



Air Safety Institute Safety Alert

Two tragic accidents that occurred within a week of each other, one Aug. 30 and the other Sept. 5, involved pilot incapacitation at high altitudes. While it's impossible to say for certain that hypoxia was the primary cause, the flight profiles and reports from the military pilots who intercepted the aircraft point toward this as a possibility. As a quick reminder, here are some of the typical symptoms of hypoxia:

- Cyanosis (blue fingernails and lips)
- Headache
- Hot flashes or a feeling of warmth
- Decreased cognitive abilities
- Impaired judgment
- Euphoria
- Visual impairment, reduced visual acuity
- Tunnel vision
- Drowsiness
- Lightheadedness or dizzy sensation
- Tingling in fingers and toes
- Numbness

Even though these are the most common symptoms of hypoxia, each pilot's physiological responses are unique. With the insidious nature of hypoxia and the resulting loss of cognitive abilities, it quickly becomes difficult to recognize the symptoms in time to take prompt action and mitigate the risks of becoming incapacitated while flying.

The good news is that general aviation pilots have a powerful, low-cost tool available to them to help avoid succumbing to the effects of hypoxia. A **pulse oximeter** is the best defense against hypoxia and can be purchased from a variety of aviation vendors or any drug store.

When flying an unpressurized aircraft pilots should check their oxygen saturation levels regularly (about every 10 to 15 minutes). In a pressurized aircraft, the first step should be using supplemental oxygen if hypoxia or cabin pressurization problems are suspected. Once on supplemental oxygen, pilots can use a pulse oximeter to monitor their oxygen saturation levels. In either case, cabin pressurization problems and hypoxia are serious emergencies. Communicating this to ATC and the use of supplemental oxygen, if available, are imperative.

It is also important to remember that each pilot's ability to maintain adequate oxygen levels will be slightly different based on a variety of health and lifestyle factors. In general, if the pulse oximeter shows 90 percent or above blood oxygen saturation, the pilot's brain should be receiving enough oxygen to function normally. Below 90 percent, mental function begins to deteriorate, and the pilot should use supplemental oxygen or descend to a lower altitude until oxygen saturation levels increase back to normal.

Bottom line: If you fly regularly above 10,000 feet msl, a pulse oximeter should be part of your pilot equipment, and you should check your oxygen saturation levels regularly during the flight. If you'd like to read more about hypoxia, below are links that go into greater detail.

<http://www.aopa.org/Pilot-Resources/Safety-and-Technique/Operations/High-Altitude-Flying.aspx>

http://www.faa.gov/regulations_policies/handbooks_manuals/aviation/pilot_handbook/media/PHAK%20-%20Chapter%2016.pdf

<http://blog.aopa.org/leadingedge/?p=2169>