



**CHINA AIRLINES**



# **Pilot Monitoring Duty**

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# Content



- **Aviation safety Data.**
- **What / How to monitor**
- **Conclusion**

# From PNF to PM - 2003 FAA-AC120-71A



U.S. Department  
of Transportation

**Federal Aviation  
Administration**

## Advisory Circular

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**Subject: STANDARD OPERATING  
PROCEDURES FOR FLIGHT DECK  
CREWMEMBERS**

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**Date: 2/27/03**

**Initiated By: AFS-210**

**AC No: 120-71A**

# From PNF to PM



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## I. PURPOSE.

a. **General.** Standard operating procedures (SOPs) are universally recognized as basic to safe aviation operations. Effective crew coordination and crew performance, two central concepts of crew resource management (CRM), depend upon the crew's having a shared mental model of each task. That mental model, in turn, is founded on SOPs. This advisory circular (AC) presents background, basic concepts, and philosophy in respect to SOPs. It emphasizes that SOPs should be clear, comprehensive, and readily available in the manuals used by flight deck crewmembers.

... the term pilot not flying misses the point. Studies of crew performance, accident data, and pilots' own experiences all point to the vital role of the non-flying pilot as a monitor. Hence, the term pilot monitoring (PM) is now widely viewed as a better term to describe that pilot.

flying misses the point. Studies of crew performance, accident data, and pilots' own experiences all point to the vital role of the non-flying pilot as a monitor. Hence, the term pilot monitoring (PM) is now widely viewed as a better term to describe that pilot. The term PM is used liberally throughout this AC. In those instances where the older term PNF appears, it should be understood that pilot monitoring (PM) is the preferred meaning.

# Aviation safety Data

## NTSB Accident Statistic Data

- Reviewed 37 crew-caused air carrier accidents
  - **84%** of 37 reviewed accidents involved inadequate crew monitoring or challenging.

# Aviation safety Data



## CFIT / ALA

- Flight Safety Foundation
  - **63%** of the reviewed ALA accidents involved inadequate **monitoring and cross-checking**.
- ICAO
  - Inadequate **monitoring** was a factor in **50%** of the accidents reviewed.

# Aviation safety Data



## CFIT / ALAR CASES

Kenya Airways Flight 431	January 30, 2000	Impacted ocean after takeoff from <a href="#">Félix Houphouët-Boigny International Airport</a> , killing all 10 crew and 159 out of 169 passengers. The pilots put the plane into a descent in response to an erroneous stall warning.
Air Philippines Flight 541	April 19, 2000	Crashed in <a href="#">Island Garden City of Samal, Davao del Norte</a> , killing all 131 people on board. It is also currently the deadliest air disaster in the <a href="#">Philippines</a> .
Gulf Air Flight 072	August 23, 2000	An <a href="#">Airbus A320</a> crashed in <a href="#">Persian Gulf</a> , while approaching the <a href="#">Bahrain International Airport</a> , killing all 143 people on board due to combination of pilot error ( <a href="#">spatial disorientation</a> ) and systemic organizational factors.
Crossair Flight 3597	November 24, 2001	Flight from <a href="#">Berlin</a> to <a href="#">Zurich</a> that crashed during its landing approach, killing 24 people.
Air China Flight 129	April 15, 2002	Crew failed to execute a timely missed approach.
Kam Air Flight 904	February 3, 2005	No official cause has been determined, although the plane flew into the area's worst snowstorm in five years.
<a href="#">2005 Loganair Islander accident</a>	March 15, 2005	Pilot continued descent past minimum altitude for procedure turn. Factors included fatigue, workload, lack of recent flying time, and possible disorientation, distraction, or subtle incapacitation.
<a href="#">2006 Slovak Air Force Antonov An-24 crash</a>	January 19, 2006	Aircraft strayed from the planned course and descended below the MDA prior to impact.
Armavia Flight 967	May 3, 2006	Bad weather, spatial disorientation, and loss of situational awareness coupled with failure to follow communications procedures between ATC, the ground meteorologist, and the crew led to improper flight inputs and impact with the Black Sea.
Atlasjet Flight 4203	November 30, 2007	While no official cause could be determined, investigators have theorized that the pilot suffered spatial disorientation before impact with a mountain.
Santa Bárbara Airlines Flight 518	February 21, 2008	The pilots took off without conducting the mandatory pre-flight procedures and used an unauthorized departure route, which led to impact with a mountainside within minutes of departure.
<a href="#">2010 Polish Air Force Tu-154 crash</a>	April 10, 2010	Polish president <a href="#">Lech Kaczyński</a> was among those killed in the crash.
Airblue Flight 202	July 28, 2010	Crashed into the Margalla Hills <a href="#">Islamabad</a> due to Bad Weather. All 152 passengers including 6 crew members were killed in the board.
RusAir Flight 9605	June 20, 2011	Crashed near <a href="#">Petrozavodsk Airport (PES, ULPB)</a> . Tu-134 RA-65691.
First Air Flight 6560	August 20, 2011	An internal Canadian charter flight from <a href="#">Yellowknife Airport, Northwest Territories</a> , to <a href="#">Resolute Bay Airport, Nunavut</a> that crashed approximately 2 km (1.2 mi) east of the Resolute Bay, Airport runway, in poor weather attempting a <a href="#">go-around</a> after a failed <a href="#">ILS</a> landing. 12 of the 15 people on board were killed.
Royal Norwegian Air Force C-130J	March 15, 2012	Crashed into <a href="#">Kebnekaise, Sweden</a> en route to <a href="#">Kiruna Airport</a> , killing the 5 officers on board. C-130J-30 'Siv'.
Bhoja Air Flight 213	April 20, 2012	<a href="#">Microburst</a> induced windshear countered by inappropriate pilot response. All 121 passengers including 6 crew members were killed on the board. It was crashed in a field near <a href="#">Rawalpindi, Islamabad, Pakistan</a>
<a href="#">Mount Salak Sukhoi Superjet 100 crash</a>	May 9, 2012	Aircraft crashed while on a demonstration flight, killing all 45 on board. The pilots had intentionally turned off the terrain warning system and were speaking to potential customers when the impact occurred.

