Pilot Monitoring Duty

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

Subject: STANDARD OPERATING PROCEDURES FOR FLIGHT DECK CREWMEMBERS

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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.
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

<table>
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<tr>
<th>Case Description</th>
<th>Date</th>
<th>Details</th>
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<tr>
<td>Kenya Airways Flight 431</td>
<td>January 30, 2000</td>
<td>Impacted ocean after takeoff from Félix Houphouët-Boigny International Airport, 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.</td>
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<tr>
<td>Air Philippines Flight 541</td>
<td>April 19, 2000</td>
<td>Crashed in Island Garden City of Samal, Davao del Norte, killing all 131 people on board. It is also currently the deadliest air disaster in the Philippines.</td>
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<tr>
<td>Gulf Air Flight 072</td>
<td>August 23, 2000</td>
<td>An Airbus A320 crashed in Persian Gulf, while approaching the Bahrain International Airport, killing all 143 people on board due to combination of pilot error (spatial disorientation) and systemic organizational factors.</td>
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<tr>
<td>Cossair Flight 3597</td>
<td>November 24, 2001</td>
<td>Flight from Berlin to Zurich that crashed during its landing approach, killing 24 people.</td>
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<td>Air China Flight 129</td>
<td>April 15, 2002</td>
<td>Crew failed to execute a timely missed approach.</td>
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<td>Kam Air Flight 904</td>
<td>February 3, 2005</td>
<td>No official cause has been determined, although the plane flew into the area's worst snowstorm in five years.</td>
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<tr>
<td>2005 Loganair Islander accident</td>
<td>March 15, 2005</td>
<td>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.</td>
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<tr>
<td>2006 Slovak Air Force Antonov An-24 crash</td>
<td>January 19, 2006</td>
<td>Aircraft strayed from the planned course and descended below the MDA prior to impact.</td>
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<tr>
<td>Arnavia Flight 967</td>
<td>May 3, 2006</td>
<td>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.</td>
</tr>
<tr>
<td>Allegjet Flight 4203</td>
<td>November 30, 2007</td>
<td>While no official cause could be determined, investigators have theorized that the pilot suffered spatial disorientation before impact with a mountain.</td>
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<tr>
<td>Santa Barbara Airlines Flight 518</td>
<td>February 21, 2008</td>
<td>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.</td>
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<tr>
<td>2010 Polish Air Force Tu-154 crash</td>
<td>April 10, 2010</td>
<td>Polish president Lech Kaczyński was among those killed in the crash.</td>
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<tr>
<td>AirBlue Flight 202</td>
<td>July 28, 2010</td>
<td>Crashed into the Margalla Hills Islamabad due to Bad Weather. All 152 passengers including 6 crew members were killed in the board.</td>
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<tr>
<td>First Air Flight 6660</td>
<td>August 20, 2011</td>
<td>An internal Canadian charter flight from Yellowknife Airport, Northwest Territories, to Resolute Bay Airport, Nunavut that crashed approximately 2 km (1.2 mi) east of the Resolute Bay, Airport runway, in poor weather attempting a go-around after a failed ILS landing. 12 of the 15 people on board were killed.</td>
</tr>
<tr>
<td>Royal Norwegian Air Force C-130J</td>
<td>March 15, 2012</td>
<td>Crashed into Kätevik, Sweden en route to Kiruna Airport, killing the 5 officers on board. C-130J-30 ‘Siv’.</td>
</tr>
<tr>
<td>Bhoja Air Flight 213</td>
<td>April 20, 2012</td>
<td>Microburst 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 Rawalpindi, Islamabad, Pakistan.</td>
</tr>
<tr>
<td>Mount Salak Sukhoi Superjet 100 crash</td>
<td>May 9, 2012</td>
<td>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.</td>
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What / How to monitor

Is human kind good at monitoring?
What / How to monitor
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 DNA
Airbus’ Survey

Question – Does your airline specifically train monitoring?

Answer 1 for YES 57%
2 for NO 38%
3 for I do not know 5%

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.
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
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”.

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

- **Observe** your team members

- **Smell.** Be sure that your team member does not involve alcoholic problem

- **Listen to them** if they have any problem or stress.

- **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

Pilot Monitoring (PM)

Challenge

Response

Take Action

Express Your View

Indicate Problem

Provide Solution

Error Resolved
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.
Thank you !