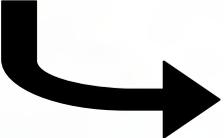




Cockpit / Cabin Smoke Procedures

Introduction

- In 2003, the Airbus “Smoke” Working Group was created to review:
 - ▶ Smoke Procedures
 - ▶ Cockpit and Cabin Indications
 - ▶ Possible Design Improvements

While ensuring that the procedure's philosophy remains intact
- The objective of this presentation is to:
 - ▶ Review the latest developments
 - ▶ Recall the Cockpit/Cabin Smoke Procedure Philosophy
 - ▶ Outline the recommendations of the “Smoke” Working Group, and how they will be incorporated in the smoke procedures.

Contents ...

- Introduction
- Recall of current procedures principles
- Cockpit / Cabin Smoke Procedure Philosophy
- “Smoke” Working Group Recommendations
- Smoke Procedure Updates
- Conclusion

Recall of current procedures principles

- The current Smoke procedures are based on a review made few years ago for the entire Airbus family in order to:
 - ▶ Ensure a **consistent approach** for mixed-fleet airlines.
 - ▶ Define **common actions** to be performed, whatever the smoke origin.
 - ▶ Provide crews with a procedure to help them in determining the **smoke origin**.

Recall of current procedures principles...

- For new Airbus models, **specific cabin crew smoke procedures** were developed for inclusion in the Cabin Crew Operating Manual (CCOM).



	ABNORMAL/EMERGENCY PROCEDURES	09.000
	TABLE OF CONTENTS	DEC 11/03

09.010	INTRODUCTION	
	-- GENERAL INFORMATION	1
	-- PRESENTATION	2
09.020	FIRE PROTECTION	
	-- LAVATORY SMOKE	1
	-- PAX SEAT SMOKE	2
	-- VCC SMOKE	3
	-- GALLEY SMOKE	4
	-- OVEN SMOKE	5
	-- LDMCR SMOKE	6
	-- FCRC SMOKE	9
	-- BCRC/FBCRC SMOKE	11

SAMPLE

Recall of current procedures principles...

CCOM Extract: OVEN SMOKE

	ABNORMAL/EMERGENCY PROCEDURES	09.020
	FIRE PROTECTION	DEC 11/03

ALL

OVEN SMOKE	
- OVEN DOOR	CLOSE <i>Do not open the oven door, as this could create an oxygen inflow which could stir up the fire.</i>
- OVEN CIRCUIT BREAKER	PULL <i>The applicable circuit breaker is located on the galley's centralized electrical panel.</i>
- ELECTRICAL POWER	OFF
- CABIN CREW	INFORM COCKPIT CREW

SAMPLE

Contents ...

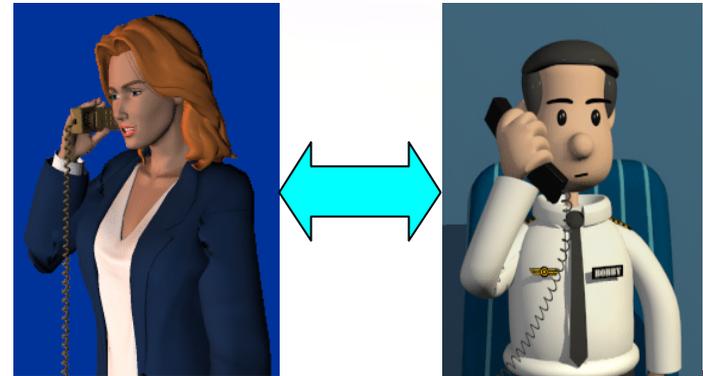
- Introduction
- Recall of current procedures principles
- Cockpit / Cabin Smoke Procedure Philosophy
 - ▶ SMOKE/FUMES: Paper Procedure Layout
- “Smoke” Working Group Recommendations
- Smoke Procedure Updates
- Conclusion



Cockpit / Cabin Smoke Procedure Philosophy

- The Airbus Smoke Procedure has implemented a global philosophy, that is applicable to both **cabin and cockpit smoke cases**.
- This philosophy includes the following main steps:
 - ▶ The “Alert” Phase
 - ▶ Common Actions
 - ▶ Smoke Removal (if dense smoke)
 - ▶ Smoke Source Identification
 - ▶ Stopping Smoke Emission

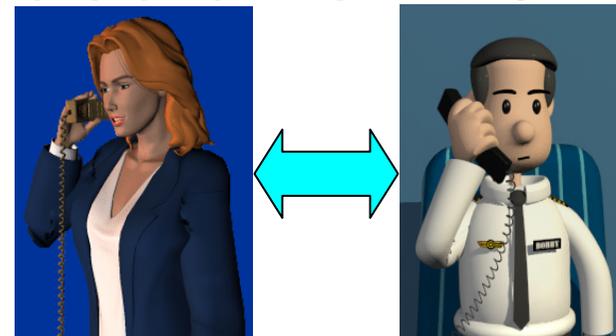
**The KEY element
throughout the procedure:
GOOD COMMUNICATION
between cabin and flight crews**



Cockpit / Cabin Smoke Procedure Philosophy...

