Situational Awareness
Assertiveness
Decision Making
Leadership
Communication
Adaptability/Flexibility
Mission Analysis

CRM Contacts:

LCdr. Scott Stroble, OPNAV N789F3
CRM Program Mgr.
stroble.scott@hq.navy.mil, DSN 664-7721

CRM Model Mgr., Pensacola, Fla.
www.act.navy.mil, DSN 922-2088

LCdr. Mke Reddix, Naval Safety Center
mreddix@safetycenter.navy.mil
(757) 444-3520, Ext. 7231 (DSN 564)

Cdr. Buzz Bauers, Naval Safety Center
wbauers@safetycenter.navy.mil
(757) 444-3520, Ext. 7210 (DSN 564)

Ever Had

By Lt. Tracy Maini

It was late summer 1996 when I arrived at VT-28, eager and ready to start my career as a Navy pilot. As I learned my way around the squadron and met with instructors, I had an enlightening conversation with the XO. We spoke of his career as a LAMPS pilot, and of my desire to also fly helicopters. He described the joys and horrors of flying these strange, yet wonderful machines. He also spoke of his experience with vertigo, and of the times I surely would experience it in the years to come. I didn't forget this conversation.

As I progressed through the training command, the FRS, and into my first fleet squadron, I experienced the vertigo the XO had warned me about. A brief case of the leans during my first IMC flight in T-34s. Having to relinquish the controls to a senior pilot on my first moonless-night takeoff from a frigate. Talking my H2P out of an extremis situation less than a half-mile

Vertigo?

If Not, Just Wait

astern of the ship as a young HAC. I learned to recognize and overcome vertigo–or so I thought.

It was my HAC cruise, and we had finished the first port call after our transLant. We did not intend to fly on the day we left port, and none of the crews had rested. However, at 2000, the request came to launch on an SSC mission. My crew was next in the chute, and despite our weariness from our recent liberty, we prepared to fly. Our 2200 brief got pushed back until midnight, for a 0200 launch. I began to feel hesitant about the flight, knowing my exhaustion was equaled by that of my two crewmates. Arrogance, however, prevailed over reason, and I pressed forward.

During our ORM and NATOPS brief, we acknowledged our lack of crew rest rendered the mission a high risk. We agreed that, by using CRM, we could handle the flight. Disorganization and some problems with start made us late getting off the deck. Despite the lack of visible horizon, I decided to expedite getting airborne; we would take off unaided and goggle-up later while in flight. That decision turned out to be one of my worst.

Winds dictated that I, the left-seat pilot, would take off. As I turned away from the well-lit flight deck and pulled power, my head started to spin, like after a night of hard drinking. The lessons I had learned about vertigo came to the forefront, and I told myself to conquer this bout, too. I brief to always admit vertigo.

As I started to climbout I said, "Be with me on the controls." The H2P seemed unresponsive. "Crap," I thought, "when this happened on my last cruise, the HAC took over and saved the day. Who is going to save the day now?" I started to get scared as I kept losing the battle with the spins.

"I need you to take the controls," I said anxiously to my copilot. As I felt him take the aircraft and saw the altimeter reach 700 feet, a minor, though welcome, sense of calm came over me. My head, however, continued to spin, convincing me the instruments must be wrong.

It was a moonless night, and worse, I looked down and couldn't see lights. "I think we are in the goo," I cursed. I called for pitot heat and checked the OAT. I saw the gyro indicate straight and level, despite my inner ear telling me we were in a turn. I started talking to my OinC, who was in the LSO shack, and I described the situation and asked him to keep a green deck for me. There was concern in his voice as he realized the gravity of my situation. I cross-scanned my copilot's AI and realized mine was definitely caged off…or was it? "Which one is right?" I thought, still spinning and still worried. Using a partial-panel scan, I saw we were straight and level. But my head still spun, and I was scared. I started adjusting my gyro to match my copilot's. I tried switching to alternate on the gyro (to make it a mere repeater of the pilots) and the darn thing flipped sideways and upside down. "Well, that isn't working right," I murmured, and went back to norm and fidgeted with it some more.

So there we were, flying straight and level, while both my head and my gyro told me something very different. The LSO recommended we put on the goggles to see if we could see the horizon. I told him and the crew I was too damn scared to turn away from the gauges and controls to put on the NVGs. "Fellas, we need to bring it

back," I said to the other two guys in my crew.

The flight now had lasted almost 15 minutes, and my head still was swirling. It was dizziness, mixed with the leans, coupled with a gyro in which I had little confidence. I felt about 95 percent sure we were going to fly the bird into the water that night, head spinning all the way. I tried to back up the H2P on the approach to the ship, but I was close to being worthless. The H2P and the AW worked as a team on the approach and brought us home alive that night. All I could say once we got on deck was, "Thanks, guys." I sat in the helo for a while to calm down. I still was shaking when I went to type the NAVFLIR.

What had happened out there? I couldn't explain it. My head, my inner ear, the fog, the gyro…what was to blame for the 15 minutes of pure terror I had spent in the sky? I thought that I, more than anyone, would always be able to fight and conquer vertigo. But vertigo is always out there, especially on the dark nights, waiting for you to succumb to it. That night, I was on the losing side.

Lt. Maini flies with HSL-48.

A Note from the Aeromedical Division

Lt. Maini has provided us with a terrific story describing spatial disorientation in detail. The physiological event described in the article is actually a vestibular illusion, most likely the somatogyral illusion, not vertigo. Vertigo is a medical condition caused by an abnormality in the vestibular system. This illusion is the result of a misperception of the magnitude and direction of rotation due to stimulation of the sensors in the semicircular canals of the middle ear.

We orient ourselves in space using visual cues, with additional information provided by position sensors in our limbs and skin, as well as inputs from the middle ear. Our peripheral vision supplies the visual cues. When you can't see the horizon these inputs are reduced greatly.

Lt. Maini not only had a total lack of peripheral visual clues, but also experienced a false sense of rotation caused by a normal pedal turn as the aircraft departed the ship. NATOPS calls for the aircraft to climb into a stable hover, then to pedal-turn 45 degrees before climbing from the ship. The aircraft can safely turn up to 30 degrees per second, greatly exceeding the 2-degree-per-second rate required to start fluid movement in the middle ear. Once the turn stops, the fluid may continue to move, causing a spinning sensation. If you add an accelerating climb away from the ship, the otolith in the middle ear is stimulated and may provide additional complex inputs to the brain to further disorient the aviator.

Lt. Maini's experience with spatial disorientation is common and was handled competently. Though spatially disoriented, this naval aviator went back to the basics by recognizing the problem, troubleshooting the event, and using crew coordination to return to the ship.

A note for the flight surgeons and physiologists who read this: Spatial disorientation is a normal physiological event that is a significant aviation hazard. Remember to annually brief all our aviators on the subject. This story could be a good teaching tool on how to handle the events.

Cdr. Rick Erickson, MSC
Naval Safety Center
Aviation Physiologist
Email: rerickson@safetycenter.navy.mil
Cdr. Nicholas L. Webster, MD, MPH
Naval Safety Center
Staff Flight Surgeon
Email: nwebster@safetycenter.navy.mil