

DU TRAITEMENT DES ÉVÉNEMENTS  
À LA GESTION DES RISQUES

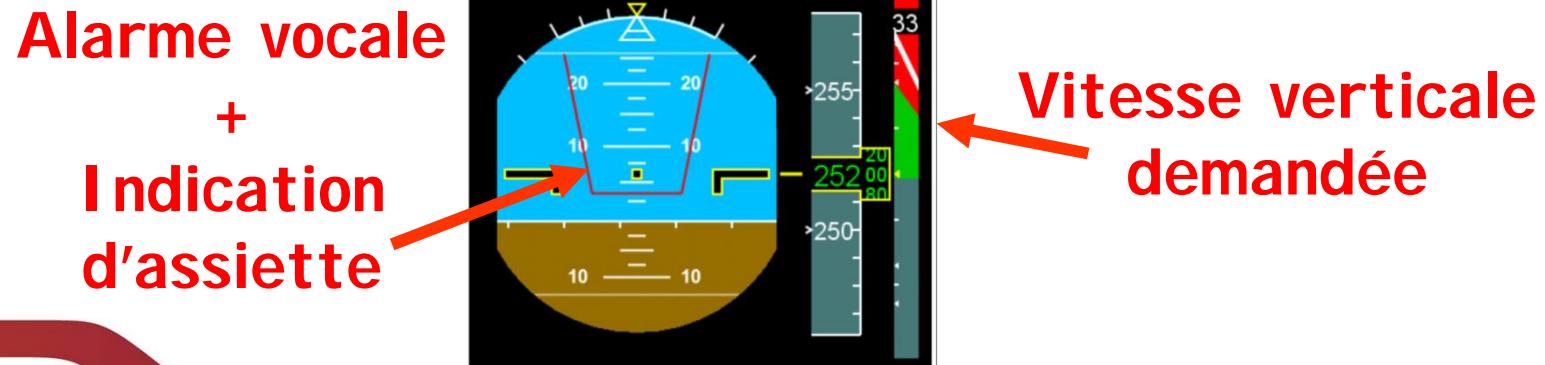
JEUDI 24 NOVEMBRE 2011

Etude de cas  
Réaction aux alarmes TCAS « AVS »

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Symposium DSAC

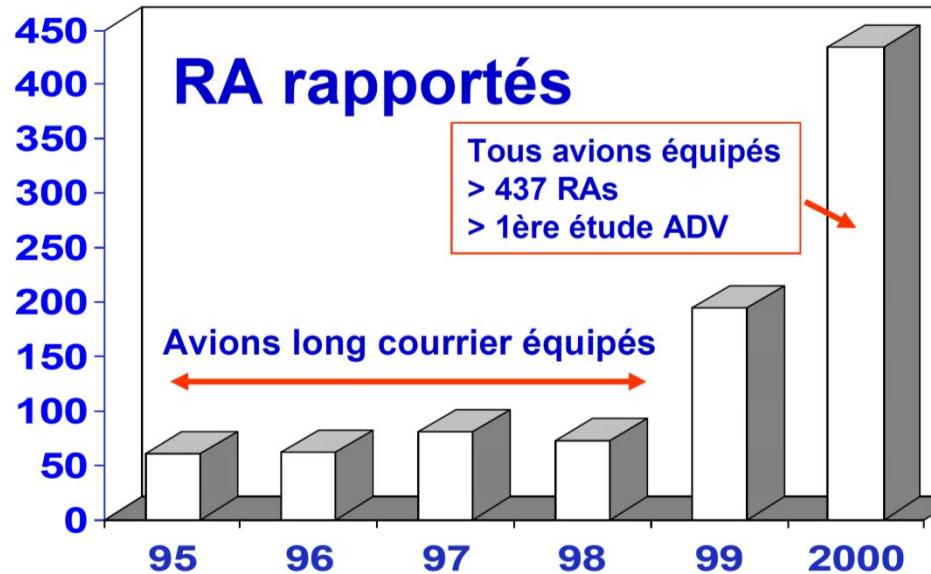
- ✓ TCAS : Trafic Collision Avoidance System
- ✓ Déetecte les trajectoires de collision potentielle
- ✓ Alerte l'équipage: Trafic Alert ("TA")
- ✓ Indique la manœuvre à effectuer pour garantir la séparation verticale : Resolution Advisory ("RA")



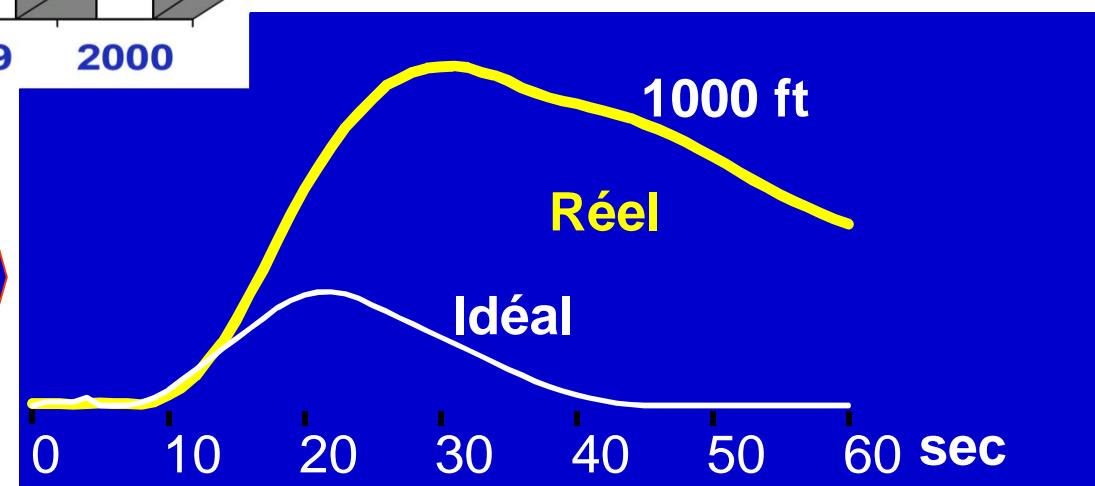
San Diego - 1978 - B727  
Approche - 2600 ft



