

# 18<sup>th</sup> Flight safety conference

Berlin, 19-22 March 2012



## **AIRBUS Smoke Procedures**

### **Procedures and Philosophy**

Presented by  
David Owens / Senior Director Training Policy

# Content

- Introduction
- Smoke/Fumes Philosophy
- Coordination with Cabin Crew
- Conclusion

# Introduction



# Introduction

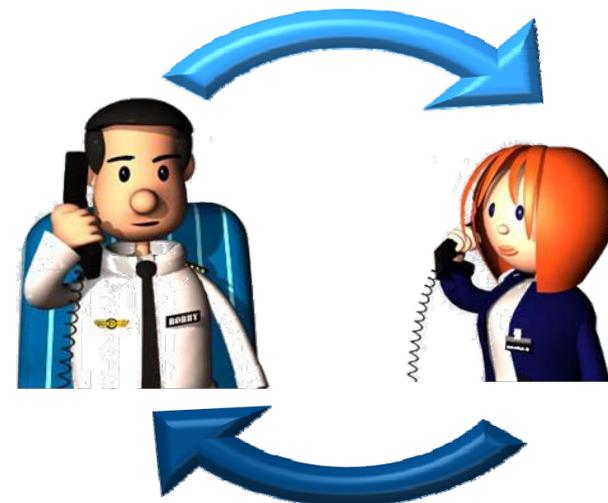
What are the 3 main challenges of smoke events?



Location of Source



Time



Communication

# Introduction

## TIME: The facts

1. A fire may become uncontrollable in 8 minutes.
2. Crew may have as little as 15 minutes to get the aircraft on the ground...
3. How fast can a fire grow?



# Introduction

## TIME: The facts

- Paper procedures and ECAM procedure start with **LAND ASAP**:

- **LAND ASAP**

Advice to the flight crew to consider landing at the nearest suitable airport.

- **LAND ASAP**

Land as soon as possible at the nearest suitable airport at which a safe approach and landing can be made.

- **IMMEDIATE LANDING** (Paper procedure ONLY)