The “Alert” Phase:

- The alert can be provided by the:
 - ▶ ECAM, or FAP warnings for smoke-monitored areas (lavatory, crew rest compartment ...)
 - ▶ Cabin/Cockpit crew
- In any case (even for smoke-monitored areas), it is essential that the cabin crew **estimate and inform** the cockpit concerning the:
 - ▶ Density of the smoke
 - ▶ Severity of situation



Cockpit / Cabin Smoke Procedure Philosophy...

Common Actions:

- The following actions should be applied immediately by the flight crew, whatever the origin of the smoke may be, and before trying to identify this origin:
 - ▶ **Extract** smoke overboard
 - ▶ **Stop** smoke re-circulation
 - ▶ **Isolate** potential smoke sources
- The objective of these actions is to **avoid** any further **contamination** of the cabin.
- If the faulty equipment has already been identified:
 - ▶ **Shut it OFF.**

Cockpit / Cabin Smoke Procedure Philosophy...

Smoke Removal:

- In case of dense smoke, and **at any time during the procedure**, the flight crew can consider applying the smoke removal procedure:

● IF DENSE SMOKE, at any time of the procedure :

- DESCENT for smoke removal..... INITIATE
- SMOKE/TOXIC FUMES REMOVAL..... APPLY
- ELEC EMER CONFIG..... CONSIDER

Refer to the end of the procedure to set ELEC EMER CONFIG

Cockpit / Cabin Smoke Procedure Philosophy...

Smoke Source Identification:

- It is the cockpit/cabin crew's role to identify the smoke source for both:
 - ▶ Smoke-monitored areas
 - ▶ Other areas



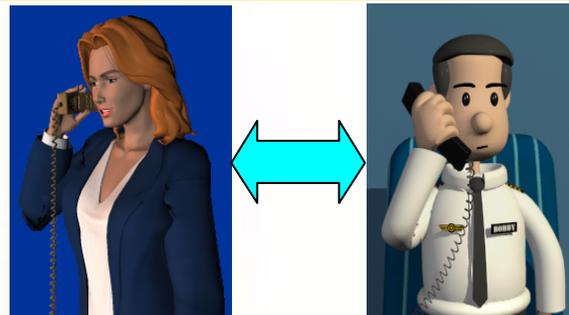
LAVATORY SMOKE	
<u>COCKPIT CREW</u>	
- SMOKE LAVATORY SMOKE	CREW AWARENESS
<i>Maintain contact with the cabin crew to follow up on the status of the fire.</i>	
<u>CABIN CREW PROCEDURE</u>	
(1)	
On the FAP , or related AAP, the SMOKE RESET pushbutton comes on, with an associated triple chime, repeated every 30 seconds (optionally : 10 seconds).	
- AFFECTED LAVATORY	LOCATE
<i>On all AIPs, the affected lavatory is clearly indicated and a red indicator flashes.</i>	
<i>The amber light, on the respective ACPs, and the outside Smoke/Pax call indicator of the affected lavatory flashes.</i>	
<i>Affected lavatory is also shown on the FAP Smoke page.</i>	

Cockpit / Cabin Smoke Procedure Philosophy...

Stopping Smoke Emission:

- Once the source of smoke is identified, the cockpit/cabin crew should apply specific actions to stop the smoke. This includes fire fighting.
 - ▶ Example: VCC Smoke

- CABIN CREW INFORM AND COORDINATE WITH COCKPIT CREW
- CC3: PAX SYS SWITCH OFF
The PAX SYS switch is located in the cockpit, on the VCC and optionally on the FAP.
- CC1: FIRE FIGHTING PROCEDURE APPLY
CC2 assist.

