior to the captain assigning PF duties. If the non-normal is an Immediate Action item, its associated checklist should be conducted prior to any transfer of control. If the non-normal is an ECAM Exception, transfer of control should occur prior to conducting its associated checklist.

5. Captain - Assigns PF

In-flight, the captain should normally assign the flying duties to the first officer while non-normal checklists are completed unless conditions dictate otherwise. This allows the captain to direct full attention to the accomplishment of non-normal procedures and conduct communications with external resources. The captain should verbalize who will assume ATC communications.

6. Accomplish Non-normal procedure

The PF calls for the appropriate non-normal procedure as follows:

PF calls for the QRH (e.g. "QRH procedure") in case of:

- ECAM Exception. PM refers to the ECAM Exceptions Index on the back cover of the QRH for page reference.
- Non-Normal procedure that is not indicated by ECAM. PM refers to the Alphabetic Index for the page reference.

PF calls "ECAM Action" in case of:

- ECAM procedures that are not ECAM Exceptions. PM refers to the electronic checklist.

7. PM - Accomplish ECAM Follow-Up procedures, if applicable

ECAM cautions and warnings requiring QRH follow up are contained in a QRH index on yellow pages following the Immediate Action Items. After completing the ECAM checklist, complete the associated QRH Follow-Up checklist if the ECAM caution or warning is listed in this index. If the ECAM checklist returns the system to normal, the associated Follow-Up procedures are not accomplished.

Additional Resources: If the non-normal is not an ECAM Exception, the ECAM Non-Normal Supplemental Manual is available for reference, time permitting.

Crew Awareness ECAMs: In the event of a Crew Awareness ECAM (e.g., COND AFT CRG ISO VALVE) on the ground, dispatch may not be permitted or an MEL/CDL may apply. Comply with After Gate Departure procedure.

ECAM Procedures	
When performing ECAM Actions always start in Box 1 , then 2,3,4. Complete ALL items before proceeding to the next box	
UPPER ECAM (Warning Display)	
Primary Failures Box 1	Secondary Failures Box 2
LOWER ECAM (Status Display)	
Procedures Box 3	Inop Systems Box 4

Example ECAM Procedures			
ECAM SCREEN		PROCEDURES / CALLOUTS	
WARNING DISPLAY (Upper)		PF	PM
Box 1	Box 2		
HYD B RSVR OVHT BLUE ELEC PUMP ... OFF		Pilot first noting non-normal read ECAM action (e.g., "HYDRAULIC B RESERVOIR OVERHEAT")	
		"ECAM ACTION"¹	<ul style="list-style-type: none"> Confirm fault on SD Read full line of ECAM action (e.g., "BLUE ELECTRIC PUMP OFF") Box 1 Perform ECAM action(s)² or request execution by the PF Repeat the response IAW the FOM (e.g. "OFF") Review all affected equipment shown in amber on HYD page.
HYD B RSVR OVHT B SYS LO PR	* F/CTL	<ul style="list-style-type: none"> Check ECAM action(s) completed "CLEAR ECAM" 	"CLEAR ECAM?"
SEAT BELTS	* F/CTL		<ul style="list-style-type: none"> Review all affected equipment shown in amber on F/CTL page Box 2
		"CLEAR FLIGHT CONTROL"	"CLEAR FLIGHT CONTROL?"
STATUS DISPLAY (Lower)			
Box 3	Box 4		
STATUS APPR PROC IF BLUE OVHT OUT: BLUE ELEC PUMP ... ON CAT 2 ONLY SLATS SLOW	INOP SYS CAT 3 BLUE HYD SPLR 3		<ul style="list-style-type: none"> Read STATUS line by line Box 3 then Box 4
		"CLEAR STATUS"	"CLEAR STATUS?"

ECAM Procedure Notes	
1. Unless conditions dictate otherwise, the captain should assign the flying duties to the F/O in accordance with the FOM. 2. Confirm correct Thrust Lever, Engine Master, Engine Fire pb, Cargo Smoke DISCH pb, IR pbs/selectors, and/or IDGs before performing ECAM action.	
Procedures will be initiated on command of PF. No action will be taken (except cancelling the audio warning through MASTER WARN light until: <ul style="list-style-type: none"> • Flight path is stabilized • The airplane is at least 1,000' AFE or obstacle clearance altitude. 	
If an emergency or abnormal procedure calls for LAND ASAP written in red or amber on ECAM, comply with FM procedures and land at nearest suitable airport.	
Primary Failure – Failure of an item of equipment or system causing loss of others in the airplane. On the ECAM their title is boxed: B SYS LO PR	
Crew Coordination – When carrying out a procedure displayed on the ECAM, it is essential that both pilots are aware of the present display. Before any CLEAR action, crosscheck that no cyan message remains (except in case of no action feedback), that can be eliminated by a direct action. *** NO CLEAR ACTION BEFORE CROSS EXAMINATION ***	
Should it be necessary to stop ECAM actions for any reason, the PF will state: "HOLD ECAM" . ECAM actions will continue when the PF states "CONTINUE ECAM" .	
ECAM Procedures, STATUS information, and a check of PFD/ND are sufficient for handling the fault. However, when ECAM actions have been performed, and ECAM STATUS has been reviewed, if time permits, the crew may refer to the ECAM Non-Normal Supplemental manual.	
Common sense must be applied when using ECAM. For example, if the last remaining hydraulic system overheats, ECAM will indicate shutting the system OFF. For obvious reasons, don't.	
Note: Anytime the aircraft is unable to maintain current altitude due to an engine failure or an ECAM/QRH-directed thrust reduction, the crew will immediately apply the QRH procedure "Loss of Thrust-Unable to Maintain Altitude" Immediate Action procedure. Ensure the aircraft is stable before initiating or resuming any other applicable ECAM/QRH procedures.	