# Introduction

## Identify the source:

Ease  
of  
Locating



■ CARGO

■ LAVATORY

■ CREW REST COMPARTMENT

■ AVIONICS

■ AIR COND

■ CABIN EQUIPMENT



• Covered by ECAM and/or local warning

• Available means to treat the fire/smoke

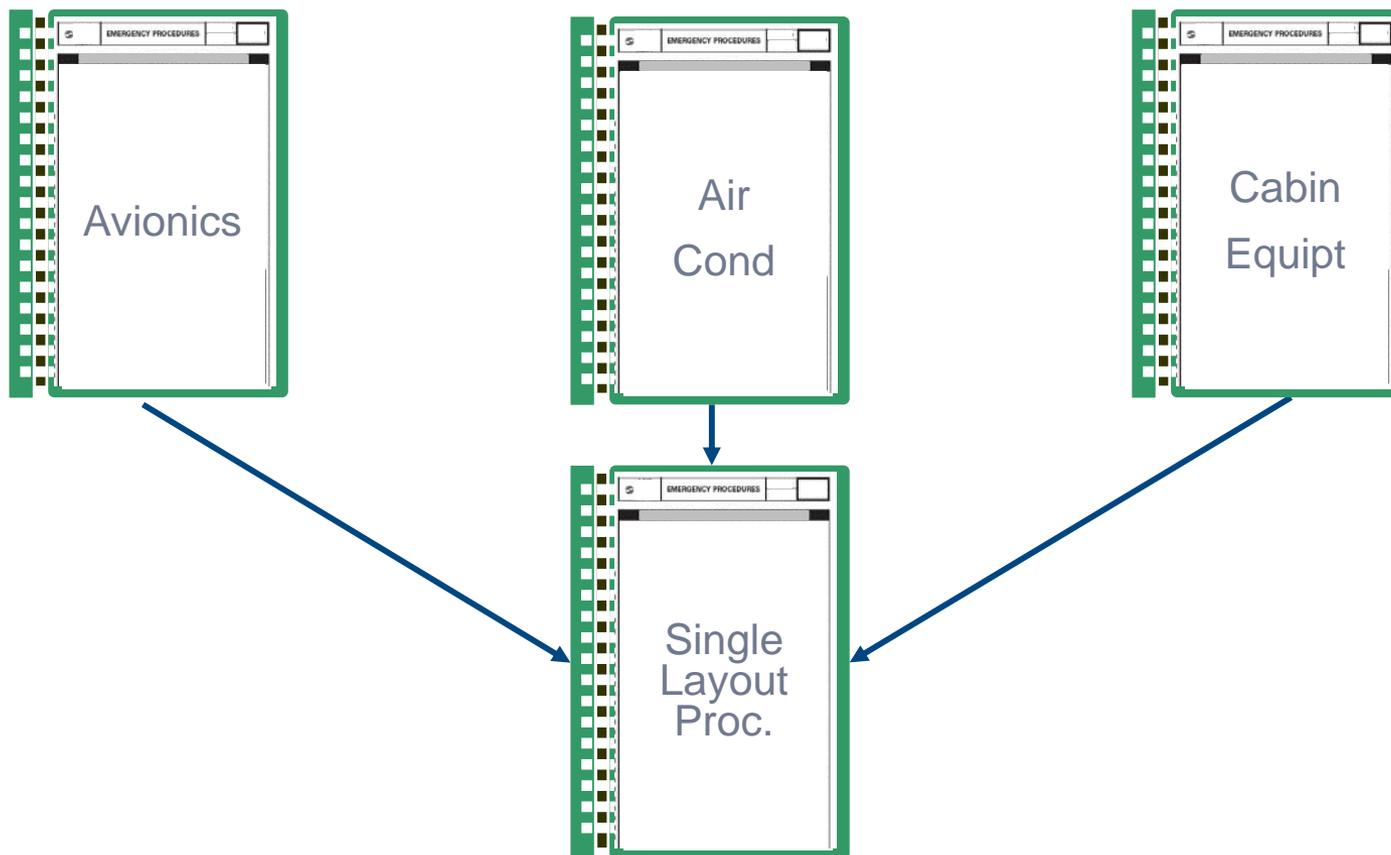
• May be covered by ECAM warning

• More difficult to locate and deal with

# Introduction

Identify the source:

Sources merged into *one single layout*.



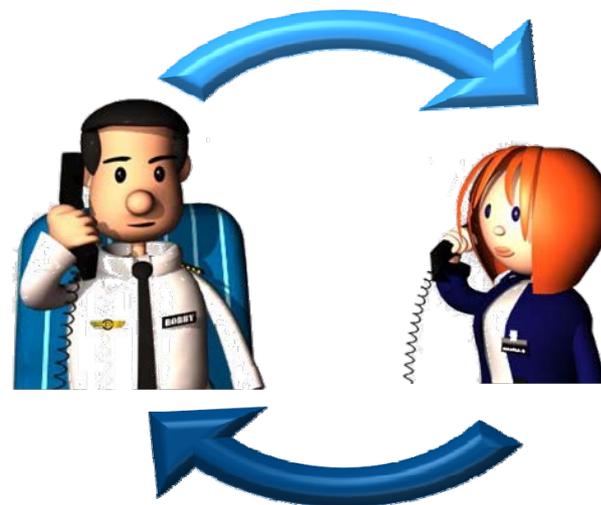
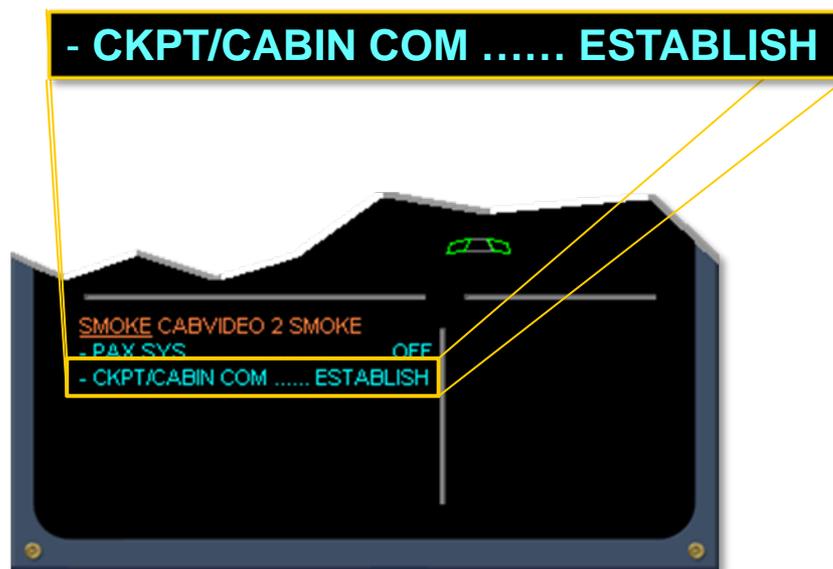
# Introduction

