NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

October 28, 2020

Attachment 2 – Quick Reference Handbook [Excerpts]

OPERATIONAL FACTORS/HUMAN PERFORMANCE

DCA18LA163

DELTA

A330

Quick Reference Handbook

AIR ABNORM BLEED CONFIG

Condition: One or more bleed systems are inoperative or selected off.

Note: Page 2.3 is applicable for MEL relief.

Note: If both bleed systems are inoperative or unavailable, immediately refer to Air Dual Bleed Fault on page 2.9

► IF BLEED NOT RECOVERED (due to bleed leak, engine fire, start valve failed open, or bleed valve failed open):

- X BLEED . . . . . CLOSE
- WING ANTI ICE . . . . . OFF
- AVOID ICING CONDITIONS

> If severe ice accretion:

- MIN SPD . . . . . V_{LS} + 10 KT/Green Dot
- Maneuver with care

Note: Do not use APU Bleed air after an ENG 1 Fire or for wing anti-ice purposes.

▼ Continued on next page ▼

ELEC GEN 1 (2) FAULT

Condition: A protection trip opened the generator line contactor with the GEN pb ON.

1. GEN 1 (2) . . . . OFF THEN ON
   - ► IF UNSUCCESSFUL:
     - GEN 1 (2). . . . . OFF

⊥⊥⊥⊥⊥⊥⊥⊥⊥⊥⊥⊥⊥⊥⊥⊥⊥⊥⊥⊥⊥⊥⊥⊥⊥⊥⊥⊥⊥⊥⊥⊥

- Start the APU (if available) and use the APU generator as an additional source of electrical power.

> If the APU does not start or if the APU generator is not available:

- See NNOI.1, Mechanical Irregularities After Airborne (ETOPS Decision Making), for possible ETOPS limitations.

STATUS

If the APU Generator is not operational: Cat III approach not authorized.

	INOP SYS
CONSIDER APU GEN USE	GEN 1 (2) PARTIAL GALLEY

■ ■ ■ ■

ELEC IDG 1 (2) OIL LO PR

Condition: The oil pressure on an Integrated Drive Generator is low.

Press the IDG pb until the GEN FAULT light comes on but not for more than 3 seconds.

1 ⚠ IDG 1 (2) ..... Confirm . . . . . OFF

Note: The IDG cannot be disconnected when the engine is shut down.

- Start the APU (if available) and use the APU generator as an additional source of electrical power.

> If the APU does not start or if the APU generator is not available:

  - See NNOI.1, Mechanical Irregularities After Airborne (ETOPS Decision Making), for possible ETOPS limitations.

STATUS

If the APU Generator is not operational: Cat III approach not authorized.

	INOP SYS
	GEN 1 (2) PARTIAL GALLEY

■ ■ ■ ■

ENG 1 (2) SHUT DOWN

Condition: The affected engine has intentionally been shut down using the master switch.

LAND ASAP

1. ENG START SEL. . . . . .IGN
2. FUEL IMBALANCE . . . . . .MONITOR
3. TCAS MODE SEL . . . . . .TA

AIR ABNORM BLEED CONFIG

4. Start the APU (if available) and use the APU generator as an additional source of electrical power.
5. ***Write down*** the fuel tank quantity in each fuel tank and monitor them over time to determine if a fuel leak exists. Only after ensuring that a fuel leak does not exist, the WING X FEED valve may be opened to prevent a fuel imbalance.
   - **When** flaps & slats UP:
     > If Y ELEC PUMP is running:
       - Y ELEC PUMP (lower pb) . . . . . .OFF

▼ Continued on next page ▼

▼ ENG 1 (2) SHUT DOWN continued ▼

► If the ENG FIRE pb was **not** pushed:

- Associated engine driven hydraulic pump:
  - > If ENG 1 fail:
    - • BLUE ENG 1 pump . . . . . OFF
  - > If ENG 2 fail:
    - • YELLOW ENG 2 pump . . . . . OFF

  (Prevents spurious HYD SYS LO PR messages on approach.)
  - > If icing conditions are encountered:
    - • X BLEED selector . . . . . OPEN
    - • PACK (affected side) . . . . . OFF
    - • WING ANTI ICE . . . . . ON

► If the ENG FIRE pb was pushed:

A/THR may be inoperative.