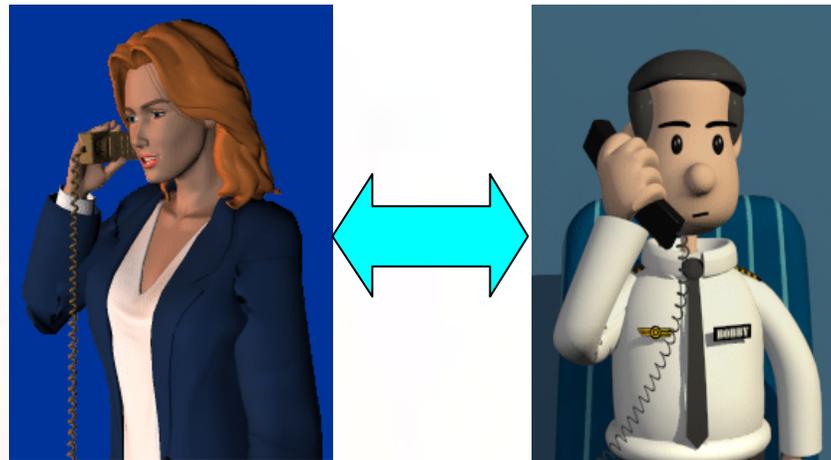


Cockpit / Cabin Smoke Procedure Philosophy...

In case of **cabin** smoke, throughout each step, the **cabin crew** must:

- Monitor cabin events
- Quickly inform the cockpit

▶ Therefore, effective **Cabin / Cockpit Communication** is, **KEY** to saving precious time, and ensuring that appropriate actions are taken.



Contents ...

- Introduction
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“Smoke” Working Group Recommendations ...

Recommendation N° 1:

- Development of a “**Getting to Grips**” Brochure containing Cabin Safety Procedures for all Airbus aircraft.

“Smoke” Working Group Recommendations ...

- **The objectives of this brochure are to:**
 - ▶ Focus on cabin smoke procedures, and on such other cabin safety issues as: Emergency Evacuation, Bomb On Board...
 - ▶ Take into account the lessons-learned, by analyzing in-service events.
 - ▶ Serve as a reminder of the basic principles of crew coordination.
 - ▶ Re-iterate the need for cabin safety procedures.
 - ▶ Provide operators with cabin safety guidelines.
 - ▶ Help implement customized cabin crew procedures, in case of smoke or emergency evacuation.

“Smoke” Working Group Recommendations ...

• Cabin Smoke section

- ▶ Includes basic rules and practices:
 - Cockpit / Cabin crew communication
 - Cabin Crew Resource Management (CRM)
 - List common actions that are applicable, when smoke/smell is perceptible in the cabin.

- ▶ Reviews potential sources of cabin smoke

- ▶ Lists all known sources of cabin smoke

- ▶ Provides guidelines for recognizing different smoke/fumes and, if possible, their effect.

“Smoke” Working Group Recommendations ...

• Cabin Smoke section ...

- ▶ Provides cabin smoke procedures:
 - For each smoke origin:
 - Identifies all ways of isolating the affected equipment, and
 - Provides an associated strategy to stop the emission of smoke.

- ▶ Indicates the location of controls and/or the C/Bs, in terms of cabin panels, not C/B labels.
 - Further customization will be the airline’s responsibility.

- ▶ However, covers all standards and options that are proposed by Airbus for all aircraft types.

“Smoke” Working Group Recommendations ...

• Fire-Fighting Procedure section

- ▶ Provides general guidelines on how to fight a fire in the cabins of all Airbus aircraft types, with the use of Airbus equipment.

• Emergency Evacuation Procedure section

- ▶ Provides the emergency evacuation procedures, developed for the A340-500/600 and A318 CCOM.
- ▶ Additional emergency procedures, developed in the CCOM, will be incorporated and adapted for all Airbus aircraft types:
 - Examples:
Depressurization, Bomb-on-Board, Crew Incapacitation...

“Smoke” Working Group Recommendations ...

Recommendation N° 2:

- Add the **“CKPT/CABIN COM ESTABLISH”** item for both ECAM and paper Smoke procedure.
 - ▶ In case of a smoke warning, the flight crew must contact the cabin crew to:
 - Confirm the warning
 - Improve smoke source determination
 - Evaluate the seriousness of the situation.
 - Follow-up on the smoke dissipation.

“Smoke” Working Group Recommendations ...

Recommendation N° 3:

- Change the “**LAVATORY SMOKE**” color from **RED** to **AMBER**:
 - ▶ To date, lavatory smoke warnings are often caused by unauthorized smokers.
 - ▶ Such, events are so frequent that confidence in the RED warning has decreased.
 - ▶ Per Recommendation N°2, the cockpit crew is now asked to establish communication with the cabin crew.
- Downgrade the LAVATORY SMOKE **warning** to a **caution**.
- Validate the change on the ECAM, via a pin-programming.

