



# WEATHER TO FLY

BY DAN GUDGEL

Within the pilot certification process and the learning that occurs in preparation for that certification, the rote memorization of Federal Aviation Regulations (FAR) and meteorologically related issues often cause the greatest angst among pilot applicants.

Regarding the FARs, it is simply necessary to know the FARs for operational mandates in the National Airspace System as well as contributing to safety-of-flight. However, learning the FARs is rather unexciting by nature as it is simply a rote learning task to endure. However, unlike the task to learn the FARs, meteorological knowledge has an obvious application to flight and therefore is very much of interest for aviators of all categories of aircraft. However, meteorology is a broad subject area that requires diligent study by the students in the training process and can be an intimidating learning challenge, especially for those students (and pilots) who do not have a technical background. The Federal Aviation Administration (FAA) requires in the Practical Test Standards (PTS) an understanding of meteorology, familiarity with the various text and graphic observation and forecast weather products, and the ability to apply and correlate the information for aeronautical decision-making for safe flight.

Unlike the Airplane, Rotorcraft, and Powered-Lift Aircraft Categories, and some aspects of Sport Pilot Classes that simply consider meteorology for its affect on their flight, Glider Category pilots additionally consider meteorology as the aircraft "power" source to fly cross-country. As noted through the years and to their credit, experienced glider pilots are especially cognizant and knowledgeable of the weather in comparison to their comparably experienced powered-flight counterparts.

Pardon the pun but there is nothing new under the sun that I propose to discuss regarding the weather. But over an ongoing series of meteorology articles, I would like to review those items that would help any prospective aviator work-

ing toward obtaining a pilot certificate meet not only the FAA's test standards regarding weather knowledge, but also to talk about the practical application of that knowledge providing for and/or affecting soaring flight.

Within the test standards, the "Weather Information" task lists "*thermal index and thermal production*" and "*other lift sources*" as mandatory knowledge. Aforementioned, glider pilots use the atmosphere's upward vertical motions to accomplish cross-country flight. While underscoring that *thermal* lift is the more widespread lift generator used by pilots and specifically listed in the FAA PTS, other forms of atmospheric vertical motion frequently occur for glider pilots under the proper meteorological and terrain conditions. The other lift types providing upward vertical motion for gliders are *ridge, mountain wave*, and types of *shear or convergence lines*. A rudimentary understanding of the lifting processes in the atmosphere, including those just listed as well as frontal boundary discontinuities, certainly benefits a pilot in pursuit of flying cross-country.

Besides discussions on the atmospheric lifting processes for soaring flight, it is important to also understand other weather phenomena that results in hazardous flight conditions. It behooves the soaring pilot to not only observe but also be short-term forecasters as they fly. A good pilot is one who not only understands the atmospheric lifting processes but also is observant for severe weather or those conditions that lead to severe weather. Pilots are quite aware that a thunderstorm is "Mother Nature's Severe Weather Generator" with its accompanying icing, turbulence, lowered visibilities in heavy rain, lowered cloud bases, lightning, and other severe weather such as hail or even tornadoes. High, gusty, and shifting winds are also present around any cell or thunderstorm complex. However, strong and gusty synoptic-scale winds (affecting hundreds of miles) result in moderate to severe mechanical turbulence and severe wind gradient issues

in the landing phase. Flight visibilities can be locally reduced to instrument meteorological conditions due to blowing dust. Increasing atmospheric layer moisture can rapidly change cloud coverage for overcast and/or undercast conditions. However, even apparently benign weather can produce insidious dangers to thermal soaring flight in the form of high density altitudes from high temperatures in strong heating conditions, or the detrimental effect of frost on the wings from a clear, cold night before a wave flight is attempted.

Whether the weather forecaster is accurate or not, the provided forecast and confidence factor of that forecaster is for a pilot's initial preflight planning purposes. However, lift is where you find it! As indicated in a fine series of annual cross-country seminars from the Pacific Soaring Council (PASCO) in the 1999-2003 time period, a good soaring pilot is one who learns about the atmosphere's forms of vertical lift (and weather threats), remains alert and aware of what is occurring weather-wise over the time period of a flight, and keeps an open mind to change flight tactics to accommodate any changes in the course of that flight.

Besides discussing weather phenomena in upcoming articles, I will also try to provide reference sources that provide information more effectively than I can, and provide for "library-building." Furthermore, with assistance from my meteorologist compatriots and peers, I will try to provide suggested "road maps" and advice on how and where a pilot might find and apply information toward a safe flight. We begin our series that leads us to the point that we find whether you have "Weather to Fly."

#### Library Build:

1) "*Extended Cross Country Soaring Seminar*," Pacific Soaring Council, copyrighted, published, and distributed by CH Engineering; Reno, NV.

2) *Soaring Society of America Website*; [www.ssa.org](http://www.ssa.org)

– On the Left Side Menu: Click "*News and Info*"

– On the Drop Down Menu: Click "*Weather*"

– Peruse the various tutorials on weather and weather-related info.

3) "*AC 00-6A Aviation Weather*"; FAA/ Gov't Printing Office, 1975



(Also available on-line at <http://www.srh.noaa.gov/faa/pubs.html>)

**About the author:** Dan Gudgel was raised in a flying and farming family in rural Central California that led to studies in meteorology. After graduation from San Jose State University he worked as a professional agricultural and charter pilot in the family business. He eventually was employed and concurrently worked for the U.S. National Weather Service (NWS) for 36 years in roles varying from an aviation meteorologist to station and program manager. Although a professional meteorologist, he managed to continue and expand his aviation interests over the years. While assisting soaring with meteorological forecasts from the Reno Office of the NWS in Western Nevada in 1975, he took his first soaring flight at Minden. Dan began routinely providing onsite weather support for local and regional contests in California and Nevada in 1979, and shortly thereafter became active as a tow pilot and gliding instructor. He has flown over 1500 hours in gliders and 4500 hours in powered aircraft; and holds flight instructor certificates in gliders, single and multiengine airplanes, instrument airplane, and rotor-

craft-helicopters. He is an FAA Designated Examiner for the glider category and continues holding a current journeyman agricultural pilot certificate for the state of California. Dan serves on the Board of Directors of the Central California Soaring Club, and splits his service time between the club and Skylark North Flight School in Tehachapi, CA, as instructor and tow pilot. His service as a soaring meteorologist and, in many cases, a concurrent chief tow pilot includes over 60 local, regional, national, and international soaring events. He has been honored to serve as a support meteorologist at the International Masters of Soaring in 1986 and 1987, Chief Tow pilot and meteorologist for the cross-country 'Return to Kitty Hawk' in 2003, Lead Meteorologist in the pre-WGC Ameriglide in Minden in 1990 and subsequently served as



the lead meteorologist in the WGC in Uvalde in 1991. Dan has also been privileged to serve Barron Hilton at the Hilton Soaring Cup as meteorologist and tow pilot since 1986. He is currently heading up a team of meteorologists for the upcoming WGC at Uvalde in 2012. ✈

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