- Avoid icing conditions.
- X BLEED . . . . . CLOSE
- WING ANTI ICE . . . . . OFF
  - > If icing conditions cannot be avoided:
    - • Use an approach speed of V_{LS} + 10 knots.
    - • Landing distance procedure . . . . . Apply (Refer to ODM)

Caution! Use caution if speeds below V_{LS} are encountered with full asymmetric power. Control authority is limited as speeds approach V_{MCA}.

▼ Continued on next page ▼

▼ ENG 1 (2) SHUT DOWN continued ▼

STATUS

CAT II approach is authorized if autothrust is available.
CAT III approach not authorized.

APPROACH PROCEDURES	*INOP SYS*
► IF ENG 1 SHUT DOWN and G HYD lost (zero pressure): BEFORE S/F EXTENSION: • BLUE ELEC PUMP .....OFF ► IF ENG 2 SHUT DOWN and G HYD lost (zero pressure): BEFORE S/F EXTENSION: • YELLOW ELEC PUMP . OFF 1. PERF APPR . .select CONF 3 2. FOR LDG . . . . . USE FLAP 3 3. LDG DIST PR . . . . . APPLY (Refer to ODM) 4. Use FLAPS 2 for go-around. **Note:** If landing overweight, see "Overweight Landing" on page 0.27.	BLUE HYD (if ENG 1) or YELLOW HYD (if ENG 2) PART SPLRS REV 1 (2) GEN 1 (2) PACK 1 (2) ENG 1 (2) BLEED B. ENG 1 PUMP or Y ENG 2 PUMP PART GALLEY YAW DAMPER 2 (if ENG 2) ALTN BRK (if ENG 1)

■ ■ ■ ■

ENG 1 (2) FIRE (In Flight)

Condition: An engine fire has been detected in flight.

LAND ASAP

1. THR LEVER (affected engine) . . . . Confirm . . IDLE

Note: If after selecting the THR LEVER to idle, all FIRE indications abate (disappear), engine shut down is not mandatory. As a precaution, if the engine is at idle, use single-engine approach/land procedures (flaps 3, etc.).

2. ENG MASTER (affected engine) . . Confirm . . OFF
3. ENG FIRE pb (affected engine) . . . Confirm .. PUSH
4. APU BLEED (if engine 1 affected) . . . . . OFF

► If the crossbleed does not close automatically:

- X BLEED. . . . . CLOSE

5. AGENT 1 AFTER 10 S . . . . . DISCH
6. ATC . . . . . NOTIFY

► IF FIRE AFTER 30 S:

- AGENT 2 . . . . . DISCH

ENG 1 (2) SHUTDOWN

7. ENG START SEL . . . . . IGN
8. FUEL IMBALANCE . . . . . MONITOR

Note: After ensuring that a fuel leak does not exist, the WING X FEED valve may be opened to prevent fuel imbalance.

9. TCAS MODE SEL . . . . . TA

▼ Continued on next page ▼

▼ ENG 1 (2) FIRE (in flight) continued ▼

AIR ABNORM BLEED CONFIG

Note: Keep the X BLEED valve closed to prevent spreading of the fire or contamination of bleed air.

10.AVOID ICING CONDITIONS

- **When** flaps & slats UP:
  - > If Y ELEC PUMP is running:
    - Y ELEC PUMP (lower pb) . . . . . .OFF
- Turn off wing anti-ice and do **not** use APU BLEED air for wing ant-ice purposes.
- For approach, if ice has formed on the aircraft, use an approach speed of V_{LS} (FULL) + 10 knots and apply the landing distance procedure (refer to ODM).
- Start the APU (if available) and use the APU generator for an additional source of electrical power.
- Do **not** attempt a restart of the affected engine.

Caution! Use caution if speeds below V_{LS} (e.g., windshear) are encountered with full asymmetric power. Control authority is limited as speeds approach V_{MCA}.

