

Most accident investigation reports are oriented towards the actions/inaction, errors/mistakes of the pilot flying or the Captain if he is flying. The crucial role of the supporting crew or the other pilot in the cockpit who is monitoring the flight progress (PM) is not examined so critically. The PM might have the powers to save the day when things don't go as planned.

The co-pilot of the ill-fated FlyDubai B-737 did perform his job(considering his experience)as the pilot monitoring when he gave vital inputs to the Captain for maintaining the reference pitch angle during the second go-around. Unfortunately, the inputs were not enough to prevent the accident.

Research published by the BEA (French accident investigation agency) states that **“Key finding relating to Pilot Monitoring: The survey indicates that many pilot monitoring (PM’s) do not know where and when to look during a go-around.”**

In the Rostov accident, the PM knew where to look at, the PITCH but did not monitor the STAB TRIM and the engine THRUST. What if he had monitored?

What could the PM have done in addition to calling the pitch angle required to be maintained? Do airlines have a “practical” policy which clearly delineates the PM function especially during a go-around? Lets examine the industry recommendations.

Airline	Place of accident	Pitch down	Trim/Thrust	Speed
Ethiopian	Beirut	63 deg	Nose DN/High	407 kts
Lion Air	Jakarta	45 deg	Nose DN/High	450kts
Tatarstan	Kazan	75deg	Nose DN/High	391kts
Ethiopian	Addis Ababa	45deg	Nose DN/High	458kts
Fly Dubai	Rostov	50deg	Nose DN/High	340kts

IATA guidance material for improving flight crew monitoring

DEFINITION

Monitoring is an overarching process requiring knowledge, skills and attitudes that enables flight crews to perform safely, effectively and efficiently. Monitoring includes the process of observing and creating a mental model, by seeking out available information to compare actual and expected aircraft state.

SCOPE OF MONITORING

Monitoring is not done in isolation; **it must be performed concurrently while performing other required tasks**, including operating aircraft controls, making data entries and communicating with others. “Good monitoring relies upon effective task management and making time for monitoring”.

The primary job of the flight crew is the flight path management, including managing the energy state of the aircraft at all times.

Secondly, **the flight crew is also required to monitor all operational tasks not directly related to the flight path**. These include monitoring of aircraft systems, destination and en-route weather, operational factors, observing other flight crew members, cabin crew, dispatcher functions, etc.

Monitoring requires a **combination of cognitive resource allocation such as attention, and a link to previously acquired knowledges** (scripts and scenarios), which allow a pilot to detect, understand, project into the future, and then take the right decision/action.

EXAMPLE OF MONITORING

Takeoff, Climb, Descent and Landing

During these phases of the flight, workload is high. The flight crew should focus all their attention to flight path monitoring. The flight crew should delay actioning any task that is not related to the flight path. If the task is a time critical one, then the distribution of workload is very important before one of the flight crew members performs the assigned task. For example, if a technical malfunction is detected by the aircraft systems or by the flight crew, performing the abnormal checklist will be the responsibility of the Pilot Monitoring.

Air France Monitoring Policy

This portion of an operator's monitoring policy puts emphasis on task and workload management, monitoring vs phase of flight, and introduces intervention strategy.

Monitoring

Monitoring is a mental process which consists of keeping watch (observe) and understanding all the elements related to the flight path, the airplane systems, the operational context and the crew.

PF duties	PM duties
<ul style="list-style-type: none">• The PF primary task is to fly, to keep control and monitor the flight path and the navigation in compliance with SOPs• The secondary PF task is to monitor the actions non directly related to flight path (ATC communications, C/L completion, aircraft system check, other operational duties)	<ul style="list-style-type: none">• The PM primary task is to monitor the flight path and the navigation. In case of deviation the PM shall immediately inform the PF and intervene if necessary.• The secondary PM task is to accomplish the actions non directly related to flight path (ATC communications, C/L completion, aircraft system check, other operational duties)

The pilots must manage disturbance in order to always secure primary task completion.

As the mental resources are limited, the pilots must manage workload to allow efficient monitoring.

The pilots use all their competencies in order to anticipate and intervene, if necessary, in the event of deviation between the action planned and the observed situation.

Extract from the IATA document giving an example of a policy

While all the text above is good for a read, practically do you get a clear guidance of what to do and where to look especially in a tightly coupled high stress situation?

Research on how did the crew manage Go-Around Execution during the experiment?

FRÉDÉRIC DEHAIS, JULIA BEHREND, VSEVOLOD PEYSAKHOVICH, MICKAËL CAUSSE &

CHRISTOPHER D. WICKENS (2017) PILOT FLYING AND PILOT MONITORING'S AIRCRAFT STATE AWARENESS DURING GO-AROUND EXECUTION IN AVIATION: A BEHAVIORAL AND EYE TRACKING STUDY, THE INTERNATIONAL JOURNAL OF AEROSPACE PSYCHOLOGY, 27:1-2, 15-28

The analysis of pilot performance revealed that all flight crews managed to stabilize the aircraft in accordance with ATC clearances. However, debriefing results indicated that the **execution of the maneuver was particularly demanding**. During the debriefing session, all PMs—except one—highlighted the complexity of the procedure and reported difficulties. In particular, they felt **overwhelmed by the PF's callouts, ATC particular instructions, and the numerous actions to be performed during a short period of time**. As stated by one pilot, **"The diverse nature of the tasks and the speed at which they must be performed generate stress, notably when the startle effect is also included in the situation. Since stress reduces our ability to cope with complex actions, performance levels drop during go-arounds."**

The eye-tracking measurements emphasized the essential role of the PM in the detection of flight-parameter deviations. The PM's numerous tasks (e.g., interaction with ATC, FCU settings, and flaps management) can leave this pilot ill equipped to face the sudden onsets of these actions and to monitor the flight path in the meantime.

mindFly analysis

The crew gets so overwhelmed by a go-around or an unexpected situation that their instrument scanning pattern changes and becomes even more unpredictable. What would happen if there is a failure coupled with the situation.

There is no clear cut precise guidance or task sharing for the pilot monitoring. The PM is expected to shadow fly the pilot flying (PF) in addition to own task sharing and the ability to read the PF's mind in order to form the perfect mental image of the scenario.

The PM is mostly heads down and the range of tasks involve monitoring instruments, review documents, communicate with ATC, perform actions relating to checklists (normal/abnormal) and on top of it keep a check on the physiological/psychological state of the PF/Captain. Considering the low experience and age of an average copilot, isn't this the job of a super hero?

[Flight Safety Foundation guide to Flight Path Monitoring](#)

[Study reveals serious deficiencies in instrument scan by Pilot Monitoring](#)

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