

PRIVATE PILOT GROUND SCHOOL

MODULE 1-8 — UNUSUAL ATTITUDES AND SPATIAL DISORIENTATION

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FACTS TO REMEMBER

KNOW THESE COLD

- Spatial disorientation is the body's motion sensors disagreeing with reality; without a visible horizon, the inner ear cannot be trusted at all.

Source: PHAK ch. 17; AIM 8-1-5

- The body senses attitude three ways — vision, inner-ear vestibular organs, and muscle/seat pressure — and in clouds or darkness the last two lie.

Source: PHAK ch. 17

- The leans: after a slow, unnoticed bank is corrected, the body swears the airplane is now banked the other way — the most common disorientation illusion.

Source: PHAK ch. 17; AIM 8-1-5

- The graveyard spiral: in a prolonged banked descent the turn sensation fades; pulling up without leveling the wings only tightens the spiral.

Source: PHAK ch. 17

- The Coriolis illusion: moving the head sharply during a prolonged turn tumbles the inner ear — keep the head still on instruments, move the eyes instead.

Source: PHAK ch. 17

- The somatogravic illusion: rapid acceleration feels like pitching up (and deceleration like pitching down) — the killer version is pushing over after a night or IMC takeoff.

Source: PHAK ch. 17; AIM 8-1-5

- Recovery from disorientation is procedural, not sensory: get on the instruments, believe them, and fly them until the conflict passes.

Source: PHAK ch. 17; IFH ch. 6

- A runway that is narrower or wider than usual, or that slopes, moves the visual approach: narrow or upsloping runways make you feel high (and fly a dangerously low approach).

Source: PHAK ch. 17; AIM 8-1-5

- The black-hole approach: a featureless dark area short of the runway invites a long, low descent into terrain — fly the glidepath aids, not the picture.

Source: PHAK ch. 17

- False horizons: sloping cloud decks, lit shorelines, or star/ground light blends get mistaken for level — cross-check the attitude indicator.

Source: PHAK ch. 17

- Hypoxia is oxygen starvation of the brain; its cruelty is that the first symptom is often euphoria and impaired judgment — the victim feels fine.

Source: PHAK ch. 17; AIM 8-1-2

- Hypoxia response: oxygen on if available, descend, and treat night vision as already degraded above roughly 5,000 ft cabin altitude.

Source: PHAK ch. 17; AIM 8-1-2

- Hyperventilation — over-breathing from stress — produces symptoms that mimic hypoxia (tingling, lightheadedness); the fix is consciously slowing the breathing.

Source: PHAK ch. 17; AIM 8-1-3

- Ear and sinus blocks come from pressure changes with a cold or congestion; they hurt worst on descent, are cleared by yawning, swallowing, or Valsalva — and the real answer is not flying congested.

Source: PHAK ch. 17; AIM 8-1-2

- Motion sickness: eyes on the horizon, cool air, gentle maneuvers, and land if it progresses — airsick pilots fly badly, and airsick passengers distract pilots.

Source: PHAK ch. 17; AIM 8-1-9

- Carbon monoxide reaches the cabin through a cracked exhaust and the heater shroud; it is odorless, and its headache/drowsiness builds slowly.

Source: PHAK ch. 17; AIM 8-1-4

- CO response: heat off, vents and windows open, land as soon as practicable, oxygen if available.

Source: AIM 8-1-4; PHAK ch. 17

- Stress: acute stress narrows attention and chronic stress erodes it; the margin is built on the ground — the IMSAFE S is a real gate, not a formality.

Source: PHAK ch. 17

- Fatigue comes in acute (one bad night — fixed by sleep) and chronic (weeks of deficit — not fixed by one night) forms, and it degrades judgment before it degrades stick skills.

Source: PHAK ch. 17

- Dehydration and skipped meals degrade performance at altitude faster than on the ground — carry water, eat before flying.

Source: PHAK ch. 17

- Hypothermia is a survival risk after any off-field landing even in mild seasons — which is why clothing for the terrain, not the cabin, is part of preflight (gear list lives in 1-9).

Source: PHAK ch. 17

- After scuba diving, wait 12 hours before flying up to 8,000 ft cabin altitude (24 hours if the diving required decompression stops), and 24 hours before flying above 8,000 ft.

Source: AIM 8-1-2

- The alcohol rule: no flying within 8 hours of any alcohol, with 0.04 blood alcohol or any degree of impairment grounding you regardless of the clock.

Source: 14 CFR 91.17(a)

- Medications rule of thumb: no flying on any drug whose effects or underlying condition are disqualifying; for over-the-counter drugs, when in doubt, ask the AME — sedating antihistamines are the classic trap.

