



AND NOW A WORD FROM OUR SPONSOR...

SUPERAWOS – WEATHER MATTERS

A 'BRIEF TREATISE' ON FLIGHT REQUIREMENTS

FAA FLIGHT REQUIREMENTS

Over the years I've come to realize that a lot of FAA policy is actually written using a board game which is the *opposite* of scrabble: The players start with coherent thoughts, words, and sentences that initially make sense, which then get sent through an "indecision" matrix, to give everyone a chance to confuse things as much as possible; then finally through legal, to produce the unreadable rules, and regulations you've all come to love.

To bring some Yin to the Yang, FAA has a great new website. If your life is particularly dull and you have nothing better to do, or you want to start winning the big money playing 'FAA Trivial Pursuit,' go check out

<http://FSIMS.FAA.GOV>

**WHAT INFORMATION IS
REALLY REQUIRED FOR IFR?**

ALTIMETER IS REQUIRED IFR

To keep from hitting things, aka 'obstruction clearance,' altimeter is required to 'shoot' an IFR approach (Kablaam??? Where'd the term 'shoot an approach come from?'). Pilots may also use a remote altimeter source within reason, but minimum descent altitudes get raised because the remote source is probably a wee bit different from the landing airport.

VISIBILITY IS REQUIRED IFR

Commercial pilots must also know they have the minimum published visibility *before* they can proceed past the final approach fix. If you stop to think about it, (which apparently I am doing), visibility minimums are designed to give a pilot landing in the schmoo enough time to visually acquire the runway to avoid an insurance claim: An aircraft landing at 150 knots needs roughly three times the visibility of an aircraft landing at

50 knots, to provide an equivalent amount of time to eyeball the runway, so faster needs more.

CONTROLLING MINIMUM CONCEPT (FSIMS 4-175)

"This concept prohibits a (commercial) pilot from continuing past the final approach fix (FAF), or beginning the final approach segment of an instrument approach procedure unless the reported visibility (RVV, or RVR, if applicable) is equal to or greater than the authorized visibility (RVV, or RVR) minimum for that instrument approach procedure. The basic objective of the controlling minimum concept is to provide reasonable assurance that once the aircraft begins the final approach segment, the pilot will be able to safely complete the landing."

WHAT ABOUT CEILING?

This will come as a shock to a lot of folks, but FAA stopped requiring ceiling *circa 1966*. FSIMS offers a great discussion titled “*The Evolution of All Weather Terminal Operations.*” See volume 4, chapter 2, Section 1, paragraph 4-147, to be specific.

In the early era of ‘turbojet airliners’ large commercial airports still had human weather observers using their eyeballs looking up the approach path, and instrumentation, to make the official ceiling call. Even today, many large air carrier airports still rely on human observers as backup in case the AWOS/ASOS says something silly; otherwise, commercial airliners would have to divert over automated nonsense. Humans are backing up robots! *Pretty funny, eh?*

WHAT REPLACED CEILING?

Laser ceilingometers only measure one tiny spot overhead; a path through which no aircraft arrives, *at least not intact*. Furthermore, attempting to measure the ‘edge’ of a cloud remains a fundamentally dubious endeavor. While lasers are pretty good, they have some serious limitations.

Back in 1966, no longer able to feed armies of human weather observers (who eat a lot), recognizing the limitations of laser ceiling sensors, tired of bell-bottom pants, funny hairdos on men, and sideburns, FAA replaced ceiling requirements with critical altitudes: ‘Decision Height’ (DH) on precision approaches, (IILS), and ‘Minimum Descent Altitude’ (MDA) on non-precision (like VOR).

FAA FSIMS 4-283(a) “*Operating minima establish minimum safe heights for instrument flight and the minimum visibility, RVV, or RVR necessary for the safe completion of the approach and landing operation using external visual references.*”

Once a commercial pilot has the required minimum visibility they are authorized to proceed past the Final Approach Fix (FAF), down the approach path to see if they can find the runway. If at or before DH or MDA they see the ‘runway environment,’ *from a position not requiring aerobatics*, they can land. If on the other hand, at DH or MDA the pilot still cannot see the runway, they either go ‘missed approach’ for another try, or off to their alternate (backup) airport.

In sum, although ‘ceiling,’ like ‘present weather’ and ‘thunderstorm detection’ may be interesting, these parameters are not required nor are they controlling to flight, and therefore do not enable or impede flight operations.

IFR TAKEOFF MINIMUMS?

In the rare case of emergency immediately after an IFR takeoff, (most thrilling!), pilots must either be able to land back at their takeoff airport (subject to landing minimums, requiring altimeter and visibility); or fly to a alternate airport within a reasonably short time, subject to the alternate airport’s landing minimums, again the same two parameters.

IFR ALTERNATE (TAKEOFF)

MINIMUMS When published for a given airport these are to address obstructions penetrating the departure route, and *always* read ‘standard,’ or ‘alternate,’ with minimums of visibility and ceiling. There’s ceiling again, *huh, what ???*

‘Standard’ refers to standard climb rates as published, i.e. feet climbed per mile traversed, necessary to clear unseen obstructions along the takeoff and/or departure path. If an aircraft cannot maintain the ‘standard’ climb rates THEN (they probably shouldn’t takeoff at all...), they have to maintain visual separation from

obstructions; i.e. the cloud deck must be above the mountains.