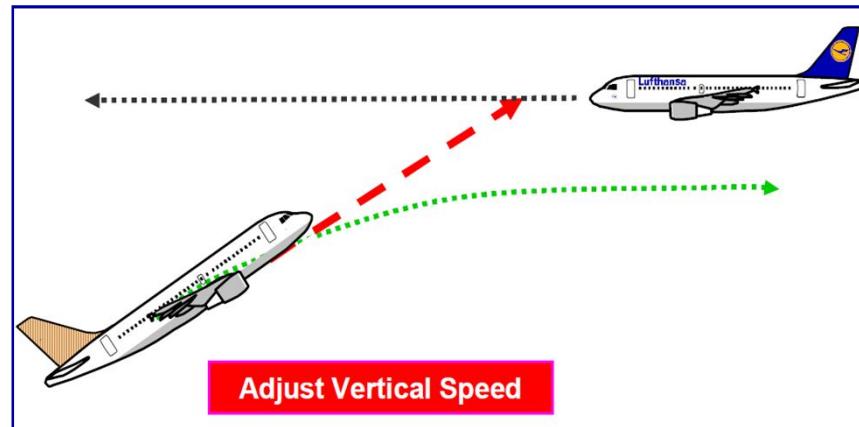
Los Angeles-1986- DC9  
Approche - 6000ft



Surveillance et  
prévention des  
réactions excessives



## Réactions inverses à RA TCAS "AVS"

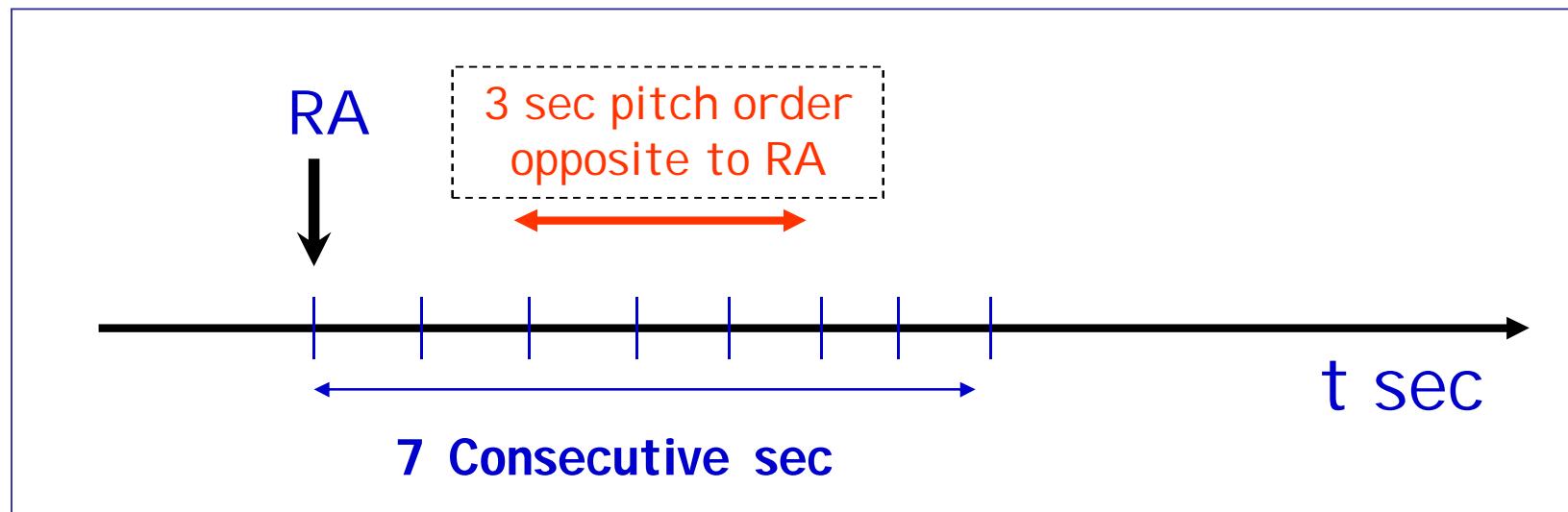


### Alarme sur trajectoire et séparation initiale nominale

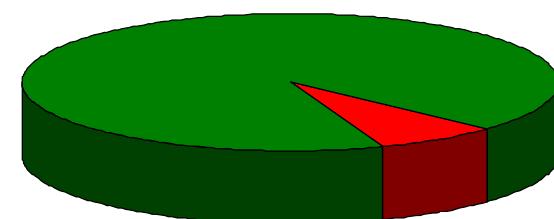
Publication de l'événement  
Réception de deux autres rapports similaires  
Mise en place d'une détection systématique

## Premières actions

### Détection et suivi des réactions inverses



Réactions pilote aux  
RA TCAS "AVS"



Réactions conformes  
93%

7%  
Réactions Inverses



# Premières actions

Partage d'information, premières analyses

## Bulletin TCAS Eurocontrol



### Airline operational feedback on initial “Adjust Vertical Speed” RAs

A major European airline is routinely monitoring flight crew responses to RA indications. It has identified an issue related to the “Adjust Vertical Speed” RAs.