▼ Continued on next page ▼

▼ ENG 1 (2) FIRE (in flight) continued ▼

STATUS

CAT III approach not authorized.

APPROACH PROCEDURES	*INOP SYS*
► IF ENG 1 SHUT DOWN and G HYD SYS lost: BEFORE S/F EXTENSION: • BLUE ELEC PUMP. . . . . OFF ► IF ENG 2 SHUT DOWN and G HYD SYS lost: BEFORE S/F EXTENSION: • YELLOW ELEC PUMP. . . OFF 1. PERF APPR . . . select CONF 3 2. FOR LDG . . . . . USE FLAPS 3 3. Monitor fuel balance. 4. LDG DIST PR . . . . . APPLY (refer to ODM) 5. If a go-around is necessary, use FLAPS 2 for the go-around. **Note:** If landing overweight, see "Overweight Landing" on page 0.27.	GEN 1 (2) PACK 1 (2) ENG 1 (2) BLEED REV 1 (2) G ENG 1 (2) PUMP PART GALLEY PART SPLRS BLUE HYD (if ENG 1) ALTN BRK (if ENG 1) YELLOW HYD (if ENG 2) YAW DAMPER 2 (if ENG 2)

■ ■ ■ ■

ENG 1 (2) FIRE DET FAULT

Condition: Both fire loops on one engine are inoperative.

Note: Fire detection on the affected engine is inoperative.

1. Monitor engine parameters more closely than normal for signs of fire and/or over temperature.

Note: Consult with Dispatch regarding ETOPS considerations.

STATUS

	INOP SYS
	FIRE DET 1 (2)

■ ■ ■ ■

ENG 1 (2) FIRE LOOP A (B) FAULT

Condition: Fire loop A or fire loop B is inoperative on one engine.

1. No action is required. This message is for crew information only.

STATUS

	INOP SYS
	ENG LOOP A (B)

■ ■ ■ ■

Introduction

The Non-Normal Checklists chapters contain checklists used by the flight crew to manage non-normal situations. Most checklists contained in the Non-Normal Checklists chapters correspond to an ECAM message. ECAM messages are generated by manufacturer-developed software. Because the ECAM is not customized for specific airlines, it does not always reflect the current operating philosophy of Delta Air Lines. Consequently, Delta provides QRH emergency/non-normal procedures to provide additional information/guidance for Delta standardization, to address situations that are not recognized by the ECAM, or for the remote case of an ECAM failure.

Checklists without an ECAM message are called unannunciated checklists. Most unannunciated checklists are in the associated system section. For example, Engine Fuel Leak is in section 12, Fuel. Unannunciated checklists with no associated system (such as Volcanic Ash) are in section 0, Miscellaneous. In addition, the Miscellaneous section contains checklists titled “Considerations.” These checklists are designed to assist crewmembers in the decision making process to accomplish a non-normal maneuver (such as a decision to perform an overweight landing), assist in the preparation and execution of a non-normal maneuver (such as preparation for a ditching), and/or provide considerations that should be taken into account after a non-normal maneuver has been executed (such as post RTO). These checklists should be referenced as time and conditions allow.

All checklists have condition statements. The condition statement briefly describes the situation that caused the ECAM alert message.

Checklists may include memory items. Memory items are critical steps that must be done from memory before reading the checklist. Condition and precaution statements, and notes associated with memory items (i.e., above the dashed line) support action steps and are not considered memory items. The last memory item is followed by a dashed horizontal line.

Checklists that need a quick response are listed in the Quick Action Index on the front cover of the QRH. Some checklist titles are shown in a larger font (such as Evacuation) to make them easier to read under conditions where crew members may be wearing an oxygen mask or under conditions of reduced visibility (e.g., smoke in the flight deck). In the table of contents of each system section, Quick Action Index checklists are listed first, followed by all other checklists. The titles of Quick Action Index checklists are printed in bold type.

Checklist titles in upper case (such as BRAKES HOT) are annunciated by an ECAM alert message. Checklist titles in title case (such as Cracked Flight Deck Window) are not annunciated.