Source: 14 CFR 61.53; AIM 8-1-1

- Unusual attitudes are prevented by the same three controls that fix them: a working scan, a trimmed airplane, and refusing distraction at low altitude.

Source: IFH ch. 7; AFH ch. 3

- Nose-high recovery on instruments, in order: add power, lower the nose, level the wings, return to level flight.

Source: IFH ch. 7; AFH ch. 17

- Nose-low recovery on instruments, in order: power to idle, level the wings, THEN ease out of the dive — pulling first tightens the spiral and loads the wings.

Source: IFH ch. 7; AFH ch. 17

- Before recovering, read the attitude off the panel as a committee (attitude indicator confirmed by airspeed

trend, altimeter, VSI, turn coordinator) — recovering from the wrong attitude is how upsets kill.

Source: IFH ch. 7

- Inadvertent VFR into IMC is escaped by the numbers: believe the instruments, level the wings, begin a coordinated 180-degree level turn back to visual conditions, and climb only for terrain.

Source: AFH ch. 17; PHAK ch. 17

- VFR-into-IMC is among GA's most lethal scenarios; the survival move is made BEFORE entry — turning around while the ground is still visible.

Source: PHAK ch. 17; FAA-H-8083-2

- Lost in deteriorating conditions, the play is CONFESS early: tell ATC, accept help, declare an emergency if needed — assistance exists and using it is airmanship, not failure.

Source: AIM 6-1-1; PHAK ch. 17

- ATC radar can give vectors, position, and terrain-safe headings to a VFR pilot in trouble; flight following makes that help one transmission away.

Source: AIM 4-1-16; AIM ch. 4

- Basic instrument navigation help: track a heading, hold an altitude, and let the equipment (VOR/GPS taught in 2-2) or the controller do the geometry — the Phase 1 skill is flying the airplane while asking.

Source: IFH ch. 6

GOING DEEPER

- Autokinesis: a single static light stared at in the dark appears to move — scan, don't stare.

Source: PHAK ch. 17; AIM 8-1-5

- Haze makes lights and terrain look farther away (and rain on the windshield makes you feel high); flicker vertigo from prop-chopped light is rare but real.

Source: PHAK ch. 17; AIM 8-1-5

- The four hypoxia types: hypoxic (altitude — not enough O₂ pressure), hypemic (blood can't carry it — CO, anemia), stagnant (blood isn't moving — G-loads), histotoxic (cells can't use it — alcohol, cyanide).

Source: PHAK ch. 17

- The hypoxia-versus-hyperventilation differential: if oxygen is available and symptoms persist on it, suspect hyperventilation; when in doubt treat for both — O₂ on, breathe slow, descend.

Source: PHAK ch. 17; AIM 8-1-3

- Decongestant self-medication before flight trades an ear block for drowsiness and rebound congestion at altitude — check the medication, not just the symptom.

Source: PHAK ch. 17; AIM 8-1-1

- CO binds hemoglobin about 200 times more readily than oxygen — it is hypemic hypoxia, and it lingers for hours after exposure.

Source: PHAK ch. 17

- Eight hours is a floor, not a clearance: the AIM's guidance is 12 to 24 hours bottle-to-throttle, and a hangover is impairment even at 0.00.

Source: AIM 8-1-1; 14 CFR 91.17(a)(3)

- A crewmember must submit to blood-alcohol testing on a law enforcement request made under the rule, and no pilot may carry an obviously intoxicated person except in an emergency.

Source: 14 CFR 91.17(b), (c)

- FAA guidance after a new medication: wait at least five maximal dosing intervals before flying, so side effects show on the ground.

Source: FAA OTC medication guidance; AIM 8-1-1

- The autopilot (if installed) is a legitimate escape tool in IMC: wings-level mode buys thinking time — but it is monitored, not trusted.

Source: IFH ch. 7; AC 90-109A

THE REGULATIONS BEHIND THIS MODULE

14 CFR 91.17 — Alcohol or drugs

No person can act as a crewmember within 8 hours after drinking alcohol, while under the influence, with an alcohol concentration of 0.04 or greater, or while using any drug that affects the person's faculties contrary to safety. No pilot can carry a person who appears intoxicated except in an emergency, and a crewmember must submit to a blood or breath test on a lawful request.

Where it goes deeper: This module, in the alcohol and medication Leg. Module 1-1 introduced it as the A of IMSAFE.

14 CFR 61.53 — Prohibition on operations during medical deficiency

A pilot must not act as pilot in command while knowing of a medical condition, or taking a medication, that fails the standard for the medical certificate.

Where it goes deeper: Module 1-3 taught the rule in full. This module applies it to medications.