- About 4% of initial responses are wrong and opposite to the RAs;
- Most of the errors are quickly corrected but a few serious events have occurred.

Some contributing factors have been identified by this operator:

- Only “Climb” and “Descend” RA scenarios are exercised on its flight simulators. An “Adjust Vertical Speed” RA can only be generated subsequently, depending upon the pilots’ reactions;
- The aural “Adjust Vertical Speed, Adjust” does not specify the direction of the manoeuvre required;
- Interpretation of the RA display on the vertical speed tape of the PFD is less intuitive than the pitch cue.

This experience is shared by some other major European airlines.

## **Controller and Pilot ACAS regulation and training**

**Examples of actual ACAS II training programmes**

### ACAS II training programme in Air France

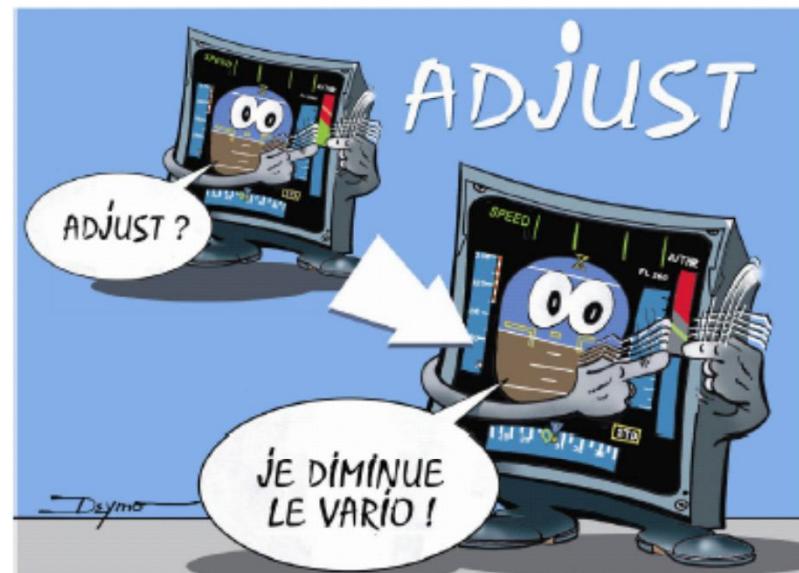
Both initial training and aircraft type qualification includes:

- Detailed TCAS II system and procedure description in the Flight Crew Operating Manual (FCOM);
- Course on how TCAS II works using CBT programmes;
- Study with a ground instructor covering all the TCAS II alerts;
- Practice session on the corresponding aircraft simulator involving TCAS II scenarios with RAs.

Subsequently, the required 6 month aircraft simulator practice session also includes some scenarios with RAs.

In addition to this training, Air France provides regular information and feedback on actual TCAS II events to all pilots. This additional information includes:

- Safety communication on specific TCAS II items (Flight Safety Bulletins, poster, etc.) when a significant issue is identified (e.g. inappropriate reactions to "Adjust Vertical Speed" RAs);
- Annual reports with the analysis of Air Safety Reports with RAs;
- Internal monthly publication of most relevant Air Safety Reports, which can include TCAS II events experienced by flight crews;
- External material relevant for TCAS II training (e.g. EUROCONTROL ACAS Safety Bulletins).

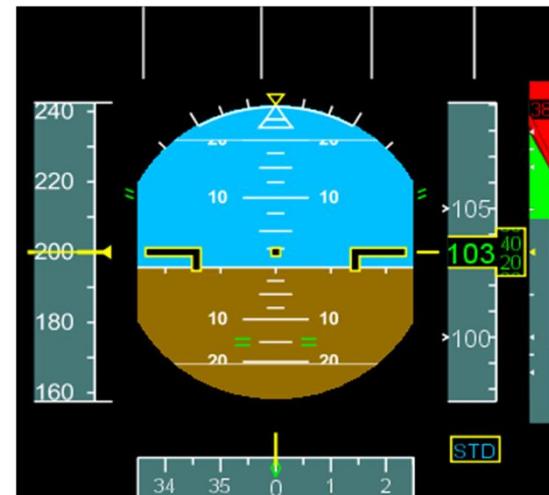
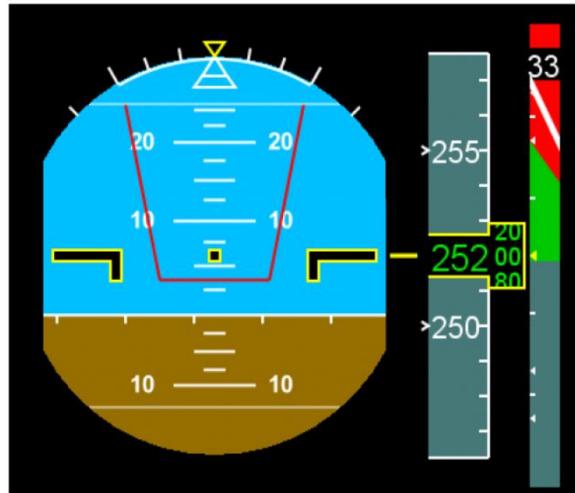


