

# ISASI 2013 Paper of Thomas Fakoussa, Germany

*Thomas Fakoussa was born in Egypt and grew up in Germany where he started flying at the age of 17. He is instructor pilot, ex LH captain on B737, studies psychology all his life and is now a consultant for more efficient brain training and therefore achieves more safety awareness.*

## **Title: INVESTIGATING ACCIDENTS , BUT HOW TO PREVENT THE NEXT?**

**Subtitle: Will accident investigation in the future address the root cause of human behaviour (from Air Florida, Birgin Air to AF 447)?**

Accident investigation in the past was concentrating on technical aspects. By investigating deeper and deeper into the technical process, more and more weak points were discovered, corrected and/ or improved. Thus aviation became the safest means of transportation and accident investigators' saved thousands of lives.

With the improvement of the technical side, the human error became more evident, more outstanding. But not being specialised in human factors the outcome of the investigation does not address the real cause in the case of human error and ends with "lack of situational awareness". Sometimes there are political reasons behind that or the understandable desire to spare the people involved the loss of their face. But is that a mean of preventing the next similar accident?

As long as we see the wrong reaction in similar situations (stall, unknown , undetected) there must be an underlying base, that these situations have in common. Lack of situational awareness is NOT the answer to it!

"A generally used and scientific definition of SA is:

**perception** of the elements in the environment within a volume of time and space, the  
**comprehension** of their meanings and the  
**projections** of their status in the near future" Mica Endsley, 2000

What we miss completely in that definition is the internal state of mind of the pilots. The knowledge of what the brain does in these situations offers also the solution for the future of accident investigation. The basic problem becomes clear, if we start from the statement:

" A pilot can only react correctly to situations trained to react correctly!"

This means that every time accidents happen, the pilots were not trained for that situation. Logic would than require that pilots are being trained for all possible situations they might encounter. To achieve this is not realistic.

So we have to concentrate on how to train pilots to react to new and untrained situations. And that should be stressed in the accident report. There are no single persons to be blamed, but the worldwide training system of pilots is at fault. The change in mental perception and mental data processing is not taken into account at all. And according to the Swiss Cheese model of James Reason this starts with ICAO, FAA and EASA and continues on the level of national regulators, flight instructors and type rating instructors.

There are no rules and guidelines about how to train a pilot in a modern cockpit compared to an old fashioned cockpit. There is not a single rule or even an idea about how to train (situational) awareness.

Let us answer the question:

How does a human brain react to new unfamiliar and unexpected situations?

I claim, that the Human Brain needs a balance of feelings and rationality to be able to operate on the basis of conscious behaviour.

Did Air Florida, Birgin Air and AF447 show that conscious behaviour? Does that explain WHY the loss of consciousness took place? – NO, and therefore it will happen again!! Safety investigation means to stop this development of non rational reactions of pilots. That requires the accident investigator to stress that point called “pilots training”!

Training worldwide misses the point of what is situational awareness and how can it be trained. First we need to understand that SA is only one of many awareness's.

In the case of the Air Florida stall, the missing awareness is BODY awareness. If my arm reaches just 60% of the normal stretch out for take off power and I am NOT aware of that, who trained body awareness?

Birgin Air got into a stall because over-speed and stall warning came up nearly at the same time. Is this a normal and known situation for our brain? No – and therefore it switches into stress mode. This requires the body to direct all energy to the muscles and to withdraw it from the brain. Were the pilots trained for NOT getting into stress mode? How do you recognise that you or your colleague is getting into it and how can you prevent it? Safety investigation would require a few words about that status, accident investigation calls it “loss of ....” and gives no reason. Therefore pilots training remains traditional (and thus wrong).

Air France 447 shows the combination of lack of body awareness and lack of control of my own mental stress reaction. In addition, due to the verbal difference between the Captain and the Senior FO in trying to trigger the correct reaction on the side of the FO, the FO on the controls got into logical confusion mode. That means no more rational behaviour can be activated.

But basically none of the 3 pilots actually consciously discovered the hint on the artificial horizon. This effect is called “risky shift”. A group of people decides differently than a single person of this group would do.

Any way it is irrational decision making, due to lack of training of awareness’s!

If the accident investigation would point out **CLEARLY any deficiencies in pilots training (why did he lose control over himself and thereafter over his airplane?) and continue to dig deeper into flight instructors and type rating instructor’s role** in any accident / incident, it would possibly wake the regulators and the pilots up.

The basic training of pilots is historically grown, mainly based on manual skills, and has good and bad parts. But if it’s now mainly human error, we need to prepare the next generation of accident investigators for and improve their knowledge in the field of human factors.