Non-Normal Checklist Operation

General

Non-normal checklists start with steps to correct the situation. If needed, information for planning the rest of the flight is included. Flight patterns for some non-normal situations are located in the Maneuvers section of the Flight Crew Training Manual (FCTM), and show the sequence of configuration changes.

If a checklist or a step in a checklist is not applicable to all airplanes, airplane effectivity information is included in the checklist. Airplane effectivity can be listed by ship number or airplane model. If a checklist is applicable to some, but not all airplanes, airplane effectivity is centered below the checklist title. If a step in a checklist is applicable to some, but not all airplanes, airplane effectivity is included above the step. If a checklist or a step in a checklist is applicable to all airplanes, airplane effectivity information is not included.

While every attempt is made to supply needed non-normal checklists, it is not possible to develop checklists for all conceivable situations. For example, in some smoke, fire or fumes situations, the flight crew may need to move between the Cabin Smoke/Fire/Fumes checklist and the Removal of Smoke/Toxic Fumes checklist. In some multiple failure situations, the flight crew may need to combine the elements of more than one checklist. In all situations, the captain must assess the situation and use good judgment to determine the safest course of action.

Landing at the Nearest Suitable Airport

There are some situations where the crew must always land at the nearest suitable airport. These situations include, but are not limited to, conditions where:

- The ECAM displays “LAND ASAP” in red;

  Note: If the ECAM displays “LAND ASAP” in amber, consideration should be given to landing at the nearest suitable airport.

- Fire or smoke continues;
- Normal aircraft pitch, roll, or yaw cannot be maintained using aircraft trim systems;
- There is only one AC power source (such as an engine or APU generator);
- One hydraulic system remains; or.
- Any other situation determined by the crew to have a significant adverse effect on safety if the flight is continued.

Land as Soon as Possible

It must be stressed that for persistent smoke or a fire that cannot be positively confirmed to be completely extinguished, the earliest possible descent, landing, and evacuation must be done.

If a smoke, fire or fumes condition becomes uncontrollable, “Land As Soon As Possible” implies immediate diversion to a runway. However, the smoke, fire or fumes situation may be severe enough that the captain should consider an overweight landing, a tailwind landing, an off-airport landing, or a ditching.

Checklists Directing Engine Shutdown

Checklists directing an engine shutdown must be evaluated by the captain to determine whether an actual shutdown or operation at reduced thrust is the safest course of action. Consideration must be given to the probable effects of running the engine at reduced thrust.

Non-Normal Checklist Assumptions

Non–normal checklists assume:

- System controls are in the normal configuration for the phase of flight before the start of the non-normal checklist.
- Aural alerts are silenced and the master caution system is reset by the flight crew as soon as the cause of the alert is recognized.
- During engine start and before takeoff, the associated non-normal checklist is done if a non-normal situation is identified. After completion of the checklist, consult the Minimum Equipment List (MEL) to determine if dispatch relief is available.
- The EMERGENCY position of the oxygen regulator is used when needed to supply positive pressure in the masks to remove contaminants. The 100% position of the oxygen regulator is used when positive pressure is not needed but contamination of the flight deck air exists. The Normal position of the oxygen regulator is used if prolonged use is needed and the situation allows. If smoke/fire/fumes are detected in another part of the aircraft, flight crew judgment will determine if/when masks are donned.

Circuit Breaker Policy

Aircraft systems and avionics circuit breakers are located in the Electrical and Equipment (E & E) compartment below the flight deck. There is NO procedure that requires a flight deck crew member to pull or reset a circuit breaker in the E & E compartment. However, a SATCOM Non-Normal procedure may direct resetting the SATCOM system by pressing the TEST pb on the SATCOM receiver unit located in the E&E compartment.

DO NOT enter the E&E compartment in flight unless:

- Access is specifically called for by a non-normal procedure.
- Specific prior authorization is obtained from the SOF (Supervisor of Flying).

In Flight access of the E&E compartment requires at least three pilots and one additional crewmember to be present on the flight deck. Access to the E&E on the ground to reset the SATCOM system does not require prior authorization.