“Smoke” Working Group Recommendations ...

Recommendation N° 4:

- Change the FWC logic on single-aisle aircraft, to prevent undue memorization of the “LAND ASAP”.
 - ▶ With current FWC standards: If smoke is detected, when on ground, “LAND ASAP” is triggered after takeoff.
 - ▶ Some aborted flights have been reported to Airbus.
 - ▶ Therefore, “LAND ASAP” memorization will be removed by next FWC Standard.

“Smoke” Working Group Recommendations ...

Recommendation N° 5:

- Improve avionics smoke detection on single-aisle aircraft, by installing a dual loop design
- Avoid spurious avionic smoke warnings that are triggered on single-aisle aircraft by installing two detectors.
 - ▶ On long-range aircraft, two detectors are installed, and there are considerably less spurious warnings.
- Delete the “if perceptible smoke” condition from the AVIONICS VENT SMOKE procedure.

“Smoke” Working Group Recommendations ...

Recommendation N° 6:

- New ECAM Procedure:
 - ▶ Title of the procedure has changed to:
“AVNCS VENT SMOKE”.
- Common procedure for all fly-by-wire aircraft.
- Displays commons actions to:
 - ▶ Protect the flight crew
 - ▶ Establish COCKPIT/CABIN communications
 - ▶ Limit smoke propagation
 - ▶ Light the cabin signs
 - ▶ Refer to the paper procedure



Contents ...

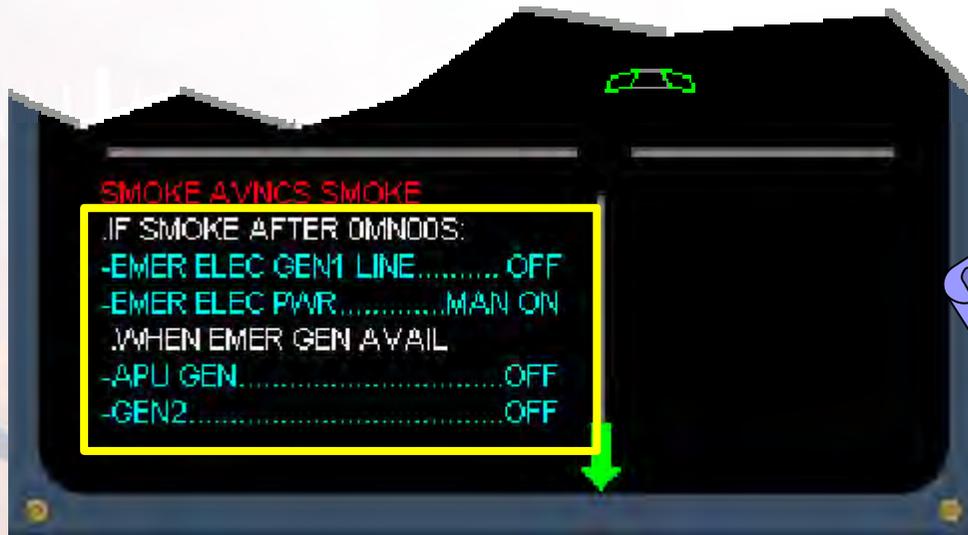
- Introduction
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- **Smoke Procedure Updates (ECAM + Paper)**
 - ▶ **Current Smoke Procedure (ECAM)**
 - ▶ **Smoke Procedure Updates (ECAM)**
 - ▶ **Smoke Procedure Updates (Paper)**
- Conclusion



Current Smoke Procedure (ECAM)

For Single-Aisle Aircraft:

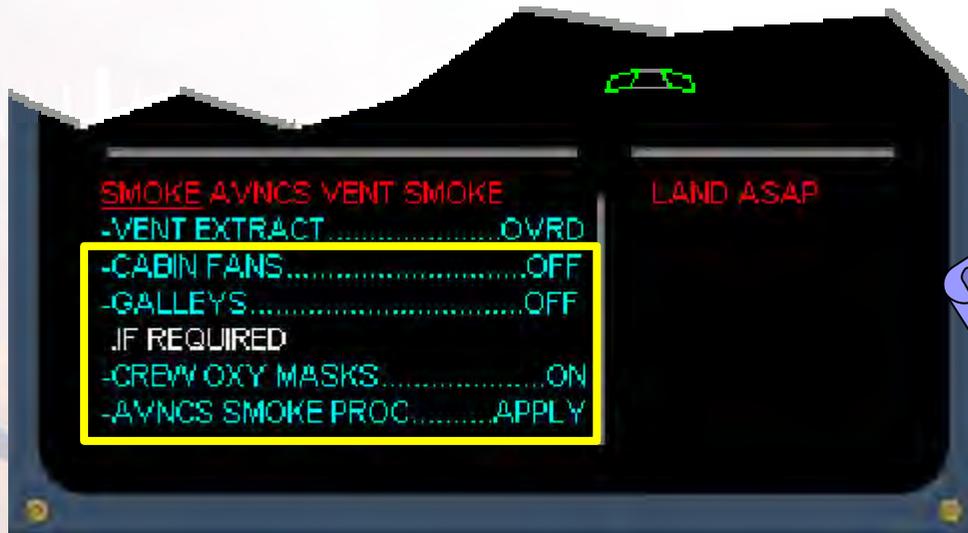
- In case of “**SMOKE AVNCS SMOKE**”, the ECAM SMOKE procedure leads to an **EMER ELEC** after a 5-minute countdown.



Current Smoke Procedure (ECAM) ...

For Long-Range Aircraft:

- The ECAM SMOKE procedure:
 - ▶ Already focuses on:
 - Crew protection, and
 - Smoke propagation prevention
 - ▶ Already refers to the paper procedure.



Smoke Procedure Updates (ECAM)

For Single-Aisle and Long-Range Aircraft:

- Addition of the **“CKPT/CAB COM.... ESTABLISH”** line to the ECAM Procedure.



SA EXAMPLE

Smoke Procedure Updates (ECAM) ...

For Single-Aisle and Long-Range Aircraft:

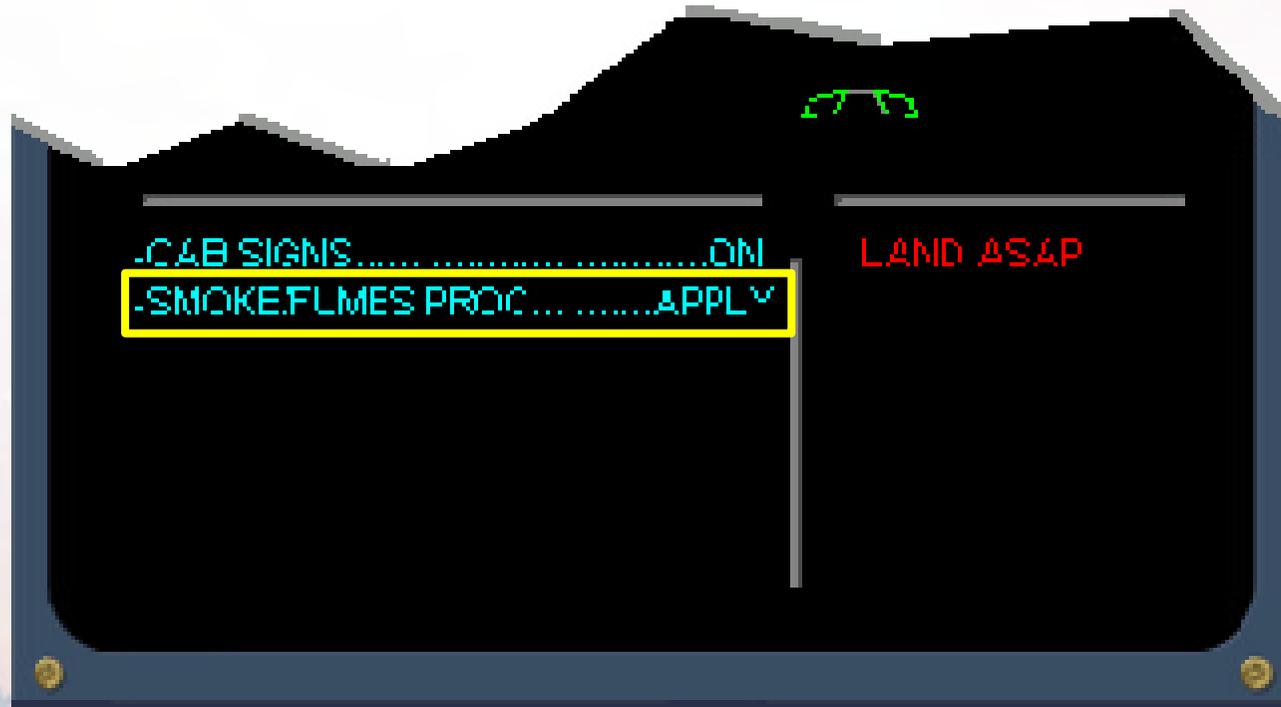
- Addition of the **“CAB SIGNS.... ON”** line (SEAT BELTS and NO SMOKING) to the ECAM procedure.