## Communication:

Action step in both *Cockpit* and *Cabin* Smoke procedures:



**- CKPT/CABIN COM ..... ESTABLISH**



# Content

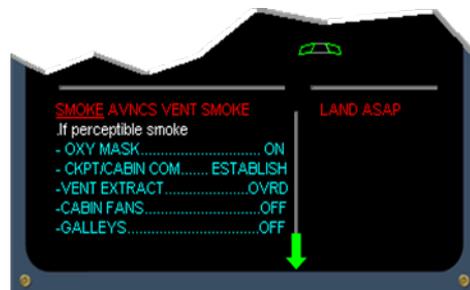
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# Smoke/Fumes Philosophy

The alert can come from :

- The ECAM



or

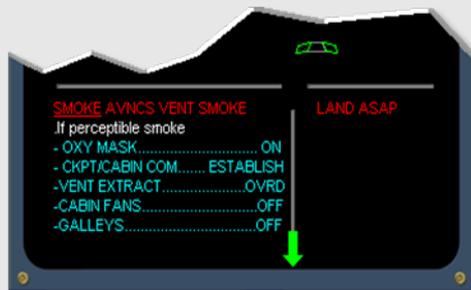
- The Cabin or Cockpit crew



Procedure must be applied without delay.

# Smoke/Fumes Philosophy

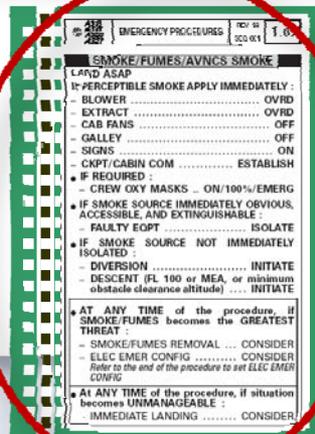
When supported by ECAM:  
Carry out **ECAM actions**



Crew (cockpit or cabin)  
perception without **ECAM Alert**



At any time the **SMOKE/FUMES**  
QRH paper procedure could be applied



# Smoke/Fumes Philosophy

SMOKE/FUMES/AVNCS SMOKE	
	LAND ASAP
APPLY IMMEDIATELY	
VENT EXTRACT.....	OVRD
CAB FANS.....	OFF
GALLEYS.....	OFF
SIGNS.....	ON
CKPT/CAB COM.....	ESTABLISH
● IF REQUIRED:	
CREW OXY MASKS.....	ON/100%/EMERG

**LAND ASAP**

**Immediate Actions**

**ANTICIPATE  
DIVERSION**



● IF SMOKE SOURCE IMMEDIATELY OBVIOUS,

ACCESSIBLE  
FAULTY EQ

● IF SMOKE SO

ISOLATED:

DIVERSION

DESCENT (P  
altitude)

● At ANY TIME  
becomes the

SMOKE FUM

ELEC EMER

Refer to the e

EMER CONF

● At ANY TIME

becomes UNMANAGEABLE:

IMMEDIATE LANDING..... CONSIDER

SMOKE/FUMES/AVNCS SMOKE	
	LAND ASAP
APPLY IMMEDIATELY	
VENT EXTRACT.....	OVRD
CAB FANS.....	OFF
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CKPT/CAB COM.....	ESTABLISH
● IF REQUIRED:	
CREW OXY MASKS.....	ON/100%/EMERG

Immediate actions before analysis:

- Quick / simple / reversible
- Prevent smoke recirculation
- Crew Protection
- Communication
- Do not make the situation worse

# Smoke/Fumes Philosophy

## “AT ANY TIME” items

● At ANY TIME of the procedure, if smoke/fumes becomes the **GREATEST THREAT**:  
 SMOKE FUMES REMOVAL.....CONSIDER  
 ELEC EMER CONFIG.....CONSIDER  
*Refer to the end of the procedure to set ELEC EMER CONFIG*

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



**IMMEDIATE LANDING.....CONSIDER:**

- Tail wind landing
- Overweight landing
- Off airport landing
- Ditching
- ...

APP  
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IS  
DIVERSION INITIATE  
DESCENT (FL 100/MEA, min obstacle clearance altitude) INITIATE

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# Smoke/Fumes Philosophy

SMOKE/FUMES/AVNCS SMOKE	
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APPLY IMMEDIATELY	
VENT EXTRACT.....	OVRD
CAB FANS.....	OFF
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SIGNS.....	ON
CKPT.....	
● IF SMOKE SOURCE IMMEDIATELY OBVIOUS, ACCESSIBLE AND EXTINGUISHABLE:	
● IF SMOKE SOURCE IMMEDIATELY OBVIOUS, ACCESSIBLE AND EXTINGUISHABLE:	
FAULTY EQPT.....	ISOLATE
● IF SMOKE SOURCE NOT IMMEDIATELY ISOLATED:	
DIVERSION.....	INITIATE
DESCENT (FL 100/MEA, min obstacle clearance altitude).....	INITIATE
● At ANY TIME of the procedure, if smoke/fumes becomes the GREATEST THREAT:	
SMOKE FUMES REMOVAL.....	CONSIDER
ELEC EMER CONFIG.....	CONSIDER
<i>Refer to the end of the procedure to set ELEC EMER CONFIG</i>	
● At ANY TIME of the procedure, if situation becomes UNMANAGEABLE:	
IMMEDIATE LANDING.....	CONSIDER

**LAND ASAP**

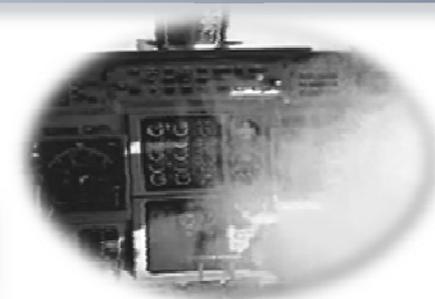
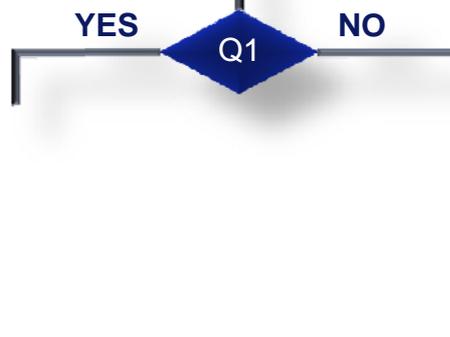
**Immediate Actions**

● IF SMOKE SOURCE IMMEDIATELY OBVIOUS, ACCESSIBLE AND EXTINGUISHABLE:

**Source Isolation**

**ANTICIPATE DIVERSION**

Q1: Is the smoke source immediately obvious, accessible and extinguishable?