Computer Reset buttons are located on the overhead panel of the A330 flight deck. A summary of authorized “Computer Resets” can be found in section NNOI.1 of this manual.

The A330 has circuit breakers located in the cabin. Therefore, the Delta policy and procedures regarding resetting tripped circuit breakers applies to the cabin circuit breakers. Flight attendants are trained and should be briefed to comply with the following Delta policy.

DO NOT reset a tripped circuit breaker in flight unless the captain, using emergency authority, deems it necessary for a safe continuation of the flight. In this case, the tripped circuit breaker may be reset only once and only after observing a five minute cooling period. Resetting a tripped circuit breaker on the ground, after a five minute cooling period, is permitted if the reset is coordinated through Maintenance and the cause of the circuit breaker tripping is identified. If a reset restores the failed system to normal, make an “INFO ONLY” entry in the Aircraft Maintenance Log.

DO NOT pull a circuit breaker unless the exact function and the corresponding result of pulling that circuit breaker is known. Crew members should be keenly aware of the consequences of indiscriminately pulling and resetting circuit breakers.

Non-Normal Checklist Use

General

Non-Normal checklist use starts when the airplane flight path and configuration are correctly established. Only a few situations need an immediate response (such as CAB PR EXCESS CAB ALT). Usually, time is available to assess the situation before corrective action is started. Flight path control must never be compromised.

Use the following guidelines:

- Fly the aircraft
- Do not hurry
- Cancel the warning
- Identify the emergency or Non-Normal
- Accomplish recall items from memory (if applicable)
- Read the checklist

The following guidance recognizes:

- Non-Normal procedure completion and PF duties (flying, navigation, communication with ATC) each require the full attention of the pilot performing the task in order to ensure accuracy and maintain safety.
- One pilot cannot effectively perform or monitor all required tasks.
- During high workload periods where time is critical, the PF may not be able to monitor ECAM operation.
- Unnecessary distractions increase the likelihood of errors.
- Accidents have occurred in situations where all pilots were concentrating on the Non-Normal procedures and nobody was actively monitoring the airplane.
- Human Factors studies indicate that reading checklist procedures aloud decreases the likelihood of human error. It also provides the PF the opportunity to monitor and acknowledge the accomplishment of the ECAM/QRH procedure. In order to ensure proper checklist selection and completion it is important that the PF actively participate and monitor the accomplishment of the non-normal procedure as long as his/her workload permits. The PF primary responsibility must be to keep control of the aircraft.

Calling for the Checklist

At the onset of the ECAM annunciation or when a non-normal situation becomes apparent:

- The pilot recognizing the non-normal will state the ECAM annunciation (Title). If un-annunciated, the pilot will state the condition.
- Both pilots will accomplish memory items (if applicable).
- The PIC will assign PF and PM duties. PF duties will include control of the aircraft and communication with ATC. The PM will complete the non-normal ECAM and QRH procedures. The principles of CRM, TEM, the nature of the non-normal, time criticality, and the need to coordinate operational decisions with external resources will aid in the decision of which pilot will perform each task.
- The PF will conduct the flight as directed by the PIC (e.g., maintain course, initiate a diversion), communicate with ATC, and configure the aircraft as necessary. FMS operations should be performed on a time permitting basis.
- The PM will complete the non-normal ECAM (if any), followed by the QRH procedure (time permitting).

Completing the Non-Normal Procedure

ECAM Operation

Note: For “no time” emergencies reference FOM chapter 17 regarding the captain's emergency authority.

The ECAM abnormal procedure is divided into three specific areas of information. The first area (ECAM checklist on the E/WD) displays the affected system (underlined) in red or amber, followed by the title of the failure. Action steps (listed in blue) required to stabilize the aircraft are listed below the title; for example:

ENG 1 FAIL

ENG START SEL……IGN

The second area of information (right side of the E/WD) displays special messages (such as LAND ASAP) and secondary affected systems impacted by the non-normal. The third area of information displayed is the STATUS page, which supplies information on inoperative components and non-normal configurations required for landing (if required).