Smoke Procedure Updates (ECAM) ...

For Single-Aisle :

- The **AVNCS VENT SMOKE** ECAM procedure, now refers to the **SMOKE/FUMES Paper procedure...**



Smoke Procedure Updates (ECAM) ...

For Single-Aisle Aircraft only:

- The SMOKE ECAM procedure will no longer refer to EMER ELEC CONFIG



Smoke Procedure Updates (Paper)

“Common actions”

DENSE SMOKE recommendations

SMOKE ORIGIN Research

Electrical Emergency Configuration Procedure

SMOKE / FUMES	
LAND ASAP	
-OXY MASK (if RQRD)	ON/100%/EMERG
-CKPT/CABIN COMM	ESTABLISH
-VENT EXTRACT.....	OVRD
-CAB FANS.....	OFF
-GALLEYS.....	OFF
-CAB SIGNS	ON
<ul style="list-style-type: none"> • IF FAULTY EQUIPMENT IDENTIFIED <ul style="list-style-type: none"> - FAULTY EQUIPMENT.....ISOLATE 	
<ul style="list-style-type: none"> • IF DENSE SMOKE, at any time of the procedure : <ul style="list-style-type: none"> - DESCENT for smoke removal.....INITIATE - SMOKE/TOXIC FUMES REMOVAL proc.....APPLY - ELEC EMER CONFIG.....CONSIDER 	
<ul style="list-style-type: none"> • IF AIR COND SMOKE SUSPECTED : <ul style="list-style-type: none"> -APU BLEED.....OFF -PACK 1.....OFF • IF smoke persists : <ul style="list-style-type: none"> -PACK 1.....ON -PACK 2.....OFF -SMOKE/TOXIC FUMES REMOVAL.....CONSIDER • IF CAB EQUIPMENT SMOKE SUSPECTED : <ul style="list-style-type: none"> -EMER EXIT LT.....ON -COMMERCIAL.....OFF -SMOKE/TOXIC FUMES REMOVAL.....CONSIDER • IF AVIONICS/COCKPIT SMOKE SUSPECTED: <ul style="list-style-type: none"> • AC BUS 1-1 +1-2 can be shed as follows : <ul style="list-style-type: none"> • AC BUS 2-3 +3-4 can be shed as follows : <ul style="list-style-type: none"> 	
TO SET ELEC EMER CONFIG: <ul style="list-style-type: none"> -EMER ELEC PWR.....MAN ON -WHEN EMER GEN AVAIL: <ul style="list-style-type: none"> -GEN 1+ 4.....OFF -GEN 2+ 3.....OFF -APU GEN.....OFF 	
ELEC EMER CONFIG APPLY ECAM PROCEDURE WITHOUT PERFORMING THE GEN RESET.	

Smoke Procedure Updates (Paper)

For Single-Aisle and Long-Range Aircraft:

- Title modified:
Smoke/Fumes

- If AVNCS VENT SMOKE warning first triggered, pilots go directly down to the line.

SMOKE / FUMES	
<i>Apply this procedure in case of perceptible FUMES or SMOKE smell.</i>	
If AVIONICS VENT SMOKE has been triggered go directly down to the line.	
	LAND ASAP
-OXY/MASK (if RQRD)	ON/100%/EMER
-CKPT / CABIN COM	ESTABLISH
-VENT BLOWER	OVRD
-VENT EXTRACT	OVRD
-CAB FANS	OFF
-GALLEYS	ON
-CAB SIGNS	ON
• If Faulty Equipment identified	
-FAULTY EQPT	ISOLATE
If DENSE SMOKE, at any time of the procedure:	
-EMER EXIT LT	ON
-SMOKE / FUMES REMOVAL	APPLY
-ELEC EMER CONFIG	CONSIDER

Smoke Procedure Updates (Paper) ...

For Single-Aisle and Long-Range Aircraft:

- Architecture unchanged

SMOKE / FUMES (Cont'd)
<ul style="list-style-type: none">•If AIR COND SMOKE suspected:<ul style="list-style-type: none">---•If Cabin Equipment SMOKE suspected:<ul style="list-style-type: none">---•If AVNICS / COCKPIT SMOKE suspected:<ul style="list-style-type: none">---
To set EMER ELEC CONFIG
<ul style="list-style-type: none">----

Smoke Procedure Updates (Paper) ...

