



NTSB ***SAFETY ALERT***

National Transportation Safety Board

★ **Reduced Visual References Require Vigilance** ★

Preparation and proficiency may help prevent accidents

The problem

- Historically, about two-thirds of all general aviation (GA) accidents that occur in reduced-visibility weather conditions are fatal.¹ These accidents typically involve pilot spatial disorientation or controlled flight into terrain.
- Even in visual weather conditions, flights at night over areas with limited ground lighting (which provides few visual ground references) can be challenging.

Related accidents

Sadly, the circumstances of each new accident are often remarkably similar to those of previous accidents. This suggests that some pilots are not taking advantage of the lessons learned from such tragedies that could help them avoid making the same mistakes. The following accident summaries² provide examples of some common—and preventable—accident scenarios related to flight in conditions with reduced visual ground references:

- A pilot with an airline transport certificate was killed when his Aero Commander 680FL airplane collided with mountainous terrain during a personal flight to return his airplane to its home base. No flight plan had been filed, and there was no record of an official weather briefing. During the flight, the pilot flew the airplane under a cloud layer and about 1,000 feet above ground level (agl) through a mountain pass. About 1 minute before the crash, the pilot reported that he was having difficulty maintaining flight under visual flight rules (VFR) and requested an instrument flight rules (IFR) clearance. His request came too late to prevent the collision.

¹ Each year, the NTSB investigates about 1,500 GA accidents in which about 475 people are killed. See the NTSB data for [GA accidents and fatalities for calendar years 2007 – 2011](http://www.ntsb.gov/data/aviation_stats_2012.html), which is available from the NTSB's [Aviation Statistics](http://www.ntsb.gov/data/aviation_stats_2012.html) web page at www.ntsb.gov/data/aviation_stats_2012.html. Also, the NTSB safety study, [Risk Factors Associated with Weather-Related General Aviation Accidents](http://www.ntsb.gov/safety/safety_studies.html), can be accessed from the NTSB's Safety Studies and Special Reports web page at www.ntsb.gov/safety/safety_studies.html.

² The accident reports for each accident referenced in this safety alert are accessible by NTSB accident number from the NTSB's [Accident Database & Synopses](http://www.ntsb.gov/aviationquery/index.aspx) web page at www.ntsb.gov/aviationquery/index.aspx. (The NTSB accident numbers are [WPR11FA078](http://www.ntsb.gov/aviationquery/index.aspx), [NYC08FA157](http://www.ntsb.gov/aviationquery/index.aspx), and [ERA11FA412](http://www.ntsb.gov/aviationquery/index.aspx), respectively.) Each accident's public docket is accessible from the NTSB's [Docket Management System](http://www.ntsb.gov/investigations/dms.html) web page at www.ntsb.gov/investigations/dms.html.

- An instrument-rated private pilot and his passenger (the airplane's builder, who did not hold an instrument rating) were killed on their way to a popular fly-in when the pilot lost control of the experimental RV-10 airplane due to spatial disorientation in instrument meteorological conditions (IMC). During the last 14 minutes of the flight, the pilot repeatedly deviated from his assigned altitude and heading and failed to intercept an instrument approach course. While executing a missed approach, the pilot advised the air traffic controller that he was going to check the weather at another airport. Shortly thereafter, the airplane crashed. The pilot was highly experienced in airplanes equipped with conventional instruments; however, the accident airplane had a glass cockpit configuration.
- A private pilot and his passenger were killed when the pilot lost control of his Cessna 182S airplane while flying under VFR near the destination airport in dark night conditions. The pilot experienced spatial disorientation while maneuvering the airplane in an area described as a "black hole." The airplane made two 180° turns near the approach end of the runway before it descended in a steep turn. The investigation found that the airplane's radio was not configured to transmit. The circumstances suggest that the pilot may have maneuvered near the runway while attempting (unsuccessfully) to activate the airport's pilot-controlled lighting.

What can pilots do?

- Obtain an official preflight weather briefing, and use all appropriate sources of weather information to make timely in-flight decisions. Other weather sources and in-cockpit weather equipment can supplement official information.
- Refuse to allow external pressures, such as the desire to save time or money or the fear of disappointing passengers, to influence you to attempt or continue a flight in conditions in which you are not comfortable.
- Be honest with yourself about your skill limitations. Plan ahead with cancellation or diversion alternatives. Brief passengers about the alternatives before the flight.
- Seek training to ensure that you are proficient and fully understand the features and limitations of the equipment in your aircraft, particularly how to use all features of the avionics, autopilot systems, and weather information resources.
- Don't allow a situation to become dangerous before deciding to act. Be honest with air traffic controllers about your situation, and explain it to them if you need help.
- Remember that, when flying at night, even visual weather conditions can be challenging. Remote areas with limited ground lighting provide limited visual references cues for pilots, which can be disorienting or render rising terrain visually imperceptible. When planning a night VFR flight, use topographic references to familiarize yourself with surrounding terrain. Consider following instrument procedures if you are instrument rated or avoiding areas with limited ground lighting (such as remote or mountainous areas) if you are not.

- Manage distractions: Many accidents result when a pilot is distracted momentarily from the primary task of flying.

Interested in more information?

Education and training are essential to improving GA safety. The Federal Aviation Administration (FAA) Safety Team (FAASTeam) provides access to online training courses (many of which were developed by the Aircraft Owners and Pilots Association [AOPA] Air Safety Institute), seminars, and webinars as part of the “WINGS—Pilot Proficiency Program,” which includes targeted flight training designed to help pilots achieve flight proficiency and develop skills to assess and mitigate the risks associated with the most common causes of accidents. The courses listed below and others (many of which were developed by the AOPA Air Safety Institute, a division of AOPA Foundation), as well as seminar and webinar information, can be accessed from the [FAASTeam](#) website at www.faasafety.gov. (Course access requires login through an existing or creation of a free FAASTeam account.)

- Weather Wise Courses: [Ceiling and Visibility](#) and [Air Masses and Fronts](#)
- [IFR Insights: Cockpit Weather](#)
- Accident Case Studies: [VFR into IMC](#), [Cross-Country Crisis](#), and [Time Lapse](#)
- [A Direct Approach to Private Pilot Preflight Briefings](#)
- [Aeronautical Decision Making for VFR Pilots](#)
- [NTSB – Weatherwise](#)

Other resources:

- The AOPA [Air Safety Institute](#) offers several interactive courses, presentations, publications, and other safety resources that can be accessed from its website at www.aopa.org/asf/. (Course access requires creation of a free account.)
- “[Pilot's Handbook of Aeronautical Knowledge](#)” (FAA-H-8083-25A) discusses aeronautical decision making and risk management in [chapter 17](#). It provides basic tools (including the “IMSAFE” health evaluation, the “DECIDE” process for aeronautical decision making, and other tools) to help pilots assess and manage risk. The “[Risk Management Handbook](#)” (FAA-H-8083-2) provides a more in-depth discussion of risk management principles. Both handbooks can be accessed from the FAA's website at www.faa.gov.
- A [Personal Minimums Checklist](#) (based on the “PAVE” model) that you can print and tailor to your skill level can be accessed from the FAA's Guidance and Documents website at www.faa.gov/training_testing/training/fits/guidance/.

This NTSB safety alert and others, including “[In-Cockpit NEXRAD Mosaic Imagery](#),” “[Controlled Flight Into Terrain in Visual Conditions](#),” and “[Thunderstorm Encounters](#),” can be accessed from the NTSB's [Safety Alerts](#) web page at www.nts.gov/safety/safety_alerts.html.