After the PIC assigns duties and an overall plan of action, the PF should call "ECAM Actions". The PM will confirm the failure by checking/inspecting the overhead panel and/or associated SD. The PM shall manage the ECAM checklist procedure. The PM will read aloud each message and step in order, and complete the ECAM checklist procedure to a lights out condition. Lights out refers to the CLR light being extinguished on the ECAM Control Panel. The ECAM checklist can include monitored and non-monitored items. When a monitored action step is completed it will disappear, and the remaining steps will replace it in order. A non-monitored action step, such as "NOTIFY ATC", will remain displayed.

Note: The CLR PB will never clear blue action items.

When completing an ECAM action item (e.g. moving a control), the PM will read aloud the action to be taken (e.g., "ENG START SEL…IGN"). As the action item is completed, the crewmember taking the action will again state the checklist response (e.g., "Ignition" for IGN), confirming that action was taken.

After all of the actions listed under the title are completed, the PM will verbally challenge the PF to clear the failed system message (e.g., "Clear Engine 1 Fail?"). The PF should visually confirm that the referenced ECAM actions have been completed, and then state "Clear Engine 1 Fail." Before the PM presses the CLR key, the PM should visually confirm the ECAM failure title that will be cleared. The PM will then press the CLR key. This ensures that any additional Master Warnings or Cautions will be advanced to the top of the ECAM checklist section. Complete each subsequent ECAM checklists using the same procedure before proceeding to the system and status pages.

When the ECAM displays several failures at one time, the flight crew should repeat the same sequence for each failure (ECAM actions, request "CLEAR" and confirm "CLEAR" before clearing). When all necessary actions are completed, amber and red failure titles will no longer appear on the E/WD. The affected systems pages will be displayed on the lower ECAM (Systems Display) and provides an easy way to assess overall system status. Before the PM clears a system page, the PM will analyze it and verbally challenge the PF to clear the system page (e.g., "Clear BLEED?"). The PF should check the displayed system page and respond to the challenge (e.g., "Clear BLEED."). If the ECAM displays several systems pages, the flight crew should repeat the same sequence for each SD (analyze, request "CLEAR" and confirm "CLEAR" before clearing).

Note: If an extended interruption occurs (ATC call, Flight Attendant call, etc.) or a configuration change is necessary, the PF should have the PM stop the ECAM procedure. When ready, the PF should ask the PM to continue the ECAM.

When reaching the STATUS page during the ECAM abnormal procedure, the crew should complete any outstanding normal checklists (e.g., After Takeoff Checklist) and consider any applicable computer resets. If there are no actions to complete or when the actions are complete, the crew should continue the ECAM.

The status page summarizes the status of the aircraft as well as provides minimum information for an approach. Status page approach procedures (i.e., blue action/informational steps) will be addressed at this time. When workload permits, the PM should brief the PF on the status of relevant inoperative aircraft systems as well as limitations displayed on the STATUS page. If the status page indicates limitations, the PM will read them out loud. In many cases, a significant number of items may be displayed on the STATUS page INOP SYS list. The most effective briefing identifies the significant items from the list so they are properly understood and considered.

Note: When it is necessary to review a system page while completing STATUS page procedures, the PM should press the desired system page key to display requested page (e.g., Fuel page). After reviewing that page, the PM should press the STS Key to return to the STATUS page and continue the procedure.

After all STATUS page approach procedures are complete and system/limitations have been briefed, the PM will challenge the PF to clear the STATUS page (e.g., "Clear Status?") the PF should confirm and state "Clear Status." The PM will press the CLR key and confirm the light remains extinguished. At that time the PM should announce "ECAM procedure complete."

Note: The STATUS page will appear automatically when Baro-reference is selected or slats are extended to one, if there are items in the STATUS page. The PM should state "STATUS" and review the page for any changes. Once reviewed, the PM should ask "Clear STATUS?" The PF will review the STATUS page and state "Clear STATUS."