For Single-Aisle and Long-Range Aircraft:

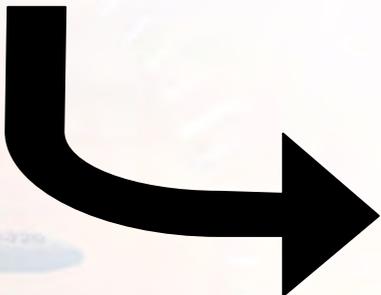
- Only a few changes to the SMOKE REMOVAL Procedure:

- ▶ OXY MASK ON/100%/EMERG
- ▶ SEATBELT / NO SMOKINGON

–The above lines have been deleted from the SMOKE REMOVAL procedure to avoid redundancy with SMOKE/FUMES and AVNCS VENT SMOKE procedures.

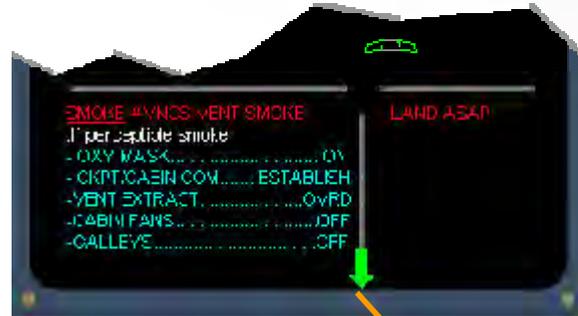
Summary of Smoke Procedure Updates

- Pilots refer to the **SMOKE/FUMES** paper procedure:
 - ▶ With new FWC standard:
 - After AVNCS VENT SMOKE ECAM warning,
 - If smoke has been detected by Cabin/Flight crew, without ECAM warning;
 - ▶ With “old” FWC standard:
 - Same as today, according to the airline policy.



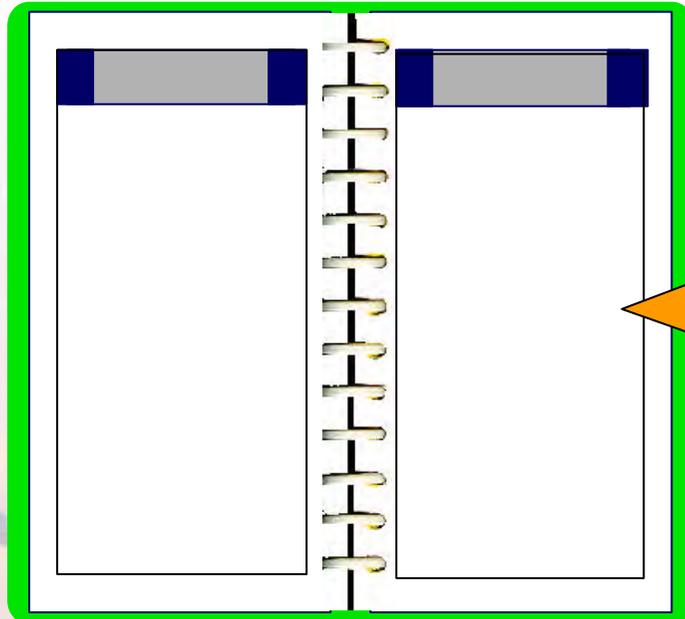
**Paper procedure
improvement is also
applicable for old FWC
standards.**

Summary of Smoke Procedure Updates ...

