



# HEAD IN THE CLOUDS

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**C**louds come with a lot of questions for public safety pilots planning a flight: How far away are the clouds?

Can I maintain minimums? Is the underlying weather a factor? And the answers to the questions only come from knowledge based on practical experience and training.

When operating a helicopter or light aircraft, it is one thing to have a rigid, regulatory agency-mandated limitation on minimum distances from clouds and visibility. It is another thing to have pilots make a personal judgment decision based on what they see and apply their existing knowledge to the current situation and flight environment.

## Experience: A Catch 22

It takes time to gain the necessary experience to judge distance from clouds. So, how do you gain the experience necessary to be able to look outside and quickly decide if you can avoid potentially unsafe situations or break minimums? Building experience relies on firsthand knowledge and learning from mistakes. Experience improves with practice, and learning what has worked and not worked for others is critical. We can all learn through shared lessons and experiences.

As with so many things in aviation, it is best to start with the basics. The basic VFR standard is based on being able to "see and avoid," and regulatory agency minimums are a guide to achieving the condition. The purpose of the minimums is

to give pilots time to see an obstacle and then fly around it.

The minimum limitations prescribed by regulators are in place because the administrators have done the math and determined that, on average, an aircraft travelling at a particular speed needs that distance and time for the pilot to see and avoid the obstacle, including clouds. The less maneuverable the aircraft, the greater the minimums for visibility and distance.

However, it is always up to the pilot to make a judgment based on prevailing conditions to stay within the prescribed minimums.

## The Five Factors

Experienced pilots must have a working knowledge of ground speed, distance to an

object, height above ground level, visibility and cloud base. Knowing these five topic areas will lead to better decision making in marginal weather. So how do we verify our relationship with each of these metrics?

Ground speed is simple. It can be determined using a flight computer or by consulting a GPS; most pilots have either option available. Determining distance to an object is more intuitive and a practiced skill. Consider that the length of an average runway at a small airport is 5,000 feet. If you visualize the length of a runway when looking at an obstacle, you can estimate its distance from your aircraft. If it is about one runway away, that is 1 mile (about 5,000 feet). If it is half a runway, it is 0.5 miles away. Using the measuring stick, you project the number of runway lengths to any obstacle and estimate its distance.

Height AGL is based on the terrain over which you are flying and can change rapidly with a specific altimeter altitude. Knowing height AGL requires a working knowledge of local obstacle elevations and applying it against the number displayed on the altimeter. The difference between the two is your height AGL.

Flight visibility is defined as the average forward horizontal distance at which an object can be seen and identified from the cockpit. By day, visibility is in reference to unlit objects; at night, the object may be illuminated. Visibility is affected by the presence of fog, clouds, haze, dust, smoke, precipitation, light and darkness and may vary due to viewing direction and angle.

Pilots must know the current cloud base to avoid it and maintain personal limits on when they should turn around or land. The problem with clouds is that they are constantly changing—base level, type, thickness, shape and coverage. Weather fore-

casts will always provide some cloud information, including the base and top, and aviators must pay attention to the provided information whenever they are planning a flight. Smart phones or tablets can give you updated information even during a flight, and some programs are available to help determine the weather on a specific route. However, interpreting the weather and making decisions based on the available information are still the pilot's responsibility.

### Beyond the Basics

Determining the right course of action is far easier for pilots who know the basics than for those who do not. For example, when flying at low levels in bad weather, most pilots know to slow down. However, if the pilot feels the need to reduce speed below another set minimum because of reduced visibility, then he or she should recognize that turning, descending or landing might be preferable to pushing on. At 60 knots with 0.5 miles of visibility, the pilot has 30 seconds to see and avoid inclement weather or an obstacle.

While we can rely on technology to inform us of weather conditions and cloud clearance capabilities, we must not become complacent and forget to look outside to determine actual conditions. At night, clouds labeled in weather reports as scattered may not be visible under night vision imaging systems. During flight planning, the clouds should, therefore, be considered a full layer and not dismissed.

Reviewing accident reports and doing scenario-based training in simulators or aircraft build the experience necessary to make informed weather decisions. Estimating cloud and obstacle distance is a learned skill and should be practiced in each training event. ➤



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