ECAM Advisories

An advisory is generated when a system parameter exceeds the normal range but has not exceeded a preset limit. When an advisory is activated, the associated systems page is automatically displayed on the SD, and the affected parameter pulses in green.

When an advisory is displayed, refer to the associated Advisory Displayed page (e.g. FUEL ADVISORY DISPLAYED) in NNC.0, ECAM Advisories.

QRH Use

Upon completion of the ECAM procedure to “lights out”, the corresponding QRH procedures should also be accomplished, time permitting. The QRH often provides amplifying information in the form of notes, cautions and clear language that is not provided in the ECAM procedure.

When reading the QRH procedure, the PM reads aloud:

- The checklist title
- The airplane effectivity (if applicable) as needed to verify the correct checklist title.
- As much of the condition statement as needed to verify that the correct checklist has been selected

The PF does not need to repeat this information but must acknowledge, time and workload permitting, that the information was heard and understood.

For checklists with memory items, the PM first verifies that each memory item has been completed. The checklist is normally read aloud during this verification. The PF does not need to respond except for items that are not in agreement with the checklist. The item numbers do not need to be read.

Some QRH procedures contain a line of inverted Ts in the checklist. All of the items above the line of inverted Ts were contained within the ECAM procedure. The PM should silently verify that the steps above the inverted Ts have been accomplished during the ECAM procedure, and verbalize any applicable notes, cautions, or warnings. The PM should then continue with the QRH checklist by reading out loud the remaining items of the checklist.

Upon completion of the QRH procedure, the PM will brief the PF on additional QRH items and approach procedures. Review the QRH Approach Procedures early enough to allow for sufficient time to plan an alternate course of action before beginning the approach. Use the normal Approach and Landing checklists, in conjunction with the ECAM/QRH Approach Procedures, to verify correct flight deck and aircraft configuration for landing.

The PF will update the PM on aircraft's position, navigation, communication, and other status items including tasks completed and those still needing to be accomplished, as appropriate.

The captain will coordinate with Flight Control and the flight leader, or designate as appropriate.

If not landing immediately, review relevant approach items from the non-normal procedure when the approach briefing is conducted.

Dual Verification of Critical Controls

The word “confirm” is added to checklist items when both crew members must verbally agree before action is taken. During an in-flight non-normal situation, verbal confirmation is required prior to the movement of the following critical controls:

- An engine thrust lever
- An engine Master Switch
- An Engine or APU Fire pb
- An IDG Disconnect pb
- The ADIRS panel

After determination that a critical control must be actuated in flight, the following steps must be taken:

- The pilot performing the action (PM) must visually and verbally identify the affected control
- The pilot performing the action (PM) will place his hand on the affected control
- The pilot monitoring the action (PF) will visually and verbally confirm the proper control has been selected.
- The pilot performing the action then actuates the affected control.

Note: This does not apply to the ALL ENGINE FLAME OUT procedure.

Deferred Items

When there are deferred items, the non-normal checklist will include the item "**Checklist Complete Except Deferred Items.**" The PF is to be made aware when there are deferred items. In the printed non-normal checklists, these items are included in the Deferred Items section of the checklist and may be delayed until the usual point during descent, approach or landing.

The deferred items are read aloud by the PM. The crewmember taking the action states the response.

In the printed non-normal checklists, when there are deferred items, the Deferred Items section of the non-normal checklist will include the Descent, Approach and Landing normal checklists. These checklists should be used instead of the usual Descent, Approach and Landing normal checklists. If a normal checklist item is changed as a result of the non-normal situation, the changed response is printed in **bold** type. The PF or the PM responds to the deferred normal checklist items based on each crewmember's area of responsibility.

When there are no deferred items, the Descent, Approach and Landing normal checklists are used to verify that the configuration is correct for each phase of flight.

A ■ indicates items that should be considered for re-accomplishment in the event of an approach change or go-around.

Checklist Completion

Each checklist has a checklist complete symbol at the end. The following symbol indicates that the checklist is complete:

■ ■ ■ ■

The checklist complete symbol can also be in the body of the checklist. This only occurs when a checklist divides into two or more paths. Each path can have a checklist complete symbol at the end. The flight crew does not need to continue reading the checklist after the checklist complete symbol.