IFR ALTERNATE AIRPORT

Area forecasts and IFR SIGMETs are enough to determine the need for an alternate; pilots do not need a ‘Terminal Area Forecast’ (TAF); nor does the alternate need to have a TAF, either. When area forecasts or SIGMETs call for IFR conditions, pilots are required to *have* an alternate, *there is no extra charge*.

On those rare occasions a pilot goes missed approach and really needs their alternate (backup) airport, by the time they get to the alternate they may also be low on fuel, so they **MUST** know *unequivocally* they can land at their alternate. Therefore, the alternate needs full-up reporting; and should be selected using the most current information available; such as just before shooting the initial approach to the initial airport.

FORECASTS OR REPORTS

There is no requirement to have a terminal Area Forecast (TAF), *otherwise, most of the airports in the USA would be totally useless!*

If NWS is inclined to fund and staff a TAF for a given airport, great; but neither NWS nor TAFs can open or close airports to commercial operations.

Pilots are required to review all available observations or forecasts. The purpose is pilots should use all available resources to determine whether they can safely complete their flight; including being prepared with an alternate, should the need arise.

AWOS SYSTEMS DO NOT MAKE ANY FORECASTS!

Only NWS makes forecasts, which are predictions of *future* conditions, using 30,000+ weather feeds from NOAA, satellites, radiosondes, and more. Pilots must review NWS (or other approved) forecasts, and use whatever reports or forecasts; are available to flight plan intelligently.

WHY SUPERAWOS HAS BOTH CERTIFIED AND NON-CERTIFIED WX PARAMETERS

A lot of people don't realize that certification of each additional sensor *imposes significant additional ongoing costs on the airports*, for the ongoing maintenance and inspection of each.

Because we are airport owners we took the real world approach of looking at COST vs benefit, and therefore only sought certification for weather parameters where certification provides benefits to flight operations.

EXAMPLE: DEWPOINT

Why should any airport incur significant ongoing expenses to periodically hire a 'technician' with a sling psychrometer *to keep calibrating their dewpoint sensor?* Certified dewpoint isn't required *for anything*.

EXAMPLE: TEMPERATURE

Although Pilots *do* need temperature for density altitude and aircraft performance; *every aircraft already has an "Outside Air Temperature" (OAT) indicator*. There is no need for *another* approved source!

Reality check: Imagine for Xmas FAA gave you a \$700,000 'AWSS' (That's FAA's 'no price is too high' version of an AWOS). Now imagine its temperature and dew point sensors were 'missing.' (Of course Federal systems never fail, but let's just pretend, just for fun). Under these inconceivable circumstances the only temperature available to pilots would be their aircraft's (OAT); and oh my gosh, *dewpoint would be 'missing.'*

Would commercial pilots have to disembark their passengers and cancel their flights? Would medivac operators have to kick out their patients and tell them to find another way to the hospital? *Of course not; that would be silly.*

In sum, *advisory* information imposes no ongoing costs onto airports; and is totally defensible in court, while certification of information already provided by other means, or not required to meet flight requirements, only imposes cost without any benefit.

WIND SENSOR 'STANDARDS'

So far I've found multiple accepted 'standards' for wind:

'TECHNICAL 'STANDARD' #1

The Official World Meteorological Organization (WMO) / ICAO 'standard,' developed for meteorological models and TREND analysis, requires the wind sensor be atop a 30 ft mast; creating an airspace obstruction hazard so tall the sensor must be moved 500 feet away from the runway. Hey, *no one lands 30 feet in the air or 500 feet from the runway!*

This standard wind algorithm also requires a two-minute average of wind data, *comparable to the response time of a boat at anchor*.

While this standard makes sense for large, high-inertia, high landing speed jetliners operating at big airports, who only use AWOS to get general trends anyways, miles out: *They rely on the Tower for runway selection and the most current conditions anyways*.

For smaller non-towered, airports without, a one size fits all wind standard quickly becomes illogical: Applied thoughtlessly it would deny many smaller airports from proving *any* wind information to pilots, while also condemning 18 acres of otherwise valuable income producing

airport real-estate, *making for a very costly standard indeed*.

'TECHNICAL STANDARD' #2

If an airport has an ILS, the sacred 30 foot 'sensor height requirement' automatically drops to 20 feet. *Maybe the 30 foot requirement isn't so sacred?*

'TECHNICAL STANDARD' #3

The Federal Meteorological Handbook (FMH-1) specifically accepts the following methods for measuring wind, usually when wind sensors are missing; but acceptable is acceptable:

TABLE 5.4.1- "*Direction may be estimated by observing the wind cone or tee, (where SuperAWOS get installed) movement of twigs, leaves, smoke, etc., or by facing into the wind in an unsheltered area*"

Table 5-1. "*Wind speed may be estimated by smoke, wind on the face, rustling of leaves, loose paper and small branches move..*"

...And my personal favorite for measuring windspeed, "*...crested wavelets form on inland waters.*"

That's really quite poetic. I'm feeling quite calmed, *and even romantic* just quoting it.

