

# Night Operations

- Flying within the 30-min civil twilight – need anti-collision visible for 3SM.
- Eye takes around 30 min to adapt to darkness.
- Use red light to limit dark adaptation effects.
- To scan the sky, look left to right or vis-versa in 30° increments pausing no longer than 2-3 seconds. Overlap areas by 10°.
- Use off-center viewing (peripheral vision). Don't look directly at the object. Change the position of the peripheral view every few seconds.
- Stressors that can affect night-time viewing:
  - Cigarette smoking
  - Hypoglycemia and nutritional deficiencies. Lack of vitamin A can impair your vision (won't improve it)
- Visit the site during the day to get to know the lay of the land.
- Use VOs to help with risk factors.
- Lights on manned aircraft
  - On the left wing, you'll see a red light.
  - On the right wing, you'll see a green light.
  - On the rear of the aircraft, you'll see a white light.
  - At night, you'll also see anti-collision lighting in the form of a red or white strobe or a rotating beacon.
- How the eye works.
  - At the very front of the eyeball, light enters through the cornea. It travels through the lens and then falls on the retina.
  - In the retina, you have two types of light-sensitive cells (rods and cones).
    - Cones are responsible for color vision. The main location of cones is in the center of the eye in the macula.
    - Rods are responsible for vision in dim or dark light. They are located on the outer edges of the retina and help with peripheral (side) vision. Rods don't provide color vision; night vision is only in black and white.
  - Rods take longer to adapt to darkness but once adapted it is estimated that they are 10,000 more sensitive to light.
- Visual Illusions
  - Autokinesis – caused by staring at a point of light with a dark background. Light appears to move. Avoid fixing on a spot for more than 10 seconds.
  - Fascination (Fixation) – when you ignore orientation cues and focus on a goal or object.
  - Reversible Perspective Illusion – inability to determine if an object is moving toward or away from you. Use the intensity of light to determine movement. Bright: closer, dimmer: away.
  - Size-Distance Illusion – Bright objects appear closer and dimmer further away.
  - Flicker Vertigo – flickering light at 4 and 20 cycles per second can produce nausea and vertigo. Proper scanning techniques can help eliminate this.