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# Federal Aviation Agency



AC NO: AC 60-4
AIRMEN
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**SUBJECT : PILOT'S SPATIAL DISORIENTATION**

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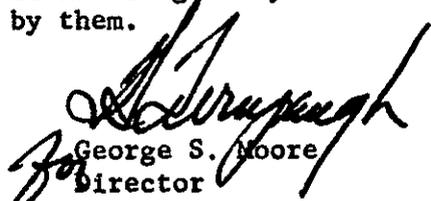
1. **PURPOSE.** To acquaint pilots with the hazards of disorientation caused by loss of horizon or surface reference when attempting flight under visual flight rules during marginal visibility or similar conditions.
  2. **DISCUSSION.**
    - a. The attitude of an aircraft is generally determined by reference to the natural horizon. When the natural horizon is obscured, attitude can be maintained by surface reference if visible. If neither horizon nor surface references exist, the attitude of the aircraft must be determined by artificial means from an attitude indicator or other flight instruments. Sight, supported by other senses, maintains orientation. However, during periods of low visibility, the supporting senses sometimes conflict with what is seen. When this happens, a pilot is particularly vulnerable to disorientation. The degree of disorientation may vary considerably with individual pilots, as do the conditions which induce the problem. Spatial disorientation to a pilot means simply the inability to tell which way is "up."
    - b. Recent tests conducted by the U.S. Air Force with qualified instrument pilots indicate it can take as much as 35 seconds to establish full control by instrument reference if orientation is lost.
    - c. Surface references or the natural horizon may at times become obscured by smoke, fog, smog, haze, dust, ice particles, or other phenomena, although visibility may be above Visual Flight Rule minimums. This is especially true at airports located adjacent to large bodies of water or sparsely populated areas, where few, if any, surface references are available. Lack of horizon or surface reference is common on over-water flights, at night, or in low visibility conditions. Other contributors to disorientation are reflections from outside lights, sunlight shining through clouds, and beams from the anti-collision rotating beacon.
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- d. Another condition creating restrictions to both horizontal and vertical visibility is commonly called "white-out." "White-out" is generally caused by fog, haze, or falling snow blending with the snow-covered earth surface which may obscure all outside references. Therefore, the use of flight instruments is essential to maintain proper attitude when encountering any of the elements which may result in spatial disorientation.

3. RECOMMENDED ACTION.

- a. It is important that YOU as a pilot understand the elements contributing to spatial disorientation. You should also know the corrective steps necessary to prevent loss of control of your aircraft if you encounter these conditions.
- b. The following are certain basic steps which should assist materially in preventing spatial disorientation:
- (1) Before you fly with less than three-miles visibility, obtain training and maintain proficiency in aircraft control by reference to instruments.
  - (2) When flying at night or in reduced visibility, use your flight instruments.
  - (3) Maintain night currency if you intend to fly at night. Include cross-country and local operations at different airports.
  - (4) Study and become familiar with unique geographical conditions in areas in which you intend to operate.
  - (5) Check weather forecasts before departure, enroute, and at destination. Be alert for weather deterioration.
  - (6) Do not attempt VFR flight when there is a possibility of getting trapped in deteriorating weather.
  - (7) Rely on instrument indications unless the natural horizon or surface reference is clearly visible.

4. CONCLUSION. You and only you have full knowledge of your limitations. Know these limitations and be guided by them.

  
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