

# Eye Tracking

&

# Circuit visuel PNT

**André VERNAY**  
**Pilote**  
**Chef programme risques humains**



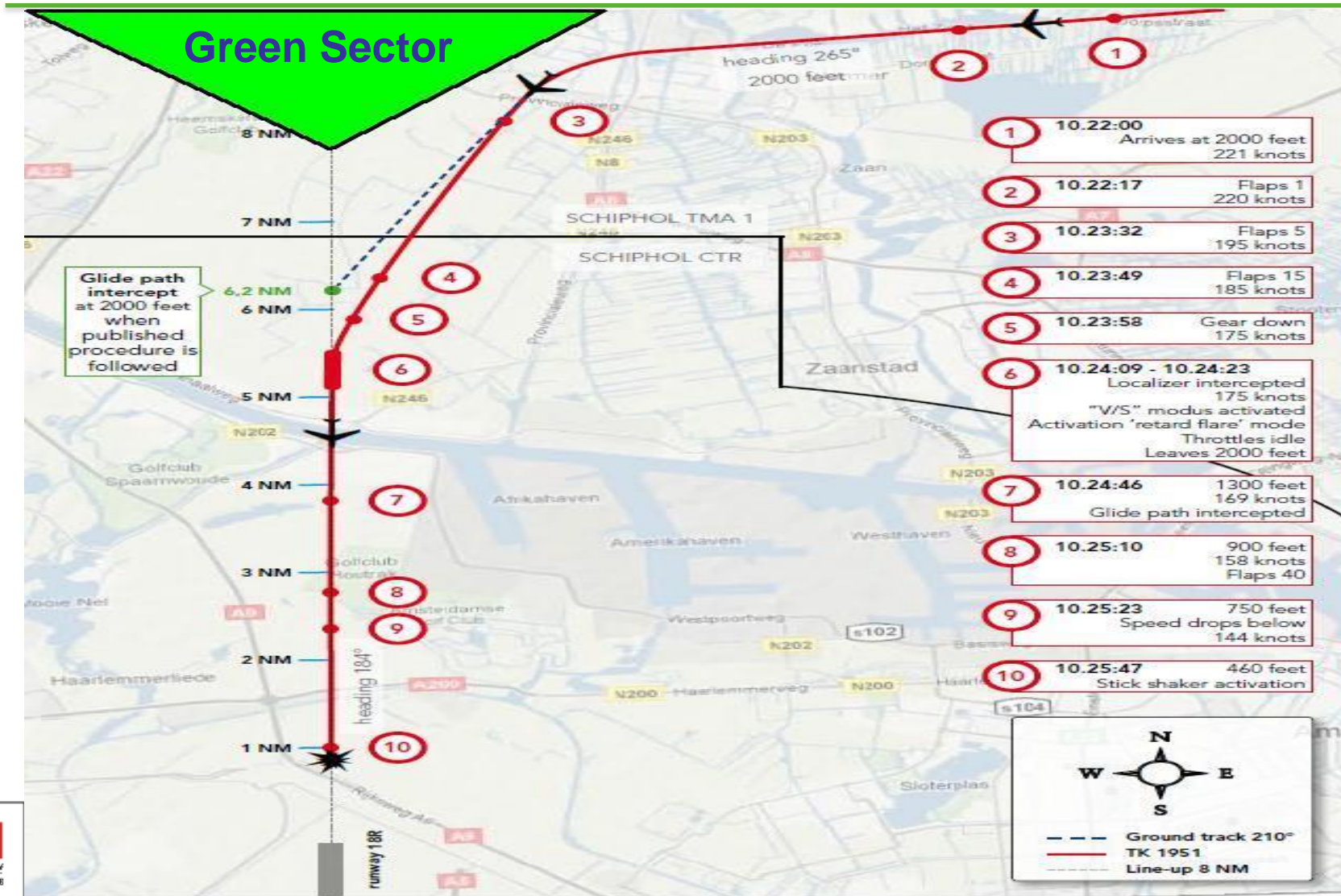
Direction générale de l'Aviation Civile

Ministère de l'Écologie, du Développement durable et de l'Énergie

# Crash B738 Schiphol 25th February 2009



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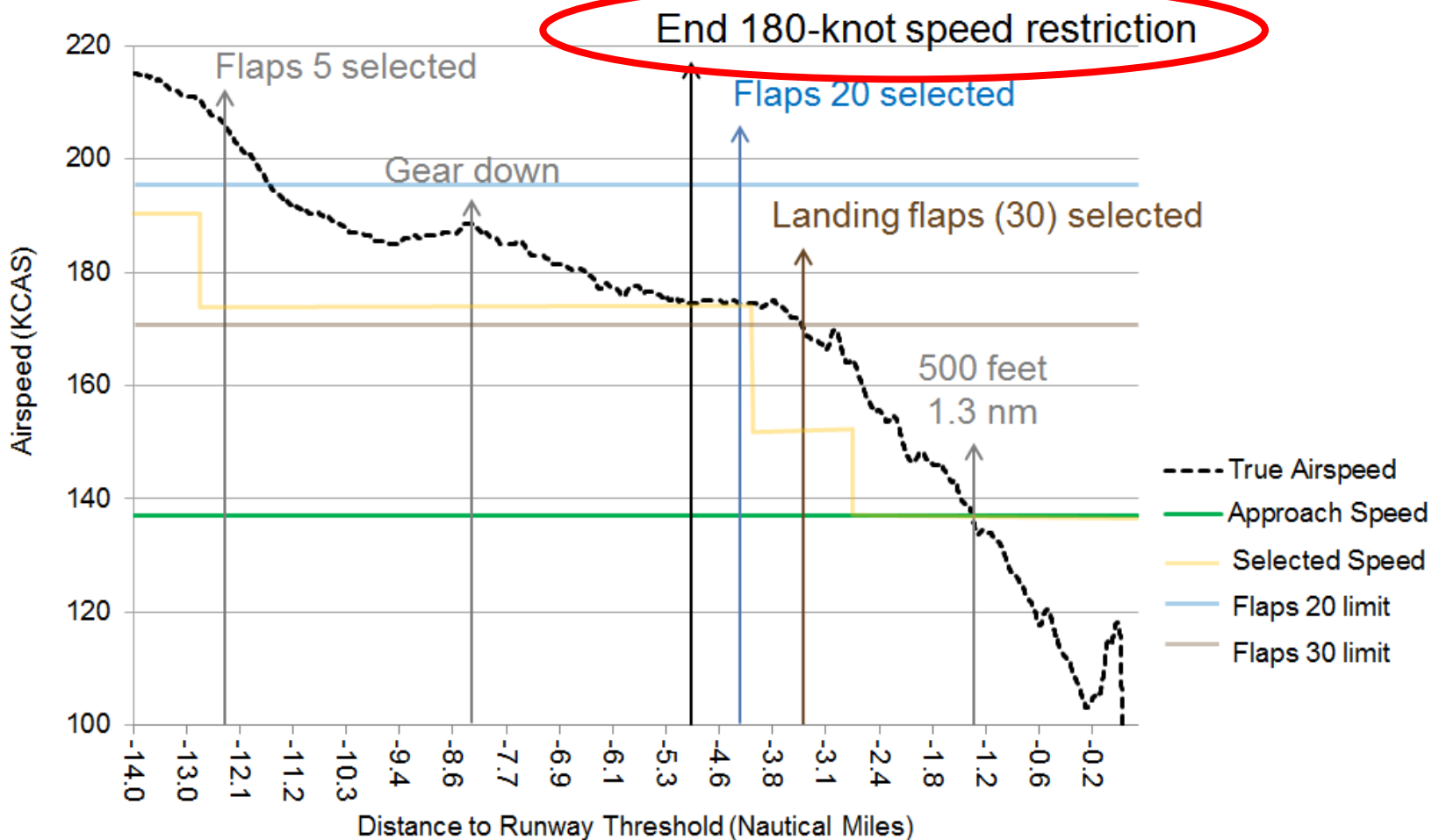
- The aircraft's navigation equipment is designed and optimised for an approach and **interception from below and not from above**.
- As a **result of intercepting the glide slope signal from above**, the incorrect operation of the auto throttle was **obscured** for the crew.
- Completing the landing checklist, **no pilot monitored the flight path** and aircraft speed.