# What / How to monitor



Is human kind good at monitoring ?





# What / How to monitor



**VIDEO**



## Is **MONITORING** a pilot's competency?

Q: Why is monitoring NOT a competency?

A: Monitoring is a fundamental component of each existing competency and, each competency is vital for good monitoring.

e.g. Situational Awareness



# Airbus' Survey

Question – Does your airline specifically train monitoring?



**Monitoring is required to be trained.  
And ...to be assessed**

# Common Definition of Monitoring

## **Monitoring:**

*The **observation and interpretation** of the flight path data, configuration status, automation modes and on-board systems appropriate to the phase of flight.*

*It involves a **cognitive comparison** against the expected values, modes and procedures.*

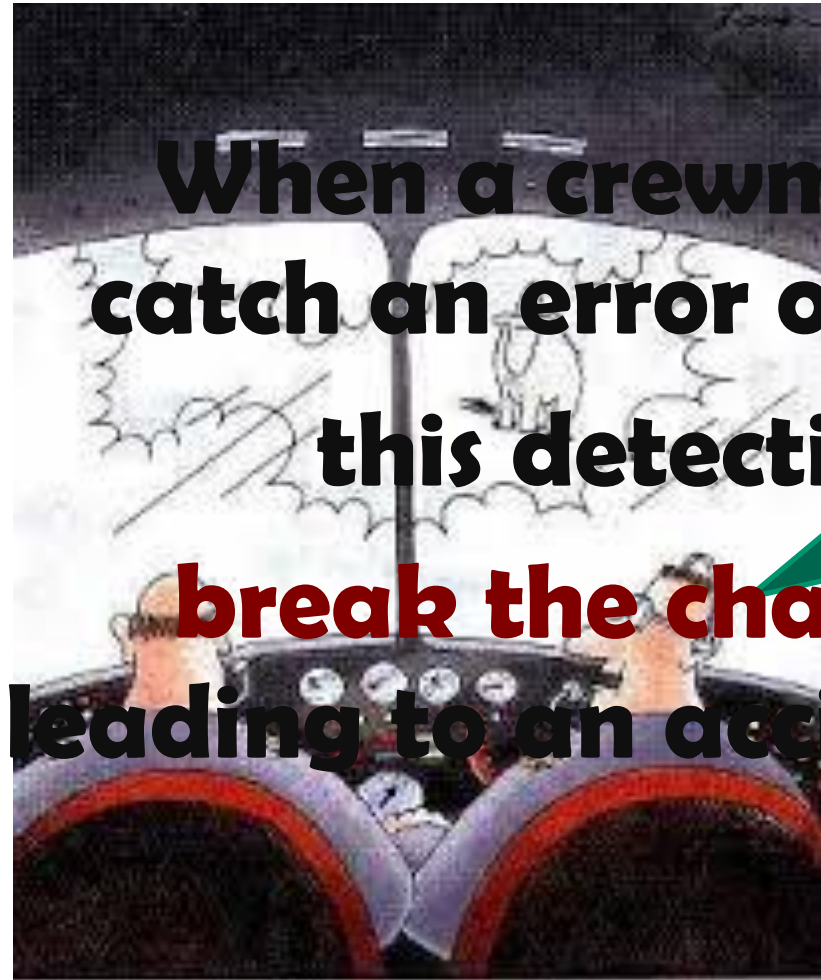
*It also includes **observation** of the other crew member and timely intervention in the event of deviation.*

The answer is:

Both of PF and PM have the responsibilities for monitoring.



