

How fatigue and authority gradient on the flight deck can cause disaster,
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SLEEPWALKING



Early Morning in IMC

It had been a short night of only four hours sleep for the captain. After an early wake-up and transfer to the airport, the co-pilot could get only a little more sleep.

On November 22nd, 2004, N85VT, a Gulfstream G-1159A (GIII) was approaching the runway 04 at William P. Hobby Airport (HOU), Houston, Texas. The aircraft had been cleared for an ILS approach to the runway 04.

It was early in the morning and according to the ATIS information 'Quebec,' the wind was calm; the visibility was 1/8 statute mile in fog; the runway visual range (RVR) for runway 4 was variable between 1,600 and 2,400 ft; the clouds were broken at 100 ft and overcast at 9,000 ft.

It was still dark and the crew were in IMC. They were on a radar heading to intercept the ILS and were cleared for approach. "I can't get the approach mode on my thing," the captain said. The co-pilot replied that he could not get the approach mode either. Despite not being able to arm the approach mode on their flight guidance system, the captain turned inbound and started the descent saying, "just gonna have to do it this way."

The co-pilot stated: "Okay, we are high on the glideslope now." At this time, the aircraft was well below the glideslope. Neither of the pilots had a glideslope indication on their instruments and it is probable that the co-pilot was mistaking the fast-slow speed indication for the glideslope indication. Shortly after, the co-pilot said: "You're on the glideslope now." However, the aircraft was in fact 700 ft below the glideslope.

Recognizing the Mistake

Suddenly, at 1,000 ft AGL, the co-pilot realized the mistake. The ILS frequencies had been pre-selected, but not activated. He proceeded to activate the ILS on both navigation sets. This startled the captain, who asked "What happened? Did you change my frequency?" At this point, the aircraft was at an altitude of 900 ft and 800 ft below the glide slope.

After the co-pilot explained that the ILS is now active, he repeated twice: "You're all squared away now." The captain replied: "I don't know if I can get back on it in time." The captain turned to intercept the localizer while continuing the descent with a full 'fly-up' deflection of the glideslope. As the co-pilot announced that they are approaching the minimum, the aircraft struck a light pole and crashed. All the occupants on board perished.

All Warnings Go Unnoticed

Despite multiple 'non-normal' indications during the approach, the crew did not react to them and continued the approach into the ground. Neither of the pilots could identify the urgency of the situation and the imminent danger to the safety of the flight.

When the co-pilot finally noticed the mistake in setting the ILS frequency, he did not inform the captain; but simply switched the frequencies, which startled the captain. Realizing that they had not been tracking the ILS signal when well below 1,000 ft AGL in IMC should have resulted in an immediate go-around.

Both pilots were highly experienced and well respected within the flight ops department. 'Out-of-character' behavior could be caused by a lack of rest. The early reporting time for this positioning flight from Dallas to Houston gave both of them a very short night's rest.

The situational awareness of both pilots at this point was lacking completely. Neither of them called for a go-around; and instead they reassured each other that they would be fine by continuing with what they were doing. Is this surprising at all? Probably not. Many pilots might have been exposed to the invisible

TIMING

A substantial number of the fatal night IFR accidents occur while the pilot is flying an ILS approach.

SAFETY SENSE

gorilla experiment during their CRM courses. A person focusing on a task simply does not 'see' the gorilla standing in front of him or her. Have a look at <http://www.theinvisiblegorilla.com>.

the invisible gorilla



Mitigating

Standard Operating Procedures (SOPs) are designed to prevent unsafe conditions. They depend on the flight crew adhering to them to be successful. If SOPs are not designed in such a way that they actually take into consideration human factors, then unsafe conditions can materialize and go unnoticed until it is too late.

Multiple basic SOPs were not followed during this approach: The ILS was not set and identified; the approach mode was not armed; the descent was commenced without a glideslope indication.

Leadership

The authority gradient on the flight deck of N85VT also contributed to the lack of leadership and decision-making. The captain was 67 and had accumulated 19,000 flight hours. He had also been the chief pilot of the company for four years until July 2004. The co-pilot was 62 and had about 19,100 flight hours. He had taken over as chief pilot in July 2004 and held this position until the day of the accident.

The high level of experience of both pilots and their similar rank and status within the company meant that there was no clear leader on the flight deck.

Although the captain and the co-pilot were designated as such and

the captain was the pilot flying, the co-pilot took decisions and made changes to the aircraft configuration and navigation settings which did not reflect his role as co-pilot.



The roles and responsibilities between the two pilots became blurred. In the end, there was no leader when it came to making a 'difficult' decision such as initiating a go-around.

The high level of experience might actually have inhibited the realization of the severity of the situation. Each pilot trusted that the other pilot knew what was going on, and hence each pilot felt confident that the other one had the situation under control. The professional calmness on the flight deck covered up the fact that neither of the pilots was aware of the dangerous situation they were in.

The co-pilot's repeated remarks of "You're all squared away now" increased the false sense of control and safety. The respect for the experience of the other pilot led to complacency and prevented the crew from realizing the dangerous situation they were in.

Sleepwalking

The flight crew's behavior is similar to that of sleepwalkers. They were, of course, awake; but still they performed as if in a dream, which turned into a nightmare at the end. Their reaction time was slow. The pilots were not mindful and did not have sufficient cognitive capacity to appre-

ciate the perception of the clues for non-standard display readings. Performance of essential tasks was imprecise and hesitant. It is as if they wanted to perform an ILS on a trial and error basis.

Communication, leadership, teamwork, situation awareness, workload management, problem solving, decision making, monitoring, crosschecking, task sharing, briefing and flight management are the subjects taught in Crew Resource Management (CRM) training.

This accident unfortunately demonstrates how CRM can fail even with a very experienced and expert crew.

Maybe the fact that the crew was positioning to HOU to pick up a former US president increased the patriotic spirit, but this did not help improve their airmanship.



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OVERSIGHT

'The Invisible Gorilla' experiment reveals how obvious things can go unnoticed when concentrated.