Poster developed by Air France to catch pilots attention  
regarding Adjust Vertical Speed" RAs  
(Je diminue le vario = I reduce the vertical rate)

# Premières analyses

## Principaux facteurs contributifs

- ✓ "Adjust" n'indique pas le sens de correction
- ✓ Aiguille de vitesse verticale rouge sur fond rouge
- ✓ Guidage en Vitesse verticale et non en Assiette
- ✓ Simulateurs non adaptés aux TCAS « AVS »



# Safety Conference Airbus

Monitoring  
TCAS Crew Responses

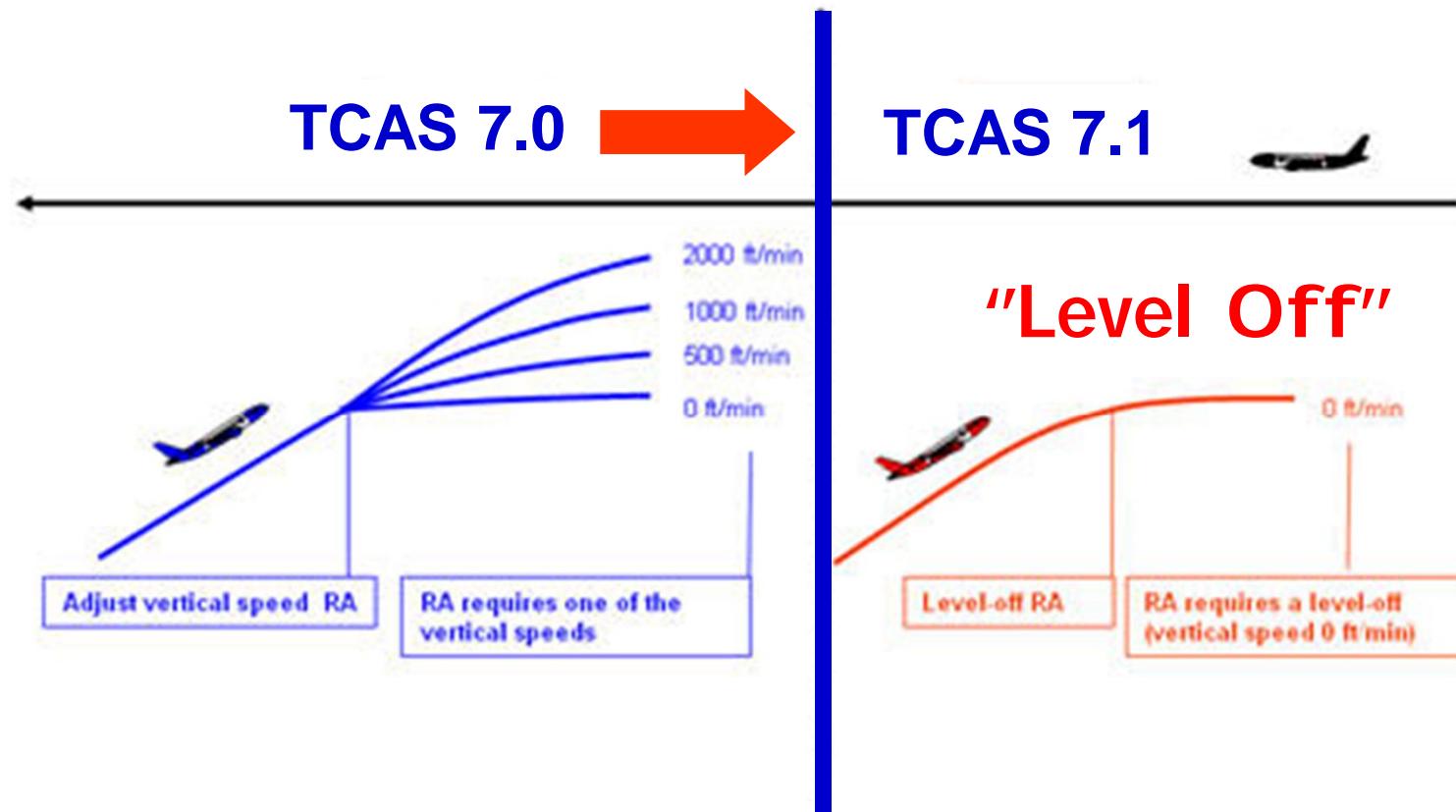
Barcelona - October 2003

Flight Safety  
Conference

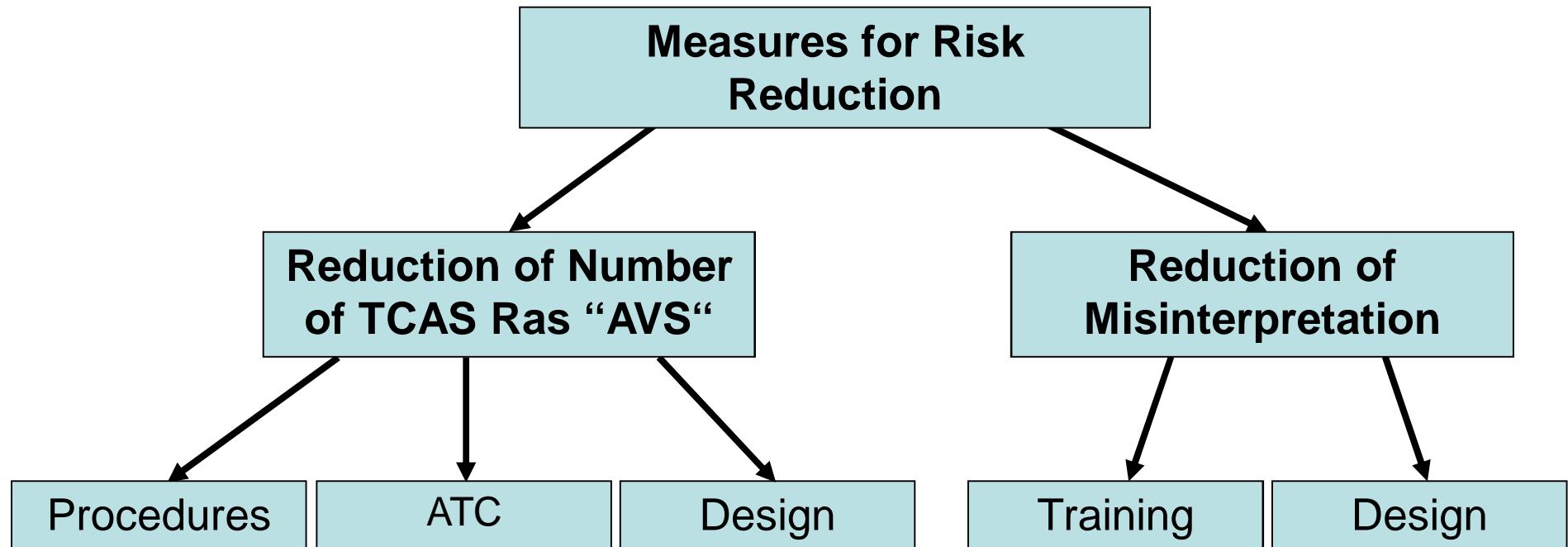
**Présentation des événements et partage avec  
l'ensemble des compagnies de l'algorithme  
d'analyse des vols  
pour la détection des cas de réaction inverse.**



## Evolution du TCAS



# Reduction du risque

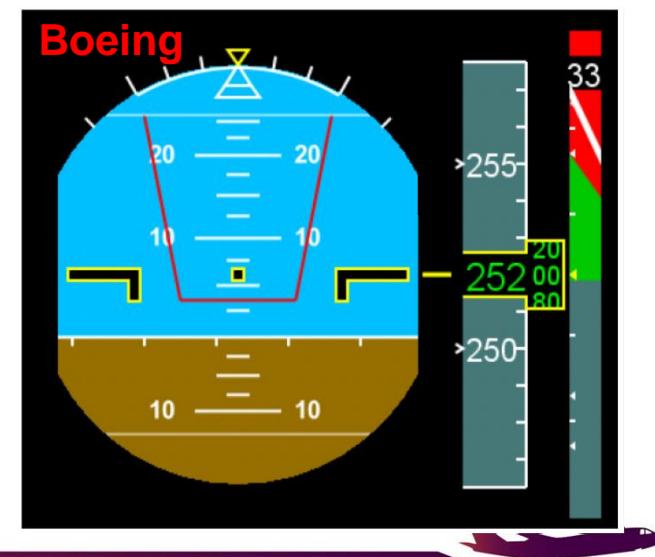
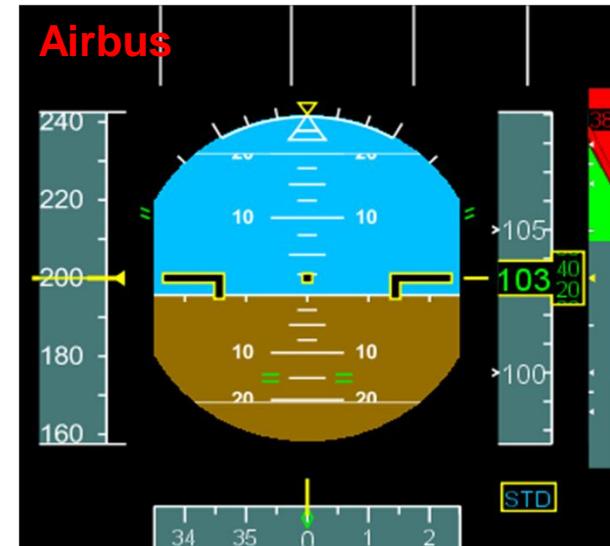


A380, A350, etc ...