# Why Monitoring



**When a crewmember can catch an error or unsafe act, this detection may break the chain of event leading to an accident scenario.**

mountain goat going way up here in a cloud bank?

# PF's Responsibility

- Flying the aircraft in accordance with the operational brief and

**monitoring the flight path.**



# PM's Responsibility

- PM will have
  - an explicit set of activities designated by SOPs
  - a specific and primary role to **monitor the aircraft's flight path, communications and the activities of PF.**

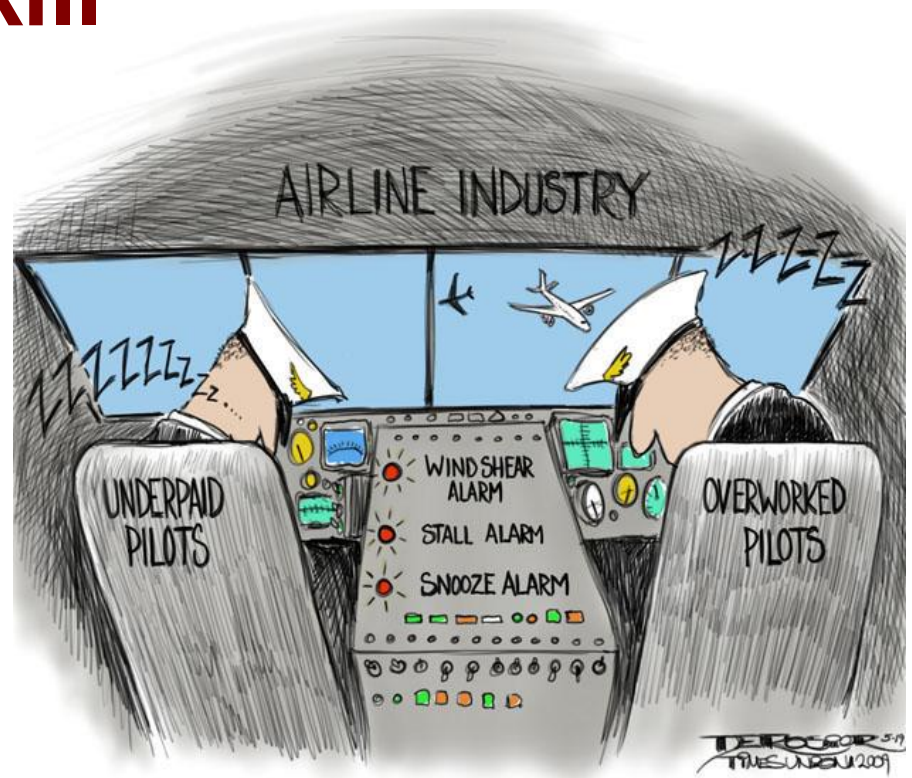


Which would be focused is

# Monitoring Skill

not

**PM position**



# Monitoring

## Improving Monitoring

“First, we must change our approach to monitoring”

“Good monitoring skills are not inherent in a pilot as they progress in their careers. Therefore, effective monitoring techniques must be trained and rewarded”.

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## “Watching” as Opposed to “Monitoring”

“Watching” is simply staring at the instrument displays without processing the information, trouble-shooting, or not keeping pace with the trajectory of the flight. Watching is in fact a form of ineffective monitoring.

# What Need to Be Monitored

- Crosschecking of system & action, such as
  - Aircraft trajectory
  - Automation systems and mode status (FMA)
  - Aircraft systems and/or components





# How to monitor ?

**“Fly, navigate, communicate” Golden Rule**

**PM job: Monitor right things at right timing**

# Whom Need to Be Monitored

Your team members !



# How to Monitor Team Members



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- **Observe** your team members

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- **Smell.** Be sure that your team member does not involve alcoholic problem
- **Listen to them** if they have any problem or stress.