# Smoke/Fumes Philosophy

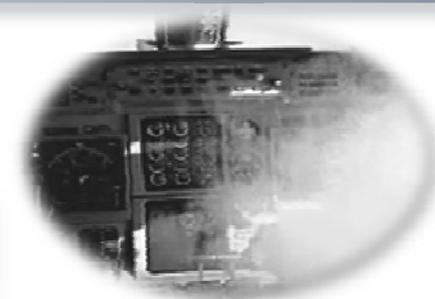
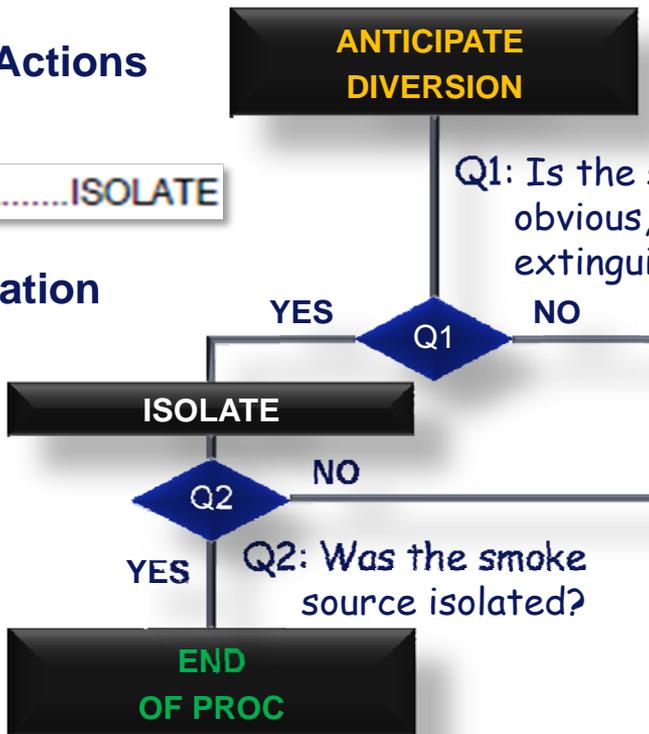
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ELEC EMER CONFIG.....	CONSIDER
<i>Refer to the end of the procedure to set ELEC EMER CONFIG</i>	
● At ANY TIME of the procedure, if situation becomes <b>UNMANAGEABLE</b> :	
IMMEDIATE LANDING.....	CONSIDER

**LAND ASAP**

**Immediate Actions**

**Source Isolation**

**ANTICIPATE  
DIVERSION**



Q1: Is the smoke source immediately obvious, accessible and extinguishable?

Q2: Was the smoke source isolated?

# Smoke/Fumes Philosophy



**SMOKE/FUMES/AVNCS SMOKE**

LAND ASAP

**LAND ASAP**

● **IF SMOKE SOURCE NOT IMMEDIATELY ISOLATED:**  
 DIVERSION.....  
 DESCENT (FL 100/MEA, min obstacle clearance altitude).....

INITIATE

**ANTICIPATE DIVERSION**

Q1: Is the smoke source immediately obvious, accessible and extinguishable?

**If in doubt about smoke warning → DIVERT**

Source Isolation

**Initiate Diversion**

**ISOLATE**

Q2

NO

YES

Q2: Was the smoke source isolated?

**END OF PROC**

**INITIATE DIVERSION**

● **IF SMOKE SOURCE NOT IMMEDIATELY ISOLATED:**  
 DIVERSION.....  
 DESCENT (FL 100/MEA, min obstacle clearance altitude).....

● **At ANY TIME of the procedure, if smoke/fumes becomes the GREATEST THREAT:**  
 SMOKE FUMES REMOVAL.....  
 ELEC EMER CONFIG.....  
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● **At ANY TIME of the procedure, if situation becomes UNMANAGEABLE:**  
 IMMEDIATE LANDING.....



# Smoke/Fumes Philosophy

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● AT ANY TIME of the procedure, if situation becomes UNMANAGEABLE:	
IMMEDIATE LANDING	CONSIDER

**LAND ASAP**

**Immediate Actions**

**Source Isolation**

**Initiate Diversion**

**Troubleshoot**

**ANTICIPATE DIVERSION**

Q1: Is the smoke source immediately obvious, accessible and extinguishable?