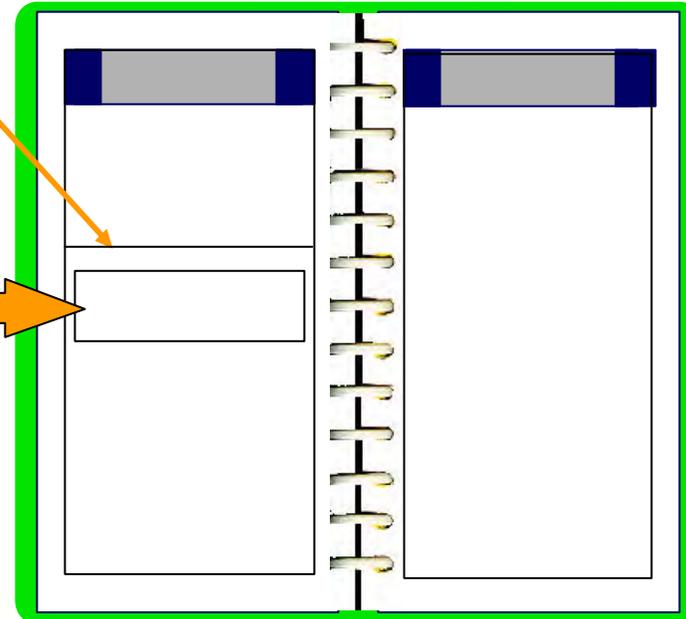


ECAM « AVIONICS VENT SMOKE » PROCEDURE

SMOKE REMOVAL PROCEDURE



SMOKE/FUMES PROCEDURE

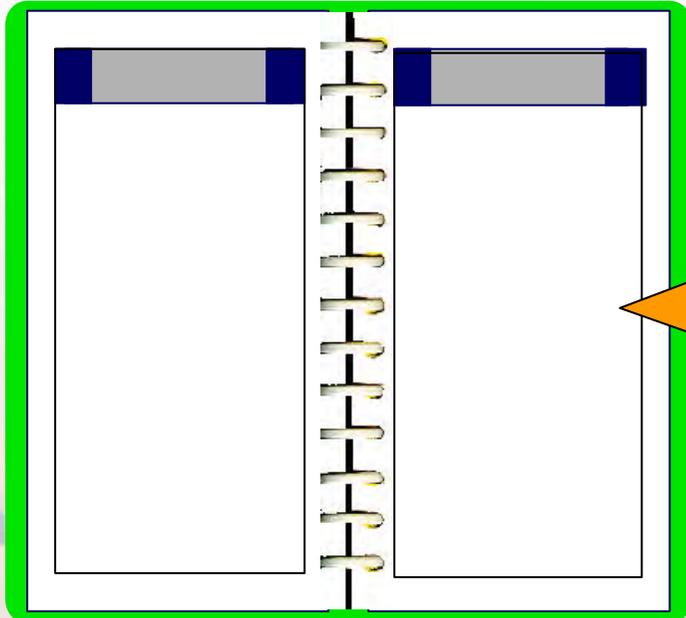


Summary of Smoke Procedure Updates ...

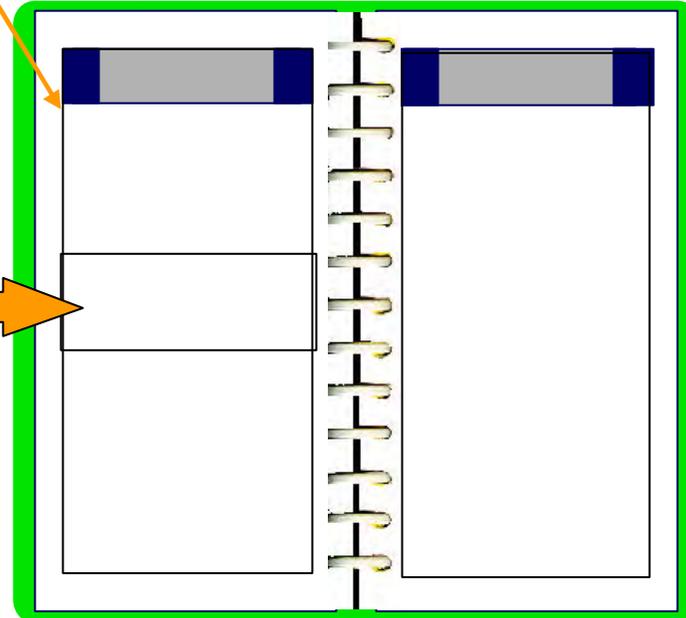


CREW PERCEPTION

SMOKE REMOVAL PROCEDURE



SMOKE/FUMES PROCEDURE

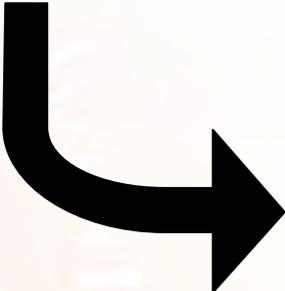


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Conclusion

- Airbus continues to work on enhancing smoke protection procedures via:
 - System improvements: FWC, consolidated detection
 - Standardization of the smoke procedure philosophy for the entire Airbus family of aircraft.
 - The development of new dedicated and detailed cabin crew procedures.
- The same philosophy will apply to the A380.



**All to ensure
INCREASED SAFETY**

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