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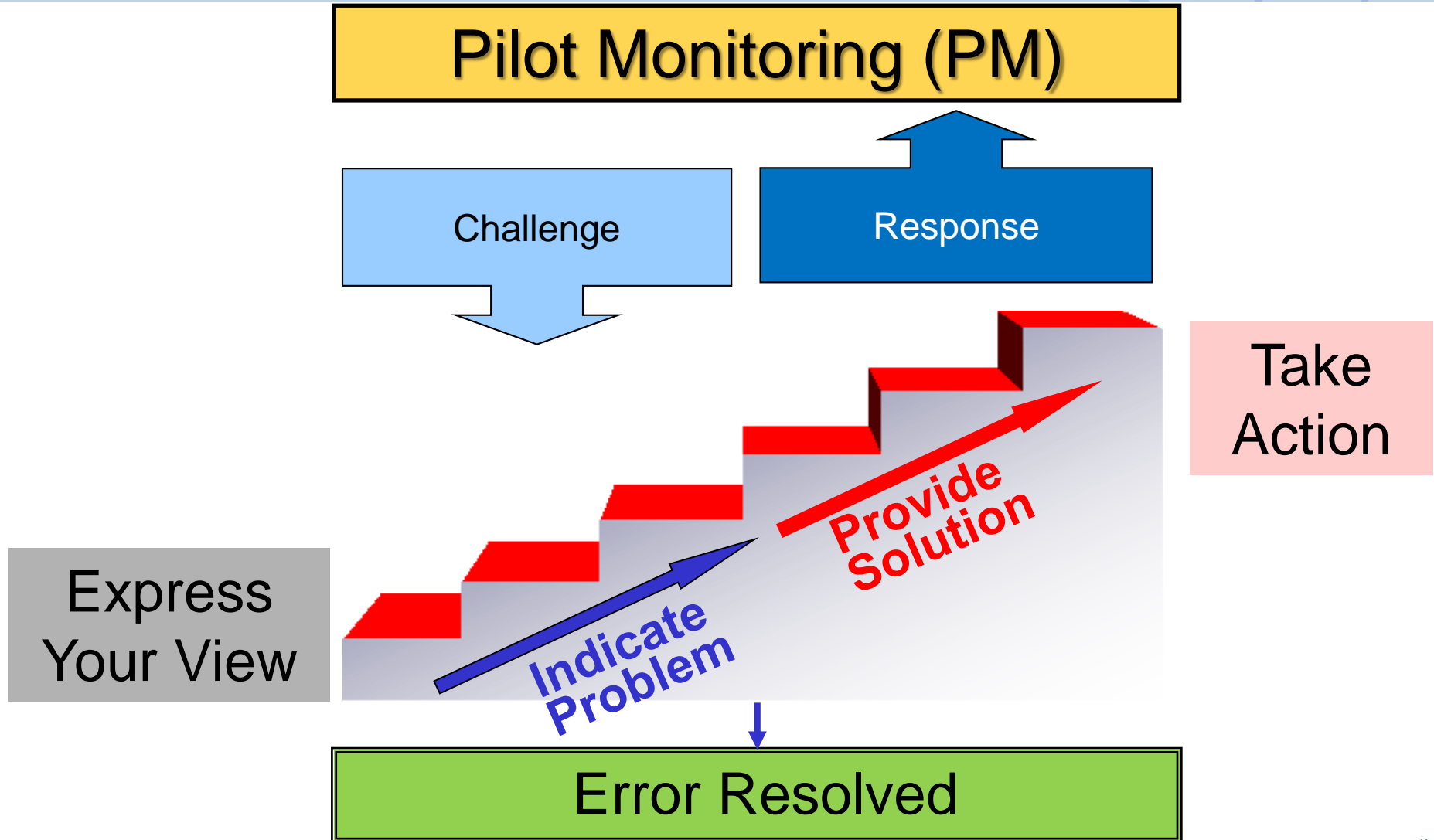
- **Ask them** if you feel that there are something wrong.

# Elements of Monitoring

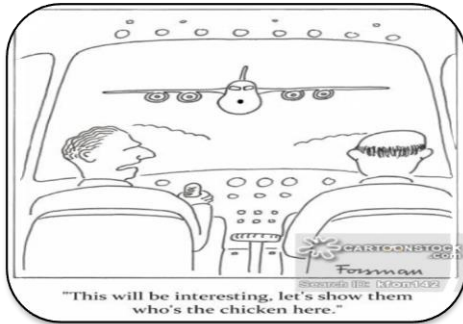
- Knowledge of aircraft and SOPs
- Vigilance
- Situation Awareness
- Shared mental model – Teamwork
  - Goal
  - Plan
  - Intent



# Monitoring and Challenge



# Barriers for Monitoring



**Ego**



**Complacency**



**New in the seat**



**Fatigue**



**Distraction**



**Interruption**

# Conclusion

- Monitoring is a vital skill for safety.
- Monitoring is the DNA of pilots' core competencies.
- Human is not good at monitoring.
- **Monitoring need to be trained.**



Calendar



Contacts



Notes



Videos



YouTube



iTunes



App Store



Settings



MyPad



Game Center



Maps



Pokemon Go



A330 PM TRNR



Safari



Mail



Photos



iPod

**Thank you !**