'TECHNICAL STANDARD' #4

Any private, commercial, or space shuttle pilot may use any windsock as an totally acceptable source of wind information.

The reality is that there are many 'acceptable' standards for various types of wind; from *official* to *estimated*, to *advisory*, to just plain old *wind*; it just takes some imagination to realize many 'standards' already exist.

SUPERAWOS GIVES PILOTS REAL-TIME ADVISORY WIND

Years ago, then head of FAA's AWOS program explained to me that the slow-moving wind algorithms for AWOS were intended to provide general trend analysis to the pilot some 7-10 minutes before arriving in the terminal area, *with the expectation the pilot would go to tower, or unicom for the most current wind information.*

SuperAWOS advisory wind are more like an intelligent talking windsock, giving pilots real-time wind right from "the runway environment," as close to the runway as possible, *where pilots actually land and takeoff.*

SuperAWOS also calls crosswinds and wind shear, based on runway configuration, trends, and stability.

Does FAA have technical standards for any of this? Not yet. Does FAA have technical standards for automated radio check? Not yet. For these reasons SuperAWOS unique and innovative features remain advisory.

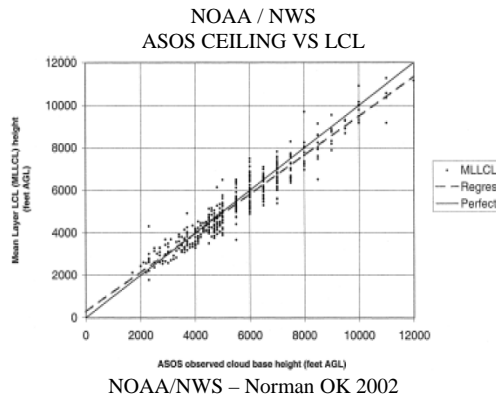
Standards never exist for anything truly unique or innovative, because they are new and innovative. SuperAWOS provides real-world operational information, just years ahead of pre-existing legacy standards.

WHAT IS SUPERAWOS 'ESTIMATED CEILING'?

To provide pilots a better indicator of area conditions along the actual approach path, and to be more affordable (to maintain) for airports, SuperAWOS provides pilots an advisory we call 'estimated ceiling.'

'Estimated Ceiling' starts with calculating 'Lifting Condensation Level' (LCL), using surface measurements, adiabatic lifting rates, and gas pressure laws, to calculate the altitude at which the laws of physics and chemistry predict clouds bases.

Basic LCL is well known and recognized as a good indicator of area conditions. The NOAA/NWS study below shows the very high correlation between calculated LCL and measured ASOS laser ceiling sensors.



LCL is most accurate when 'lifting' is present. To further extrapolate 'Estimated Ceiling' then requires further analysis of other information. The net result gives pilots a better indication of area conditions along the flight path, saves airports thousands \$\$\$ in up-front equipment cost, and thousands \$\$\$ per year, otherwise required for the ongoing maintenance of somewhat dubious laser ceilingometers. *More for less.*

MODERN QUALITY CONTROL

The most basic weather sensors made today are very accurate, reliable, and stable, well beyond what FAA ever imagined possible back in the 1970s.

Each SuperAWOS sensor starts individually NIST certified, which is the basis for *all* certification; *and already more than really necessary.*

Then, to assure ongoing accuracy, each SuperAWOS in the field uses its built-in, extremely low-cost remote data communications to send all of its hourly weather data to us. We then cobble it all together and re-format and re-pass it to NOAA; who continuously and statistically verifies each and every SuperAWOS sensor against all of NOAA's more than 30,000 sensors, *every hour, every day.*

By integrating all of our systems' data with one of NOAA's most advanced meteorological and analytical networks, SuperAWOS provides pilots and airports a more reliable, higher quality solution, performed by the government agency actually in charge of weather and its quality control, as matter of national policy. Even better, *it's free.*

ELIGIBLE AIRPORTS CAN EARN YOUR 5% MATCH TOWARD A 95% FAA AIP GRANT
FAA's Airport Improvement Handbook: Ch 3, pg 37, Section 350 says:

"The value of land, labor, materials, and equipment donated or loaned to a sponsor may be credited toward the sponsor's share"

Your airport can now *EARN* its 5% match *by doing some things we've made really simple!*

NEW! SIMPLIFIED SMALL PURCHASE PROCEDURES FOR AIP GRANTS <\$100,000

FAA's AIP grant program is now consistent with OMB Federal Procurement Policy; providing simplified "small purchase procedures" for safety and capital grants below \$100,000!!!

By the way, SuperAWOS (available on GSA schedule) costs a lot less than \$100,000 !!!

TO FIND OUT MORE PLEASE VISIT
www.SUPERAWOS.com
or call 800 207 8999

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