



SAFETYGRAM

April 2015

April showers bring May flowers, so what do May flowers bring? Pilgrims...seriously? For aviators, it really means good flying times again; our flying opportunities will increase as the days grow longer and warmer. There are however, some weather issues that are best to watch from the ground, and others that curtail our aircraft's performance. In all reality, this is usually the start of summer weather patterns – with higher temperatures and convective activity. Here's a quick review of thunderstorms and density altitude.

THUNDERSTORMS—Some of the most severe weather we can encounter in aviation is a direct result of thunderstorms. AC 00-6A, Aviation Weather has this to say about thunderstorms. “A thunderstorm packs just about every weather hazard known to aviation into one vicious bundle.” These hazards include tornadoes, turbulence, hail, icing, low ceilings, poor visibility, and lightning. Any one of these can be cause for concern while you are flying. If you get into a thunderstorm, you may get to experience many or all of them...at the same time. With that said, what is the best course of action to take when thunderstorms are in the area? **AVOID THEM!** AC00-6A gives some dos and don'ts for thunderstorm avoidance. They are as follows:

1. Don't land or takeoff into the face of an approaching thunderstorm.
2. Don't attempt to fly under a thunderstorm even if you can see through to the other side.
3. Don't try to circumnavigate thunderstorms covering 6/10 of any area of more either visually or by airborne radar.
4. Don't penetrate a cloud mass containing scattered embedded thunderstorms without airborne radar.
5. DO avoid by at least 20 miles any thunderstorm identified as severe or giving an intense radar echo.
6. Do not attempt to over fly a severe thunderstorm unless you can clear the tops by at least 1000 feet for every 10 knots of wind speed at the cloud top---in my words, **“Don't EVER attempt to over fly a thunderstorm, period.”**
7. Do remember that vivid and frequent lightning indicates a severe thunderstorm.
8. Do regard any thunderstorm with tops 35,000 feet or higher as a severe thunderstorm.

The Air Force has no peacetime mission that requires flying close to thunderstorms – in the Aero Club we fly for pleasure and training – just stay away! There is no good reason to penetrate a thunderstorm and there are many reasons to avoid them. Let us all keep thunderstorms far away from our flight paths – the hangar is the best place for our aircraft when thunderstorms are near!

DENSITY ALTITUDE—Density altitude is defined in the Pilots Handbook of Aeronautical Knowledge as “pressure altitude corrected for variations in temperature.” At standard temperature, pressure altitude and density altitude are the same. As temperature changes, density altitude changes as well. Summer temperatures will usually be above standard therefore density altitude will also be higher than during the cooler months. Why is this important? Remember, density altitude is directly related to aircraft performance. The higher the density altitude, the more critical aircraft performance becomes. Let’s look at some of the effects that relatively higher density altitude causes on airplane performance.

1. Higher density altitude increases the true airspeed for a given indicated airspeed; in addition, engine thrust decreases and acceleration slows. The combination of these factors increases takeoff distance. This could be critical on a relatively short runway.
2. Higher density altitude decreases climb performance. Reduced thrust available, and increased TAS, lengthens the distance/time required to reach a given altitude. This could be critical when trying to climb over an obstacle.
3. Higher density altitude increases landing distance due to the higher true airspeed associated with the indicated airspeed flown for the approach. This could be critical during landing on relatively short runways.

Remember, the density altitude is the effective altitude you are operating from. For example, if pressure is standard, field elevation is 2,000 feet, and temperature is 90° F, the airplane performs as if it is operating at 4,400 feet. The time to figure out you are exceeding the aircraft performance capabilities is on the ground during flight planning, not when you are running out of runway before you have accelerated to flying airspeed. If we all keep in mind the significant degradation that high density altitudes can cause on aircraft performance and adjust to the conditions, we can have a fun, safe summer of flying.

AOPA Thunderstorm Hazard Quiz

<http://www.aopa.org/asf/asfquiz/2014/140612thunderstorm/index.html>

AOPA Density Altitude Quiz

<http://www.aopa.org/asf/asfquiz/2011/110527densityaltitude/>

AC 00-6A Aviation Weather For Pilots

http://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentID/22268

Pilot's Handbook of Aeronautical Knowledge

http://www.faa.gov/regulations_policies/handbooks_manuals/aviation/pilot_handbook/media/FAA-H-8083-25A.pdf

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