# Accident Asiana Flight 214 San Francisco July 2013





# Descent Mismatch



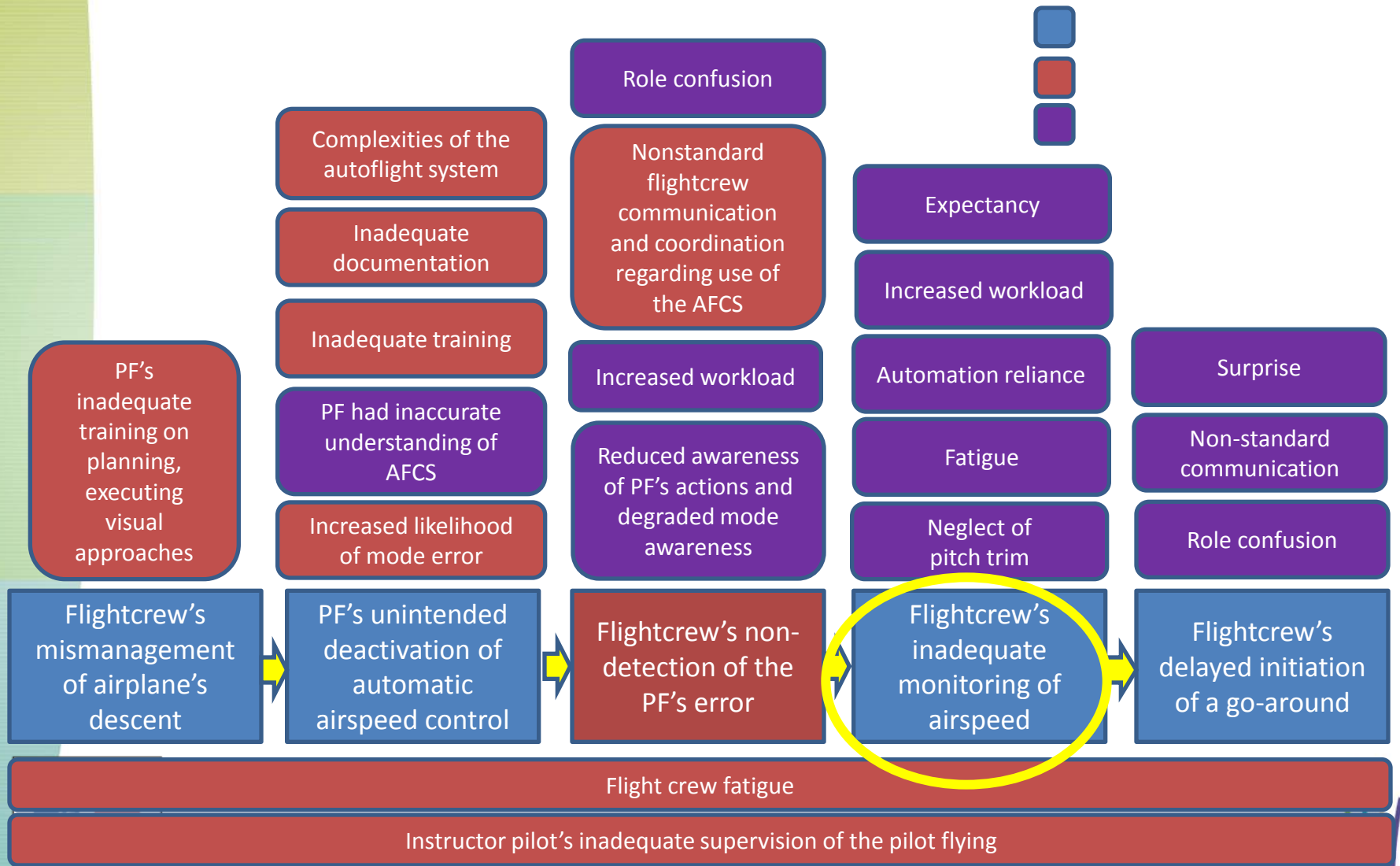
\*Numbers on the figure are approximate

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# Probable Cause + Contributing Factors + Selected Findings



# Fatal accidents and severe incidents involving NCA

- Fatal accident B777 San Francisco July 2013
- Non fatal accident A321 Lyon March 2013
- Severe incident A340 Paris CDG March 2012
- Severe incident A319 Tunis March 2012
- Fatal accident B738 Schiphol February 2009
- Severe incident B737 PARIS CDG November 2006
- Severe incident MD-83 Nantes March 2004
- Fatal accident CRL 100 Brest June 2003
- Fatal accident FK27 ELLX November 2002
- Severe incident MD83 Paris Orly November 1997
- Severe incident A310 Paris Orly September 1994
- Fatal accident Dash 8 Paris CDG January 1993
- Fatal accident A320 Mont Saint Odile January 1992
- Fatal accident EMB120 Bordeaux December 1987



# Performance du Pilote

- Compétences → techniques et non techniques  
+ Ressources disponibles = **Performance**
- CRM → équipage
- TEM
- Observation → Décision → Action
- Bien décider → Bonne conscience situation
  - Surveillance
  - Entraînement
  - Application des procédures