+ FMGS  
Altitude capture software

Mais



## Quelques leçons

### Sur le retour d'expérience

- ✓ Retour d'expérience actif
- ✓ Canaux de retour complémentaires →
- ✓ Risques partagés >> Traitement partagé (collision en vol)

### Sur la gestion de risque

- ✓ Gestion de la sécurité => Surveillance et gestion des défenses/barrière ou principe de sécurité
- ✓ Nécessité d'un modèle partagé



## Airline Safety Management

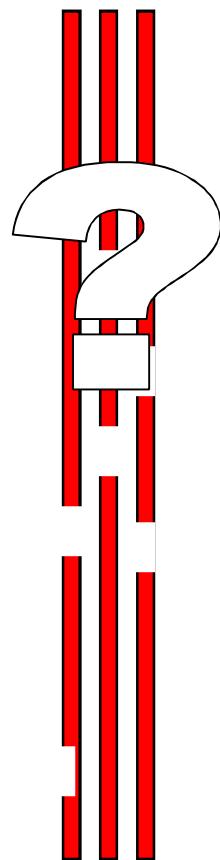
Importance of having a shared “safety model”

- Having a well recognized safety model in mind, referring to a limited number of well identified accident families will :
  - ✓ tell us what and where we should look for
  - ✓ give sense to the safety data we collect
  - ✓ orient the design of new safety data software tool
  - ✓ clarify priorities and support prevention strategies
  - ✓ encourage a more systematic, proactive and efficient management of safety functions : “control”, “recovery” and “mitigation”



## Accident and Defenses

## Operations



## Accidents

- Loss of control
- CFIT
- Mid air collision
- Runway collision
- Runway excursion
- Other damages/injuries (Flight)
- Other damages/injuries (Ground)



# Airline Safety Management

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Importance of having a shared "safety model"

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### Safety Model

Accident = “loss of control”

### Undesirable events (UE)

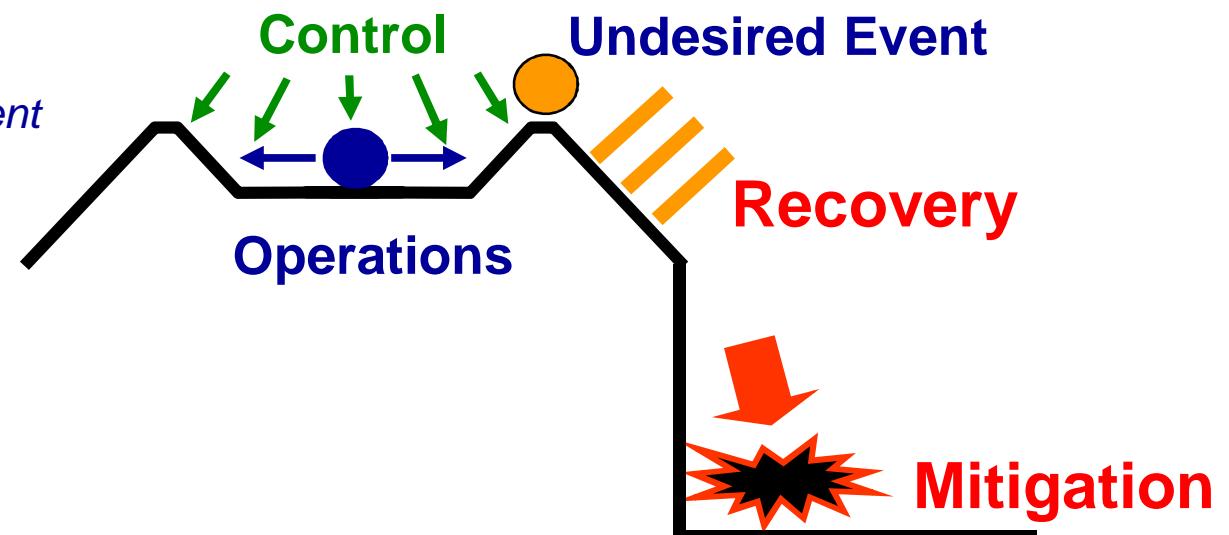
Points where the “control of the situation is lost”

### Safety Principles

Any action contributing to prevent or recover a “loss of control” or minimizing damage