**If in doubt about smoke warning → DIVERT**

**ISOLATE**

Q2

NO

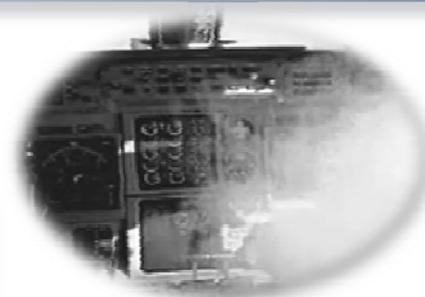
YES

Q2: Was the smoke source isolated?

**END OF PROC**

**INITIATE DIVERSION**

**ACTION SPECIFIC TO EACH SMOKE SOURCE**



# Smoke/Fumes Philosophy

**SMOKE/FUMES/AVNCS SMOKE**

LAND ASAP

APPLY IMMEDIATELY

VENT EXTRACT..... OVRD

● IF AIR COND SMOKE SUSPECTED:

APU BLEED..... OFF

VENT EXTRACT..... AUTO

ALL CARGO ISOL VALVES..... OFF

PACK 1..... OFF

**AIR COND SMOKE/CAB EQUIPMENT SMOKE**

● IF AIR COND SMOKE SUSPECTED:

● IF CAB EQUIPMENT SMOKE SUSPECTED:

**UNDETERMINED/AVNCS/ELECTRICAL SMOKE**

● IF SMOKE SOURCE CAN NOT BE DETERMINED AND STILL CONTINUES OR AVNCS/ELECTRICAL SMOKE SUSPECTED:

ELEC EMER CONFIG..... CONSIDER

**TO SET ELEC EMER CONFIG**

EMER ELEC GEN 1 LINE..... OFF

EMER ELEC PWR..... MAN ON

● WHEN EMER GEN AVAIL:

APU GEN ..... OFF

GEN 2..... OFF

**ELEC EMER CONFIG**

APPLY ECAM PROCEDURE, BUT DO NOT RESET GEN, EVEN IF REQUESTED BY ECAM.

● JUST BEFORE L/G EXTENSION:

GEN 2..... ON

EMER ELEC GEN 1LINE..... ON

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

● AT ANY TIME of the procedure, if situation becomes UNMANAGEABLE:

IMMEDIATE LANDING..... CONSIDER

## Troubleshoot

- ▶ AIR COND smoke
- ▶ CAB EQUIPMENT smoke
- ▶ AVNCS/ELECTRICAL smoke or Smoke source not detected and still continues.
- ▶ How to set ELEC EMER CONFIG

**ACTION SPECIFIC TO EACH SMOKE SOURCE**



*The order of SMOKE Sources, from most probable to the least probable, has been derived from historic data and analysis*