# 2009-2013 Fatal Aircraft Accidents

94 Accidents

IATA Members		17%
Hull Losses		100%
45%	55%	
65%	31%	4%

65% Passenger

31% Cargo

4% Ferry

45% Jet

55% Turboprop

## Breakdown per Operator Region

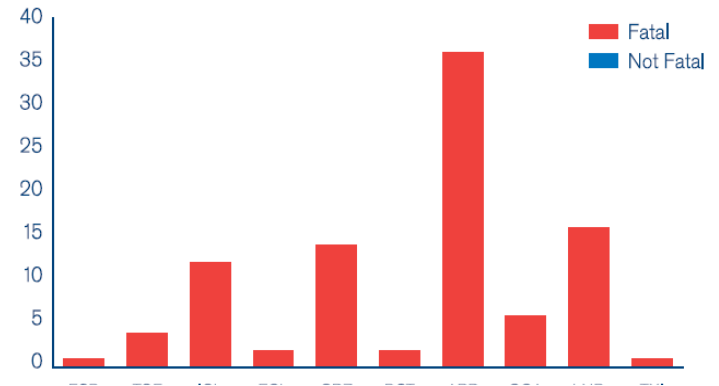
## Breakdown per Accident Category

### A) Flight Crew Errors (relating to...)

- 25 **40%** SOP adherence/cross-verification
- 20 Intentional non-compliance (72% of these cases)
- 15 Unintentional non-compliance (28% of these cases)
- 10
- 5
- 0

### Accidents per Phase of Flight

See Annex 1 for detailed "Phase of Flight" definitions



## Relationships of Interest, 2009-2013

38% of fatal accidents occurred during the approach phase of flight. Of these, 56% were due to controlled flight into terrain and 63% involved flight crew vertical, lateral or speed deviations.

Deficiencies in the operator's safety management were noted in 79% of events where inadequate standard operating procedures for flight crew were noted as a factor.

# A Practical Guide for Improving Flight Path Monitoring

FINAL REPORT OF THE ACTIVE PILOT MONITORING WORKING GROUP



Ministère de l'Écologie, du Développement durable et de l'Énergie



# Étude NTSB 1994

- 12 années en transport commercial analysées
- 84 % des accidents dus à la non surveillance et non détection d'éléments primaires erronés.

## ICAO

- 50 % des CFIT liés à des erreurs ou manques de monitoring

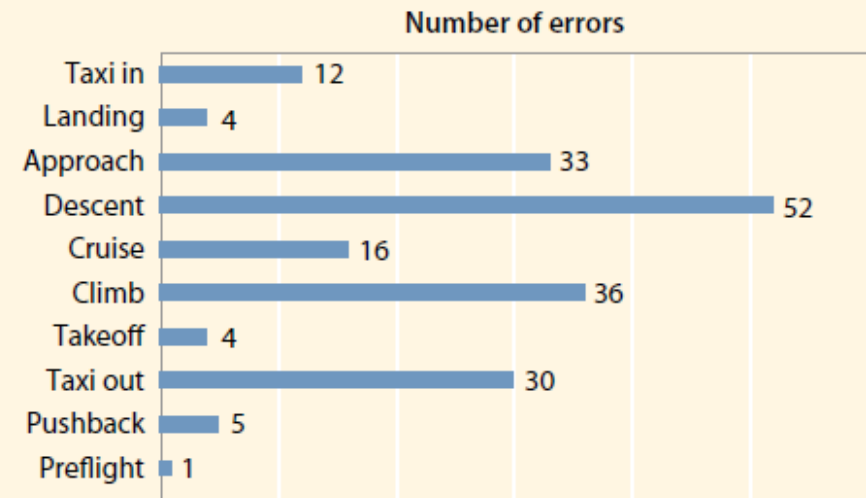
## FSF

- 63 % des accidents en Approche et Atterrissage liés monitoring et cross checkings inadaptés

# Dans les opérations journalières : LOSA

1. Poor	2. Marginal	3. Good	4. Outstanding
Observed performance had safety implications	Observed performance was adequate but needs improvement	Observed performance was effective	Observed performance was truly noteworthy

## Phase of Flight Where a Monitoring Error Occurred\*



\* More than one error occurred in some of the 188 reports analyzed.

Source: Active Pilot Monitoring Working Group

# Dans les formations : « annonces »

B777 INSTRUCTOR GUIDE

**CMV1/MAN 3U**

1301

**2) Med Emer, ATB, CAT III, Autoland, CAT II GA (PF : CA)**

(Planned 0:30/1:00)

HF Topics:

- Pilot Monitoring during Precision Approaches
- FOM 2.37 Flight Deck Authority
- Crew Communication and Planning
- Automation Management/ModeAwareness

Condition:

- METAR: KSLC 25015KTS 1/4SM R16L34R 1000FT  
FZFG OVC001 M2/M2 A2982
- RVR 500/500/500

*On climb out*

**SLC DEPT (126.25)**



Source: Active Pilot Monitoring Working Group





# Les attendus

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- Constructeurs
- Formateurs
- Autorités
- Bureaux enquêtes



# Comportement des acteurs

- Sensibiliser : définir le rôle de chaque acteur
- Protéger des interruptions de tâches
- Informer sur les phases de vol dégradées
- Compréhension des automatismes
- Vulnérabilité aux erreurs
- Impact des déviations
- Politique globale du monitoring
- Inciter à reporter ou mesurer

# Que regardons nous en tant que pilotes ?



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# Questions