### Three key safety functions

- ✓ Control
- ✓ Recovery
- ✓ Mitigation



## Airline Safety Management

Influence of actors: Unsafe Conditions

FLIGHT OPS

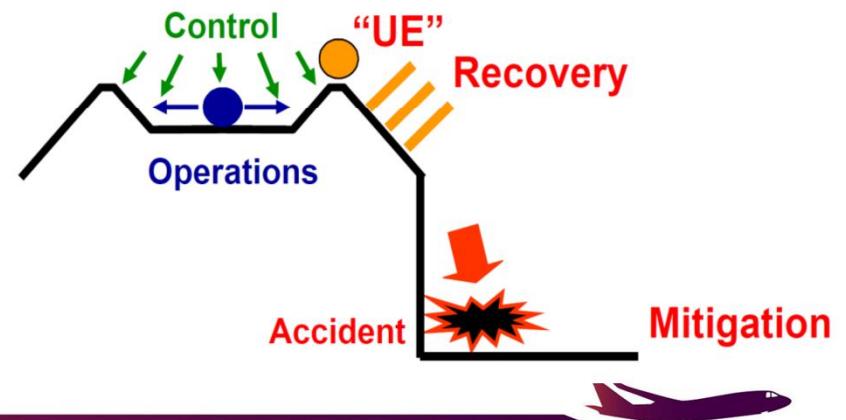
MAINTENANCE

GROUND OPS

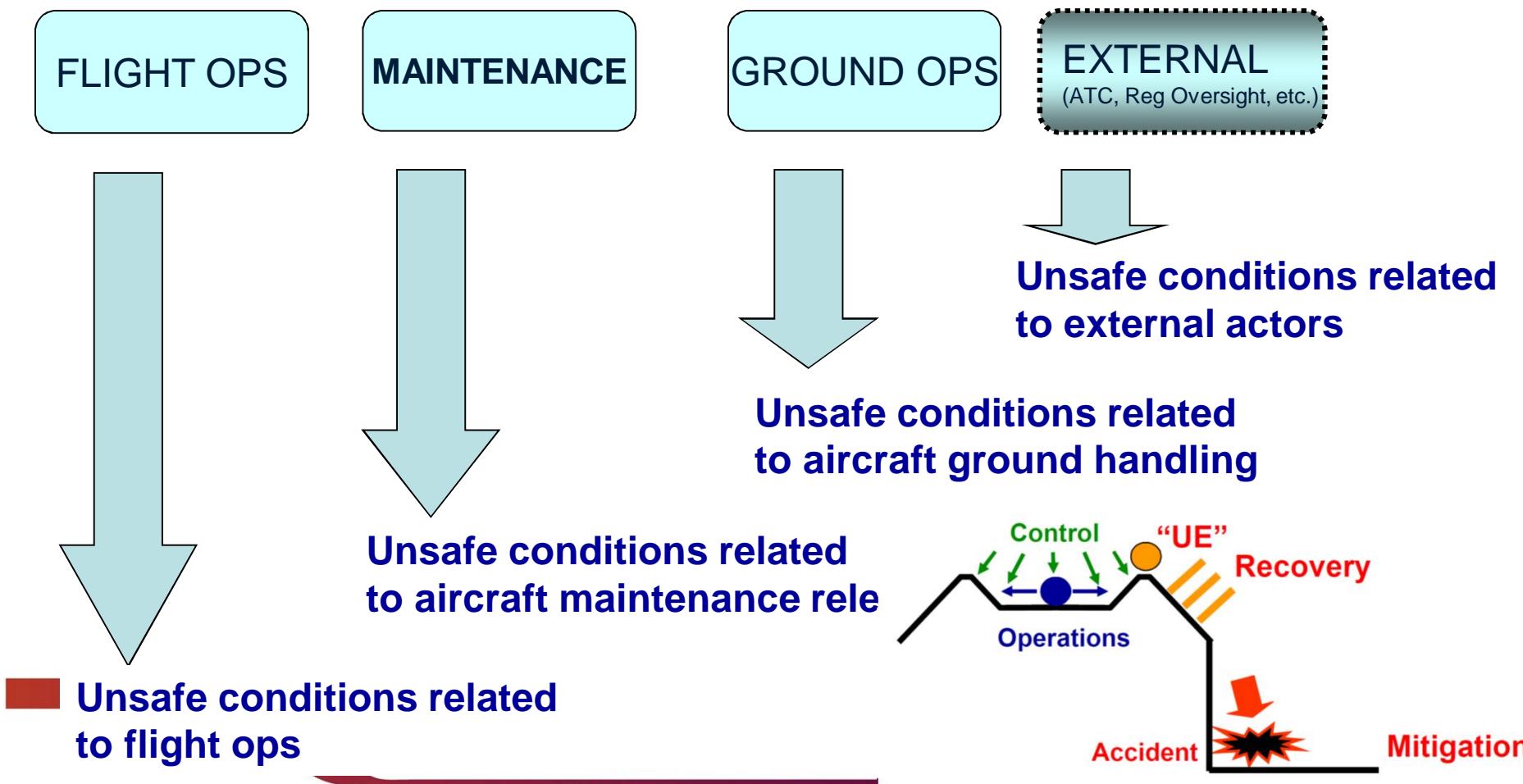
EXTERNAL  
(ATC, Reg Oversight, etc.)