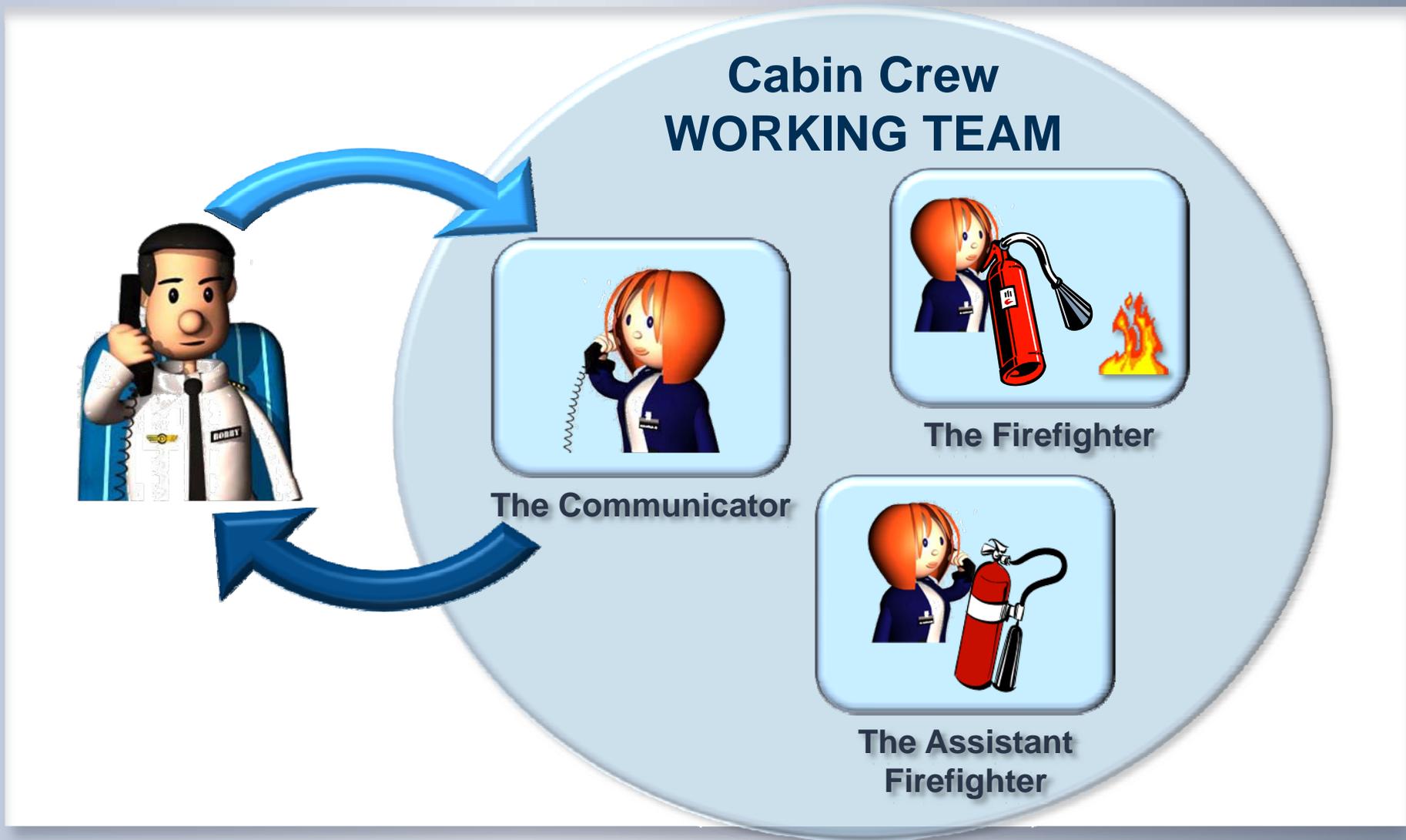
## Troubleshoot

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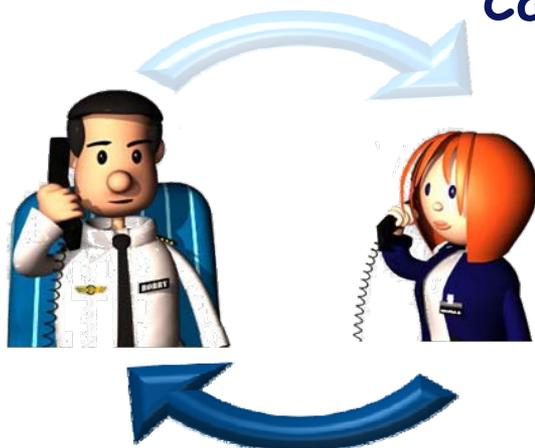


# Coordination with Cabin Crew



# Coordination with Cabin Crew

**Cabin crew reporting to the cockpit is essential:**



- Report the location
- Identify the source
- Assess the severity of situation
- Report the action taken
- *Do it accurately!*



**Coordinated, immediate and decisive action is necessary to prevent any escalation of the event...**

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# Conclusion

- Smoke event: many threats and challenges...
  - No two events are the same.
- Train for it:
  - Immediate actions / diversion / troubleshoot...
- React to the situation...
  - The entire crew is part of the solution



Train the entire crew as a crew!