ECAM Challenge-Response-Response Concept	
Confirm (In Flight only). The action is accomplished by the PM but not until the PF verbally confirms the PM has identified and is touching the correct control. Note: For the Thrust Lever only, see example below. Confirm items include: Thrust Levers, Engine Masters, Engine Fire pbs, Cargo Smoke DISCH pbs, IR pbs/selectors, and/or IDGs. The passenger door disarming lever is a confirm item on the ground. QRH Confirm items have "Confirm" printed between the challenge and response while ECAM Confirm items do not.	
ECAM Confirm Example (Thrust lever only):	
THR LEVER 1IDLE	
PF	PM
<ul style="list-style-type: none"> • Fly the aircraft • Touch, but do not move thrust lever 1 	<ul style="list-style-type: none"> • Read aloud "THRUST LEVER 1 IDLE" • Ensure the PF is touching the correct thrust lever • State "CONFIRMED"
<ul style="list-style-type: none"> • Position thrust lever 1 to IDLE • Repeat aloud "IDLE" 	
ECAM Confirm Example (Engine Masters, Engine Fire pbs, Cargo Smoke DISCH pbs, IR pbs/selectors, IDGs.):	
ENG MASTER 1 OFF	
<ul style="list-style-type: none"> • Fly the aircraft 	<ul style="list-style-type: none"> • Read aloud "ENGINE MASTER 1 OFF" • Touch, but do <u>not</u> move Engine Master 1
<ul style="list-style-type: none"> • Ensure the PM is touching the correct engine master • State "CONFIRMED" when ready for action 	
	<ul style="list-style-type: none"> • Position Engine Master 1 OFF • Repeat aloud, "OFF"
Non-normal checklist notes:	
Standard: PM reads aloud the checklist challenge and response, selects the proper control, accomplishes the action, then repeats the response aloud.	
Confirm: Accomplished the same as standard non-normal checklist items except the action is accomplished by the PM but not until the PF verbally confirms the PM has identified and is touching the correct control. Note: For the Thrust Lever only, see example below.	
Verify: Accomplished the same as standard non-normal checklist items except the response is repeated by the PF.	

QRH Memory Items
Refer to QRH Undue Activation of Alpha Protection Immediate Action

ADDITIONAL MEMORY LIMITATIONS (In Bold)

OPERATION LIMITS

Maximum wind for takeoff and landing: **50 knots**
 Maximum crosswind for takeoff and landing: **35 knots (including gusts)**
 Maximum crosswind (including gusts) for Autoland (Vis ≥ 4000 or 3/4: **20 knots**
 Maximum crosswind for landing Vis < 4000 or 3/4: **15 knots**
 Maximum tailwind component for takeoff (A320 and A321 with IAE engines): **10 knots**
 Maximum tailwind component for takeoff (All A319/321 and A320 with CFM engines): **15 knots**
 Maximum tailwind component for landing (non-Sharklet): **10 knots**
 Maximum tailwind component for landing (Sharklet): **15 knots**
 Maximum operating altitude: **39,000 feet**

SPEED LIMITS

Maximum operating airspeed (V_{MO}): **350 KIAS**
 Maximum operating Mach number (M_{MO}): **0.82M**
 Maximum taxi speed: 30 knots
 Maximum taxi speed for 90 degree turn: 10 knots
 Maximum gear extension speed (V_{LO}): 250 KIAS
 Maximum gear retraction speed (V_{LO}): 220 KIAS
 Maximum gear extended speed (V_{LE}): 280 KIAS/0.67M

Turbulence Penetration Speeds	A319/320	A321
At or above 20,000 feet	275 KIAS/.76M	300 KIAS/.76M
Below 20,000 feet	250 KIAS	270 KIAS

ICE & RAIN PROTECTION

Engine Anti-ice ON when OAT (Ground) / TAT (Flight): **10° C or below**
 (except during climb and cruise when the temperature is **below -40° C SAT**)
 Engine anti-ice must be ON prior to and during descent in icing conditions
 (including temperatures **below -40° C SAT**)

HYDRAULICS, BRAKES, & LANDING GEAR

Maximum landing gear extension altitude: **25,000 feet**

FLIGHT CONTROLS

Maximum operating altitude with flaps and/or slats extended: **20,000 feet**

AUTO FLIGHT SYSTEM

Autopilot Engaged – Minimum Height: **100 feet AGL** After Takeoff in SRS mode.

Maximum Winds for Automatic Approach, Landing, and Rollout (including gusts)		
Wind Component	Visibility	Limitation
A319		
Headwind	Any	20 knots (two engines) 15 knots (single engine)
Tailwind	Any	10 knots if LDG ELEV below 5,750' MSL and in CONF FULL. Otherwise 5 knots
Crosswind	≥ 4000 or 3/4	20 knots (two engines) 10 knots (single engine)
	< 4000 or 3/4	15 knots (two engines) 10 knots (single engine)
A320/321		
Headwind	Any	30 knots
Tailwind	Any	10 knots
Crosswind	≥ 4000 or 3/4	20 knots
	< 4000 or 3/4	15 knots

RSVM

The maximum allowable in-flight difference between captain and first officer PFD altitude displays for RVSM operations is **200 feet**.

POWERPLANT

Minimum oil quantity for dispatch: 13 quarts
Reverse thrust is for ground use only.

Send corrections/comments to Bob Sanford, Email: busdriver@hky.com
Unofficial Airbus Study Site: www.airbusdriver.net