After completion of each non–normal checklist, the pilot monitoring states "___ CHECKLIST COMPLETE."

Checklist Limitations

The flight crew must be aware that checklists cannot be created for all conceivable situations and are not intended to replace good judgment. In some situations, at the captain's discretion, deviation from a checklist may be needed.

Non-Normal Checklist Legend

The procedures are written according to a prescribed format whenever possible. An understanding of this format makes following the procedures easier and more efficient to complete.

Each emergency and non normal procedure includes the following elements, as appropriate to the situation:

- TITLE - If the title is all in capital (UPPER CASE) letters, it represents an ECAM message. If the title is not all in capital letters (lower case), an ECAM message is not available, and the title is a description of the emergency or non normal condition.
- CONDITION - Describes the condition causing the emergency or non-normal situation.
- ACTION STEPS - Procedure to contain or correct the emergency or non normal situation. The initial steps of the procedure are normally identical to the ECAM procedure and may have already been accomplished. Subsequent steps in the QRH include company procedures, approach procedures, and additional information.

  Note: The action steps in the procedure are preceded by a number or a bullet. “If” statements are preceded by a black triangle, a single caret or a double caret.

- A NUMBERED ITEM (1,2,3, etc.) indicates a step in the procedure that must always be accomplished as long as an end symbol has not been reached.
- A BLACK TRIANGLE (▶) indicates an “if” statement or a variable condition exists and the steps may or may not apply. Further “if” statements that depend on previous “if” statements are preceded by a single (>) or double (>>) caret.
- A BULLET (•) identifies a sub-step that applies to the “if” statement or variable condition.
- Informational text that does not require a specific action is not preceded by a bullet or number.
- The following end symbol may appear in the middle of a procedure and indicates that the emergency or non-normal procedure is complete based on the existing conditions. Approach procedures may still be applicable and should be complied with.

■ ■ ■ ■

As the procedure is performed, all numbered steps must be accomplished. When a triangle or caret is reached, the pilot must decide if the stated condition applies to that specific situation. If the condition does apply, the sub-step indicated by the indented black bullets must be performed or further conditions indicated by multiple carets should be examined.

If the condition following the triangle does not apply, the pilot should continue to the next caret or numbered step in the same vertical column without performing the intermediate steps. In all cases, all numbered steps must be completed and all triangles in the left most margin must be examined to see if they apply, unless the statement end symbol is encountered.

Some procedures contain the statement: "No action is required. This message is for crew information only." This statement is used when there is no procedure or action required to stabilize the non normal and the ECAM message provides information only.

Some procedures, when executed, change the aircraft/system status; this may result in the annunciation of additional ECAM messages. These messages are for information only. For example, "**F/CTL ALTN LAW (PROT LOST).**"

If a non-normal procedural step is intended to re-direct the pilot to another procedure, it will so specify with the statement "**Refer to (the desired non-normal procedure) on page xx.x.**"

Redirection Symbol

Note: (Not currently used in this manual)

The redirection symbol is used in two ways:

- In the Table of Contents of a system section, to direct the flight crew to a different system section.
- In a non-normal checklist, with the word "Go to", to direct the flight crew to a different checklist or to a different step in the current checklist.
- The words "see" or "refer to" are also used to direct the continuation of the procedure to another location.

Separator Symbol

The separator symbol is used in two ways:

- In certain system section tables of contents, to separate the titles of QAI checklists from non-QAI checklists.
- In a non-normal checklist, to separate the memory items from the reference items.

Inverted “T” Symbol

⊥ ⊥

The point in the QRH at which additional non-ECAM steps begin.

Task Divider Symbol

Note: (Not currently used in this manual)

The task divider symbol is used to indicate the end of one task and the beginning of another task.

Decision Symbol

Note: (Not currently used in this manual)

The decision symbol is used to identify possible mutually exclusive choices.

Precaution Symbol

The precaution symbol is used to identify information the flight crew must consider before taking the action.