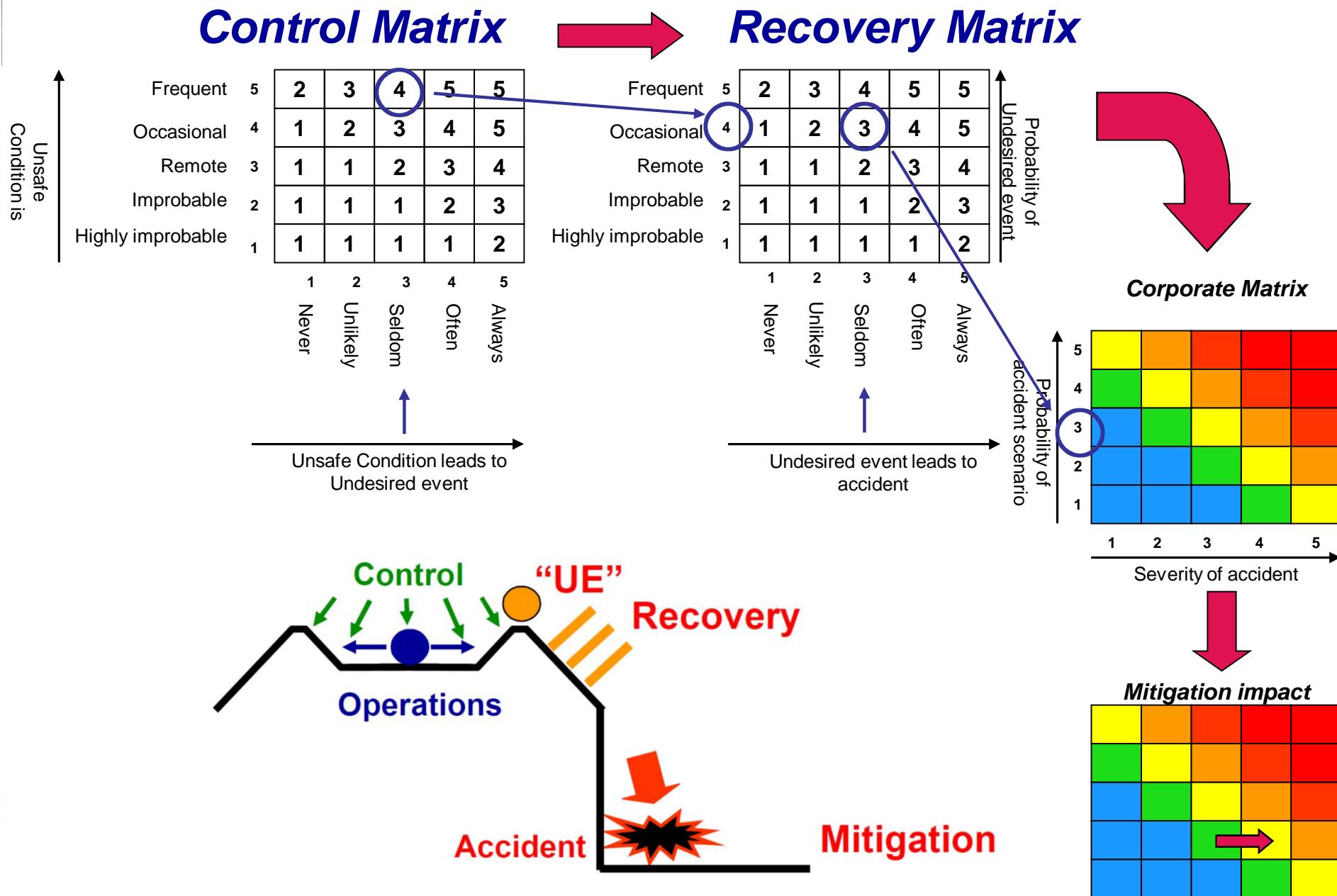
Flight ops, ground ops, maintenance, cargo and **other actors** are supporting or affecting the control, recovery or mitigation function separately, or collectively by interacting with each other

When the result of an action or inaction affects one of the « Safety Principles », it is referred to an «Unsafe Condition» or «UC»



When the result of an action or inaction from stakeholders affects one of the « Safety Principles » it is referred to an « Unsafe Condition »







Merci de votre attention

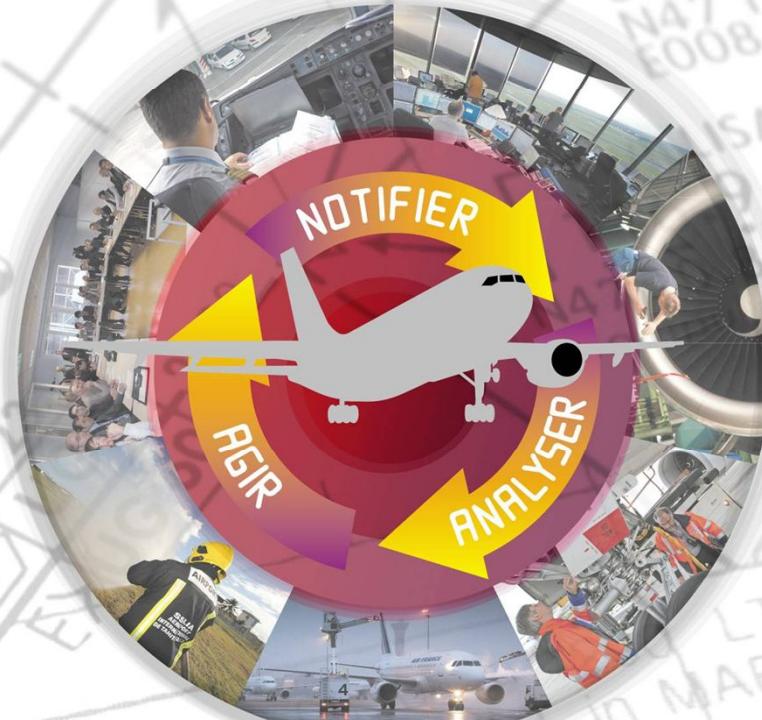


DSAC

Les symposiums

JEUDI 24 NOVEMBRE 2011

# DU TRAITEMENT DES ÉVÉNEMENTS À LA GESTION DES RISQUES



direction générale  
de l'Aviation civile



direction  
de la sécurité  
de l'Aviation civile

**BEA**  
Bureau d'Enquêtes et d'Analyses  
pour la sécurité de l'aviation civile

**dgac**  
DSNA

**CABA**  
Comité d'Analyse et de Benchmarking  
Aéroport d'Aurillac

**EuroAirport™**  
BASEL MULHOUSE FREIBURG

**AÉROPORT INTERNATIONAL**  
DE LIMOGES

**sabena**  
technics  
TAT GROUP

**AIRFRANCE**  
AÉROPORTS DE PARIS

**UNION DES AÉROPORTS FRANÇAIS**

**ALFA-ACI**

**SAFETY LINE**  
take control of your safety

**TROYES AVIATION**

**DarTA**  
TRANSPORT AÉRIEN

## Canaux de retour complémentaires

